EMOTIONS PROFILE INDEX: STABILITY AND DIMENSIONALITY OF THE STRUCTURE

Valentin Bucik, Klas M. Brenk, Blaž Vodopivec

KEYWORDS: Emotions Profile Index, EPI, stability, dimensionality, self- and peer estimation, confirmatory factor analysis

POVZETEK

Profil Indeks Emocij (PIE) je vprašalnik, ki sloni na teoriji emocij, katere avtorja sta R. Plutchik in H. Kellerman. Zaradi enostavnosti uporabe in razvidnosti rezultatov služi kot učinkovit psihodiagnostični instrument, čeprav nekateri metodološki in teoretični pomisleki vzbujajo dvom o jasnosti strukture tega modela emocij. V študiji smo preverjali dva vidika strukture PIE - dimenzionalnost (predvsem hierarhijo odnosov med dimenzijami) in stabilnost (zanesljivost in veljavnost odnosov med atributi in dimenzijami ter jasnost teoretičnih opredelitev dimenzij). Uporabili smo eksploratorni in konfirmatorni pristop. Pokazalo se je, da osem dimenzij v svoji splošnosti ni enakovrednih, ampak je Agresivnost nadredna nekaterim drugim dimenzijam (Opozicionalnost, Nekontroliranost). Nekatere dimenzije emocij so premalo jasno opredeljene v teoriji. Njihov teoretično razložen pomen se ne sklada v celoti z odnosom med pridevniki in dimenzijami v PIE. Zdi se, da dimenzije, ki jih merimo s PIE, in vsebine, ki opredeljujejo profil emocij v Plutchikovi teoriji, pomensko niso popolnoma enake.

ABSTRACT

The Emotions Profile Index (EPI) questionnaire, based on the theory of emotions, proposed by R. Plutchik and H. Kellerman, is well known and widely used personality inventory. It is attractive because of an easy and fast data-collection procedure and a clear graphical representation of the emotions profile. But simultaneously with its diagnostical application some methodological and theoretical doubts about comprehensibility of the structure of EPI arose. In our study we tried to explore two features of the structure of EPI: dimensionality (the hierarchy and exclusiveness of dimensions) and stability (the appurtenance of adjectives to dimensions, comprehensiveness and theoretical denotation of dimensions). The exploratory as well as confirmatory approach was applied. It was shown that eight dimensions are not equivalent regarding generality. The dimension Destruction appeared to be superior to some other dimensions (Rejection, Orientation). Conceptually, some dimensions are not determined distinctly enough. The theoretical definitions of the constructs are not entirely similar to their meaning, which results from the relationship between adjectives and dimensions in EPI. It seems that dimensions assessed by EPI and contents, which are supposed to elucidate the profile index of emotions in Plutchik's theory do not bear completely equivalent information.

INTRODUCTION

The Emotions Profile Index (EPI) questionnaire is a well known and still widely used personality inventory. Its theoretical ground was elaborated in the theory of emotions, presented by R. Plutchik and H. Kellerman in the sixties (Kellerman & Plutchik, 1968; Plutchik, 1968, 1970) and complemented later on (Plutchik, 1980). The data collection procedure via two-alternative forced choice method with all possible combinations or pair-comparisons of twelve self-describing adjectives seems to give a fairly good eight-dimensional emotional profile of a respondent. The technique is easy and quick to administer and in some studies it was shown to have satisfactory sensitivity, objectivity, reliability and seemingly good construct and concurrent validity (Kellerman, 1977; Hruševar & Čop, 1980; Perini & Plutchik, 1981; Martau, Caine & Candland, 1985). The result of assessment with EPI, the graphical representation of the circular eight-dimensional emotional profile, is also very clear and evident, and therefore attractive.

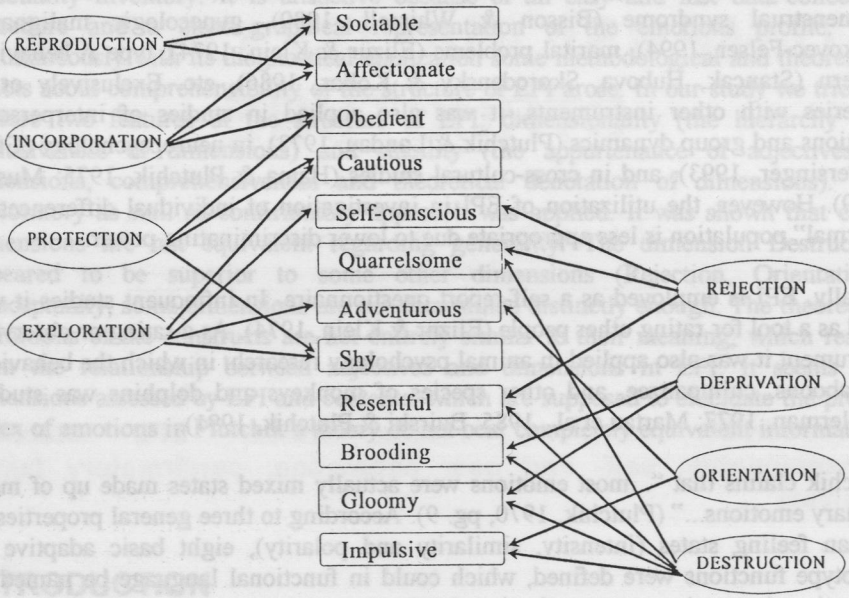
EPI was translated into and adapted to different languages (e.g. Hama, Matsuyama, Hashimoto & Plutchik, 1982; Perini & Plutchik, 1983), including Slovene (Baškovac-Milinković, Bele-Potočnik, Hruševar & Rojšek, 1979). Lacking exact and precise studies examining its psychometric properties it was used in the last two

