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TO BE IN GOOD OR BAD HUMOUR: CONSTRUCTION OF THE STATE FORM OF THE STATE-TRAIT-CHEERFULNESS-INVENTORY — STCI

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Summary—The present paper outlines the relevance of the states of cheerfulness