decades in various fields of studying personality. Most often it was applied in clinical psychology for diagnostic purposes - alcoholism (Plutchik & DiScipio, 1974; Albrecht & Brabender, 1983), neuroses and psychoses (Koukola, 1977; Hama et al., 1982), drug abuse (Kellerman & Plutchik, 1978), epilepsy (Perini, 1986), suicide (Conte & Plutchik, 1974), perinatal and postnatal depression (Hama & Tokai, 1990), premenstrual syndrome (Bisson & Whissell, 1989), gynecologic malignancy (Rakovec-Felser, 1994), marital problems (Elizur & Klein, 1974), type A behaviour pattern (Stancak, Hubova, Skorodensky & Kollar, 1986), etc. Exclusively or in batteries with other instruments, it was also applied in studies of interpersonal relations and group dynamics (Plutchik & Landau, 1973), in neuropsychology (Gillis & Persinger, 1993), and in cross-cultural studies (Hama & Plutchik, 1975; Musek, 1989). However, the utilization of EPI in investigation of individual differences in "normal" population is less appropriate due to lower discriminating power.

Usually, EPI is employed as a self-report questionnaire. In infrequent studies it was used as a tool for rating other people (Elizur & Klein, 1974). As a rating or observing instrument it was also applied in animal psychology research, in which the behaviour of baboons, chimpanzee, and other species of monkeys and dolphins was studied (Kellerman, 1977; Martau et al., 1985; Buirski & Plutchik, 1991).

Plutchik claims that "...most emotions were actually mixed states made up of more primary emotions..." (Plutchik, 1970, pg. 9). According to three general properties of human feeling states (intensity, similarity and polarity), eight basic adaptive or prototype functions were defined, which could in functional language be named as protection-destruction, reproduction-deprivation, incorporation-rejection and exploration-orientation (arranged in sense of polarity). Plutchik and his co-workers tried to determine certain words which would represent personality traits and which could describe the eight emotional states. In the phase of test construction they drew out twelve expressions of personality traits, which were supposed to reflect eight emotions. The attribution of these expressions (adjectives) to basic emotions was set as it is shown in Figure 1. In the EPI test, scores on each of eight emotions in a profile were being calculated with respect to this arrangement.

Figure 1: The relation of adjectives to dimensions according to Plutchik's theory of emotions (rectangular shaped items - EPI adjectives; oval shaped items - dimensions or constructs of emotions)



Nevertheless, there are some serious methodological and theoretical problems concerning EPI which were not considered in most studies cited above. These problems include proper denotation and comprehensibility of adjectives, theoretical definition of emotional dimensions, appurtenance of adjectives to dimensions, hierarchy of dimensions, and stability of the emotional structure, among others.
We performed two studies in which we tried to assess the stability and dimensionality of the structure of emotions, as proposed by Plutchik and Kellerman, and measured via Emotions Profile Index.

(a) In the first study we tried to examine the dimensionality of the structure of EPI. The starting point of the study was the observation that, in calculating raw results, the dimension "Destruction" gets scores on five traits or attributes, whereas other dimensions score only on two or three attributes - with exception of the factor "Exploration" which is the sum of scores obtained on four traits. This, and analysis of theoretical background of each of eight dimensions in EPI, led us to the conclusion that perhaps all dimensions were actually not on the same hierarchical level regarding extensiveness and exclusiveness of dimensions. The examination was carried out using confirmatory approach.

(b) The second study was conducted in order to explore the stability of the structure of emotions contoured with EPI dimensions and corresponding adjectives. The main interest was in the properness of denotation and comprehensiveness of adjectives (traits or attributes), the clearness of the theoretical denotation of emotions dimensions, the appurtenance of adjectives to dimensions, and hierarchy of dimensions.

STUDY 1

Method

Subjects:

113 subjects participated in the study, 31 male (27.4 %) and 82 female (72.6 %). Their average age was 24.62, (SD = 5.60, range 16 - 41). Data were recorded within professional selection procedure for rather demanding job. Hence the educational level of subjects was higher than average (85.8 % of subjects graduated from High School or reached higher educational level of different profiles).

Materials and procedure:

The Slovenian translated and adapted version of the forced-choice Emotional Profile Index (Baškovac-Milinković et al., 1979) was administered. In the instrument all possible pair-comparisons of twelve adjectives have to be estimated with a two-alternative-forced-choice method. In each pair of items subject must always choose the one, which describes him or her better. Each item belongs to two dimensions of emotions (ref. Fig. 1) and chosen item in particular pair contributes a point to a summary score on both of dimensions. The final result reflects the absolute and relative score on each of eight dimensions and also the estimate of bias (faking-good or faking-bad observer).

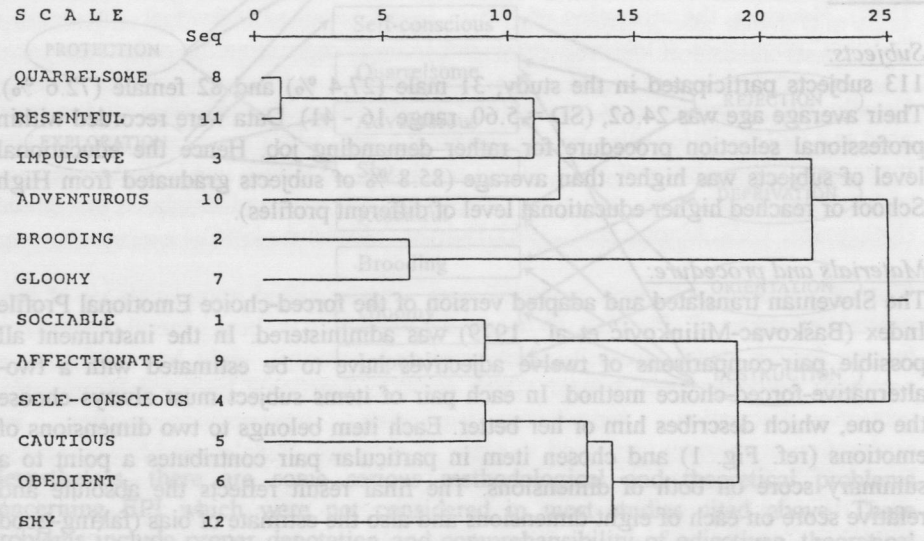
Results and discussion

Absolute and relative scores pointing out interindividual differences regarding the dimensions are not relevant for the purpose of this study, therefore they will not be presented here.

The grouping of twelve adjectives was examined in two ways, by using exploratory techniques of Cluster analysis and Multidimensional scaling. In the first analysis Squared Euclidean distances between adjectives, regarding frequencies of choosing them, were used as proximity measures, whereas Ward algorithm of minimizing variance within groups and maximizing variance between groups was carried out for agglomerate hierarchical grouping (Ferligoj, 1989). Figure 2 shows two clusters, distinguishing constructs Reproduction, Incorporation, Protection and Exploration

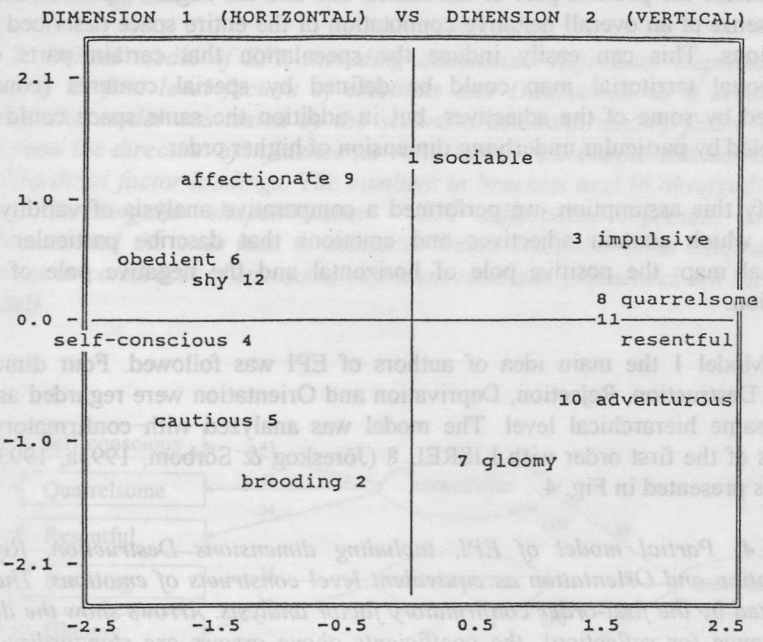
from dimensions Rejection, Deprivation, Destruction and Orientation. One could say that two clusters represent positively and negatively oriented emotions, although the distances at which adjectives are grouped are greater than expected. It is not easy to say that our results actually confirm or reject the outcomes of other authors using EPI, as according to our knowledge there were no similar attempts in experimental evidence.

Figure 2: Twelve EPI test items/adjectives clustered hierarchically with Ward method (proximity measure: Squared Euclidean distance)



On the other hand, the positioning of twelve adjectives in a two-dimensional space as an outcome of multidimensional scaling (Fitzgerald & Hubert, 1987; Norušis, 1988; Spence & Lewandowsky, 1989) can be studied comparably to some other resembling approaches in the past (Figure 3).

Figure 3: The arrangement of twelve EPI test items/adjectives in a two-dimensional space obtained by multidimensional scaling of their distances or dissimilarities.



The distribution of adjectives in Fig. 3 can be perceived in the same manner as Plutchik's presentation of circular configuration of traits (adjectives) and dimensions of emotions according to Guttman's methodology of multidimensional scaling (Plutchik, 1970, pg. 18; Bašković-Milinković et al., 1979, pg. 7). Guttman's modification of factor analysis (Brody, 1992) allows graphical arrangement of items differing in their contents. Such items do not form a simplex, an appearance of items of different complexity in certain rank order. They compose a form that is called circumplex, a presentation of items (contents) in a circular way, *"...with contents that are related assigned adjacent positions on the circumference of the circle"* (Brody, 1992, pg. 27).

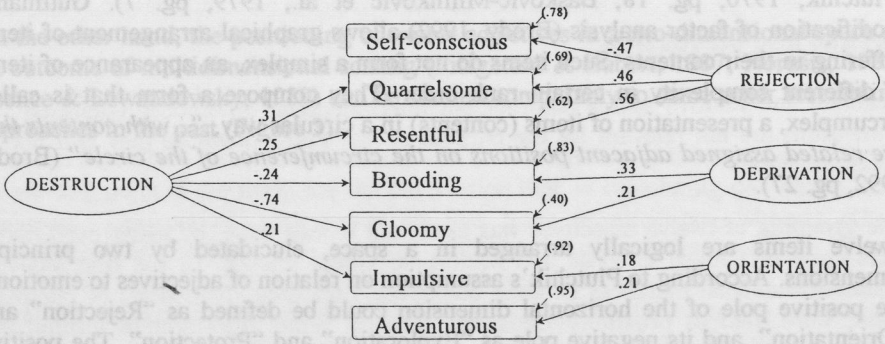
Twelve items are logically arranged in a space, elucidated by two principal dimensions. According to Plutchik's assumption on relation of adjectives to emotions, the positive pole of the horizontal dimension could be defined as "Rejection" and "Orientation", and its negative pole as "Exploration" and "Protection". The positive pole of vertical dimension could be explained as "Reproduction" and "Incorporation", and its negative pole as "Deprivation". However, a problem arises when trying to

incorporate the construct "Destruction" or "Aggressiveness" into the territorial map. It is not easy to assign it to either pole of one of dimensions in the same manner as it is with the other seven dimensions. Although, it could be used as a concept that might well describe the positive pole of dimension one and the negative pole of dimension two in sense of an overall negative connotation of the entire space described by both dimensions. This can easily induce the speculation that certain parts of two-dimensional territorial map could be defined by special contents (constructs), measured by some of the adjectives, but in addition the same space could also be interpreted by particular underlying dimension of higher order.

To verify this assumption, we performed a comparative analysis of validity of two models which contain adjectives and emotions that describe particular part of territorial map: the positive pole of horizontal and the negative pole of vertical dimension.

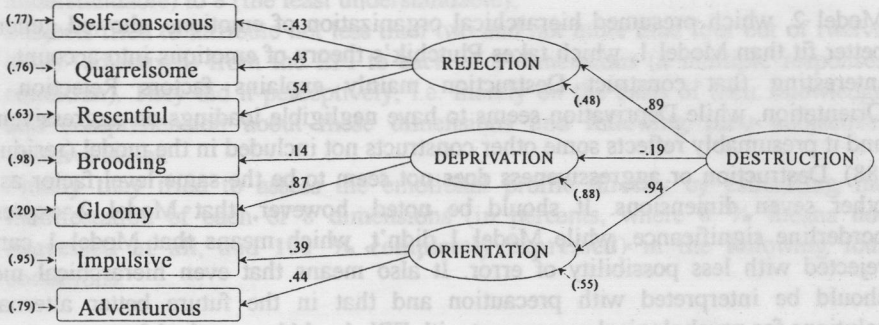
(a) In Model 1 the main idea of authors of EPI was followed. Four dimensions, namely Destruction, Rejection, Deprivation and Orientation were regarded as factors of the same hierarchical level. The model was analyzed with confirmatory factor analysis of the first order with LISREL 8 (Jöreskog & Sörbom, 1993a, 1993b). The model is presented in Fig. 4.

Figure 4: Partial model of EPI, including dimensions Destruction, Rejection, Deprivation and Orientation as equivalent level constructs of emotions. The model was tested by the first-order confirmatory factor analysis. Arrows show the direction of influence (or reflection), the coefficients above arrows are standardized factor loadings, the numbers in brackets represent errors of measurement. (Rectangular shaped items - EPI adjectives (measured/manifest variables); oval shaped items - dimensions or constructs of emotions (estimated latent variables)).



(b) In Model 2 we hypothesized Destruction as a second-order factor, as a construct superior to the remaining three factors, namely Rejection, Deprivation and Orientation. The LISREL 8 outcome of the second-order confirmatory factor analysis is presented in Fig. 5.

Figure 5: Partial model of EPI, including dimensions Rejection, Deprivation and Orientation as first level factors of emotions and Destruction as a second-order construct. The model was tested by the second-order confirmatory factor analysis. Arrows show the direction of influence (or reflectance), the coefficients above arrows are standardized factor loadings. The numbers in brackets next to observed/manifest variables (rectangular shaped items - EPI adjectives) represent errors of measurement and the ones next to estimated latent variables (oval shaped items - dimensions or constructs of emotions) represent residuals (influences not included in the model).



The comparative overview of most relevant goodness-of-fit indexes for both models is presented in Table 1.

Table 1: Comparative analysis of fitting of two alternative partial models of EPI (Model 1: first-order confirmatory factor analysis - cf. Fig. 4; Model 2: second-order confirmatory factor analysis - cf. Fig. 5).

	χ^2	df	p	χ^2 / df	RMSR	NFI	NNFI
Model 1	24.76	9	.003	2.75	.092	.63	.21
Model 2	17.53	8	.025	2.19	.062	.74	.46

df	- degrees of freedom
p	- level of significance of rejecting the model
χ^2 / df	- ratio between χ^2 and degrees of freedom
RMSR	- Root mean Square Residual
NFI	- Normed Fit Index
NNFI	- NonNormed Fix Index

Model 2, which presumed hierarchical organization of emotions, showed generally better fit than Model 1, which takes Plutchik's theory of emotions into account. It is interesting that construct Destruction mainly explains factors Rejection and Orientation, while Deprivation seems to have negligible loadings on aggressiveness, and it presumably reflects some other constructs not included in the model (residual = .88). Destruction or aggressiveness does not seem to be the same level factor as the other seven dimensions. It should be noted, however, that Model 2 expressed borderline significance, while Model 1 didn't, which means that Model 1 can be rejected with less possibility of error. It also means that even hierarchical model should be interpreted with precaution and that in the future better alternative solutions for psychological assessment with EPI should be searched for.

STUDY 2

Method

Subjects:

122 Students of psychology at the University of Ljubljana (87 female - 71.3 %, mean age = 20.45, SD = 1.27) participated in the study. All subjects took part in all phases of data collection.

Materials and procedure:

The procedure was carried out as follows:

1. Administration of the EPI questionnaire under condition: **"what am I like?"**. In each pair of adjectives students had to choose the item which described him/her better.
2. Administration of the EPI questionnaire under condition: **"what do others think I am like?"**. Students tried to imagine what their personality characteristics were (according to pairs of items) in the other people's eyes.
3. 2-week successive studying of the meaning (content) of 8 emotions dimensions, as being explicated in theory by Plutchik & Kellerman, and as described in the EPI questionnaire Manual (Bašković-Milinković et al., 1979) and in other literature (Kellerman & Plutchik, 1968; Plutchik, 1968, 1970; Lamovec, 1984). Students tried to reach the understanding of the theory of emotions according to authors as well as the exact meaning of the constructs.
4. Then, students expressed their opinion on the intelligibility of the content of each of eight dimensions they had studied before. They judged the understandability of dimensions in two ways: by estimating it directly for each dimension (on the 6-point scale - (1) completely clear, (6) not clear at all), and by ranging the dimensions in accordance to their understandability from 1 (the most understandable) to 8 (the least understandable);
5. Subjects tried to attribute not less than two and not more than four out of twelve items (adjectives) from the EPI to each of 8 dimensions (a multiple responses condition). They did it perceptively, i.e. merely on the basis of their knowledge and comprehension about these dimensions and following their subjective, intuitive belief.
6. Finally they tried to assess the emotional profile directly by estimating the manifestation of each of 8 dimensions (in percents, where **0 %** means **not expressed at all**, and **100 % completely expressed**) in the following four conditions:

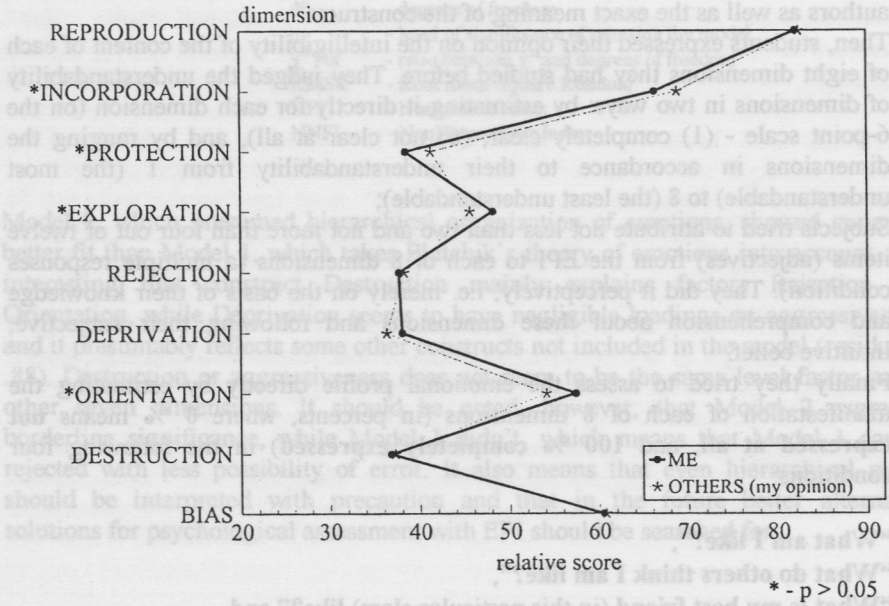
- **"What am I like?"**,
- **"What do others think I am like?"**,
- **"What is my best friend** (in this particular class) **like?"** and
- **"What should an 'ideal' or socially and emotionally mature person be like?".**

The assessment of emotional profile in this phase was carried out as some sort of "observer" technique, relying solely on students' understanding of each of eight EPI dimensions, and the insight into (i) their own emotional structure, (ii) their "reflected" structure, (iii) their peer emotional structure and (iv) the "ideal" emotional profile. With the third stage we ensured the possibility to compare the self- and peer-ratings for each subject.

Results and discussion

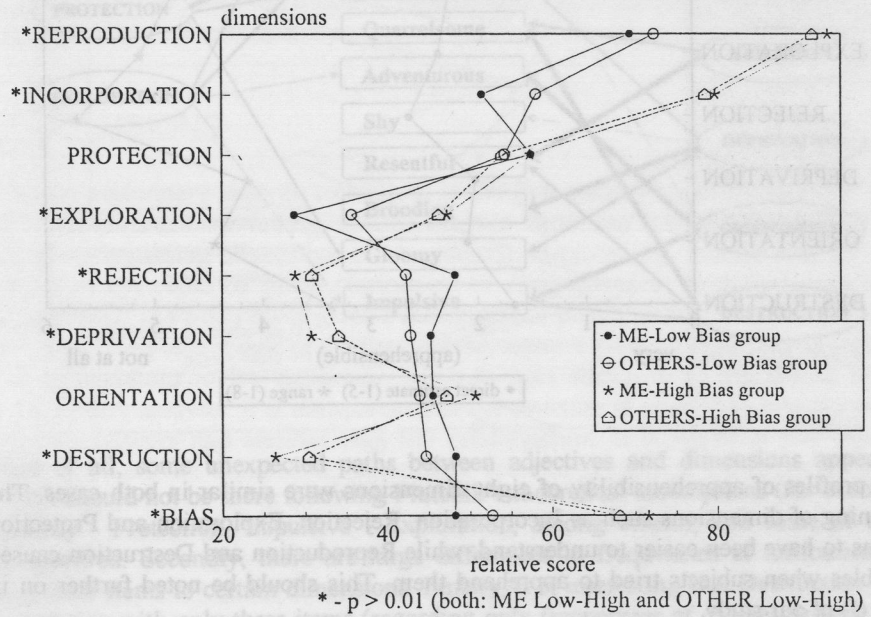
Figure 6 shows that there are no larger differences in subjects' opinion on their self image in their eyes and the image they think they have in the eyes of other people.

Figure 6: Eight dimensions of EPI and Bias score according to twelve adjectives - Method of pair comparisons. The difference between "What do I think about myself" and "What do others think about me" conditions.



This result also tells something about the reliability of the instrument. We observed relatively high Bias score on both assessments. We also considered that the estimation of self as seen by somebody else's eyes is very likely disturbed by subjective self-image, which may not have much in common with reality (Furnham, 1986, 1990a, 1990b; Cowles, Darling & Skanes, 1992). Therefore, it seemed reasonable to examine if there are any substantial differences in emotional structure between subjects with higher and those with lower Bias score. Groups were split regarding median Bias score. Figure 7 shows the result.

Figure 7: Eight dimensions of EPI and Bias score ("What do I think..." and "What do others think..."). The difference between low- and high-Bias score groups (split = Median).

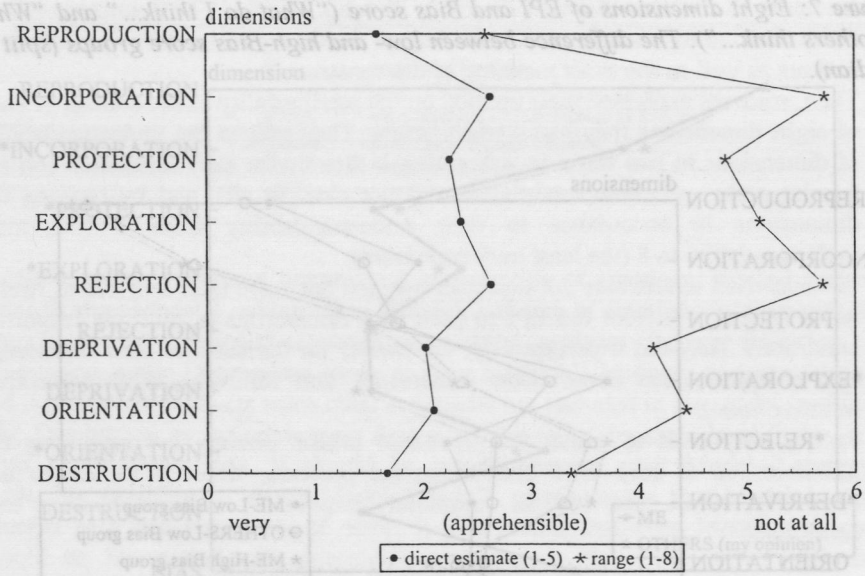


* - $p > 0.01$ (both: ME Low-High and OTHER Low-High)

In all dimensions - except Protection and Orientation - the differences between groups were high and significant. The effect of "social desirability of answers" does not seem to be negligible. It is also evident (a) that subjects with high Bias score tend to have higher scores in "positive" emotions and lower scores in "negative" emotions, and (b) that differences are approximately the same for both estimating conditions- "What am I like" and "What do others think I am like".

After thoughtful studying the theoretical background and meaning of dimensions of emotions, subjects expressed the apprehensibility of dimensions by estimating each of them with ratings and by ranging them from the most to the least understandable one. Figure 8 shows the result.

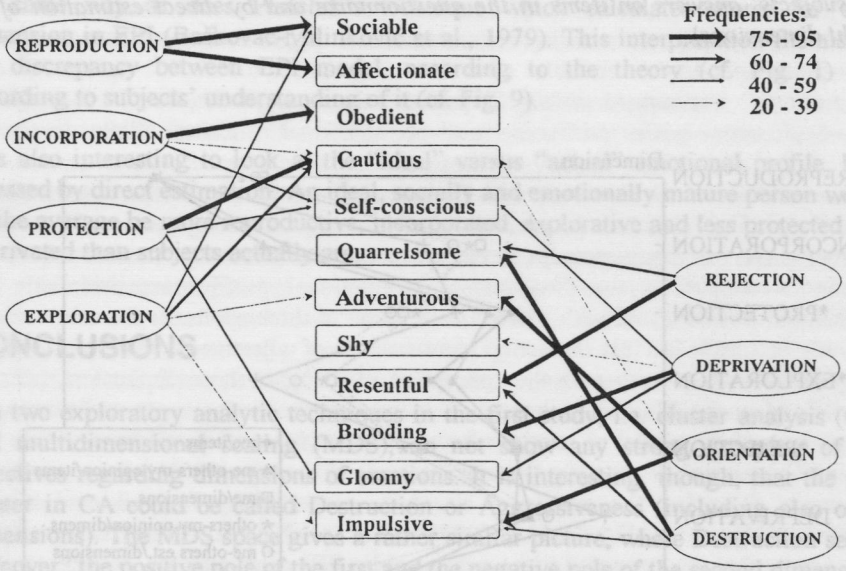
Figure 8: Apprehensibility of the eight dimensions of EPI after studying them. The direct estimate of understanding and their mean range.



The profiles of apprehensibility of eight dimensions were similar in both cases. The meaning of dimensions such as Incorporation, Rejection, Exploration and Protection seems to have been easier to understand, while Reproduction and Destruction caused troubles when subjects tried to apprehend them. This should be noted further on in step (f) of our study.

When subjects attributed two to four out of twelve adjectives to the eight dimensions of EPI, a picture emerged that was somehow different from the one expected according to theory (cf. Fig. 1). The result is shown in Figure 9.

Figure 9: Subjects' judgments on the appurtenance of items to dimensions of EPI - the Multiple response situation. Rectangular shaped items - EPI adjectives, oval shaped items - dimensions or constructs of emotions. The thickness of arrows represents the frequency of choosing an item as a representant of particular dimension. Consider the number of subjects (122).



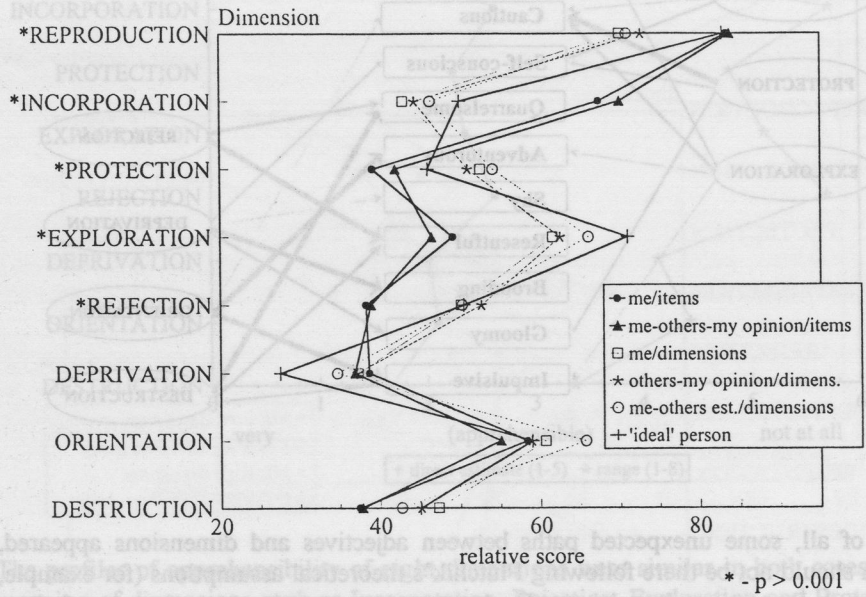
First of all, some unexpected paths between adjectives and dimensions appeared, which should not be there following Plutchik's theoretical assumptions (for example, Gloomy - Protection, Impulsive - Exploration, among others), and some of them disappeared. Secondly, there are large differences in frequencies of attributions of particular items to certain dimensions. Finally, it is interesting that Destruction is in connection with only three items (regarding only frequencies of choices greater than 19), and that this three items (Quarrelsome, Resentful and Impulsive) belong to dimensions Rejection and Orientation, and not to Deprivation. This is in strong accordance with our second-order partial model of EPI, confirmed in our first study (cf. Fig. 5).

It is not easy to explain, however, that adjectives Sociable and Affectionate clearly belong to Reproduction and still this dimension is the least understandable one. It should be noted at this point that this were actually rather inexperienced subjective

attributions, based solely on knowledge about the dimensions that students reached in a rather short time.

The groups of profiles in Figure 10 show some interesting outcomes. It is surprising how close the profiles obtained by direct estimation of dimensions are.

Figure 10: Eight dimensions of EPI in four different estimating conditions (assessed by subjects' answers on items in the questionnaire and by direct estimation of the eight dimensions).



This is logical for "What am I like" and "What do others think I am like" conditions. But it is also the peer-estimation of the emotional profile of subject that conforms in a considerable extent to the first two profiles. This outcome tells us about satisfactory reliability of such quick and direct assessment of one's emotional profile. But is this method of assessing also valid?

There are some important differences in subjects' emotional profile concerning different estimating conditions. The greatest discrepancies between profiles resulting from choosing items in pairs in a test, and profiles obtained by direct estimation of

expressions of dimensions, are in dimensions Reproduction, Incorporation, Protection, Exploration and Rejection. It is obvious that both assessment methods do not lead to similar results. Expressions of dimensions presupposed by the methodology following attribution of twelve items to eight dimensions (on the basis of method of pair comparisons), can not be considered as similar contents described in the theory (regardless their similar names). Subjects do not understand five of eight dimensions of emotions, as defined in the EPI Manual and in other literature, in the same way as does Plutchik's technique which calculates scores for each dimension in EPI (Baškovac-Milinković et al., 1979). This interpretation fits also in the discrepancy between EPI model, according to the theory (cf. Fig. 1) and according to subjects' understanding of it (cf. Fig. 9).

It is also interesting to look at the "ideal" versus "actual" emotional profile, both assessed by direct estimation. An ideal, socially and emotionally mature person would on the average be more reproductive, incorporated, explorative and less protected and deprivated than subjects actually are.

CONCLUSIONS

The two exploratory analytic techniques in the first study, i.e. cluster analysis (CA) and multidimensional scaling (MDS), do not show any strong grouping of the adjectives regarding dimensions of emotions. It is interesting, though, that the first cluster in CA could be called Destruction or Aggressiveness (including also other dimensions). The MDS space gives a rather similar picture, where Destruction seems to "cover" the positive pole of the first and the negative pole of the second dimension. The anticipations in the exploratory analysis were shown to be sound also in the confirmatory analysis. It is transparent that the structure of emotions, as explained in Plutchik's theory and assesses with EPI questionnaire, is hierarchical and that the dimensions are not explainable on the same level of generality. Our results suggest that Destruction is a latent construct of higher order of generality, compared to some other dimensions and that it is reflected not only by five adjectives (estimated variables in the test) but also through some of the lower level latent constructs, Rejection and Orientation, respectively. Although our second model did not show a very firm structure, it still points to the fact that different dimensions in EPI should not be understood as eight equivalent and equally influential constructs in explaining or determining the dynamism of personality via EPI questionnaire.

It is also interesting that the accepted model expresses the Deprivation as a construct not determined by Destruction (contrary to Rejection and Orientation). It seems that it is a distinct construct determined by underlying concepts not included in the model and/or the theory, and reflected by adjectives "Brooding" and "Gloomy", which, too, are standing rather alone in the confirmatory model and also as a distinct cluster in CA, or a pole of one dimension in MDS. Analyzing our partial model of hierarchical

structure of EPI, one can not say which underlying construct actually determines Deprivation, if any. The model also does not say anything about the hierarchical composition of the other part of emotional structure (Reproduction, Incorporation, Protection and Exploration). Some additional further studies will have to be conducted to answer these questions in the future.

The main conclusion of the second study was, that the meaning of the dimensions, as they are described in the theory, does not fit completely in the structure of the appurtenance of adjectives to these dimensions. All eight dimensions are not equally distinctive and understandable after studying their theoretical interpretations. "Destruction" was ranged among dimensions which cause troubles in determining their explanatory power and uniformity of theoretical meaning. When estimating each of the dimensions directly, the assessment of self in subjects own eyes, the assessment of self as somebody else is supposed to see it and the assessment of subject's profile from other people's point of view are surprisingly close. This stands in favor of the fact that dimensions were comprehended relatively unanimously by the estimators. Regarding the discrepancy in emotional profiles assessed with EPI questionnaire on one and with a direct estimation of dimensions on the other side, it can only be concluded that the actual appurtenance of adjectives to dimensions is not completely in conformity with the conceptual meaning of these dimensions (as they are defined in the Plutchik's theory). This conclusion is also in accordance to the comparison of the model of relations between adjectives and dimensions, which was obtained by subjects' supposing the appurtenance of the adjectives to dimensions, and the model following the emotional structure, proponed by Plutchik and his co-workers (cf. Fig. 9 and Fig. 1). Is it, therefore, conceivable to conclude that constructs or concepts that are supposed to be measured by EPI questionnaire, and contents or concepts illustrated and elucidated in Plutchik's theory of emotions, are not completely comparable?

Finally, it is worth mentioning that the effect of bias in EPI questionnaire is not negligible. The responses of our subjects expressed significantly different emotional profiles on six out of eight dimensions, when taking differences in bias score into account. Unfortunately, this is not the case with only this instrument but also with a vast majority of self-report personality questionnaires (Furnham, 1986, 1990b; White & Nias, 1994).

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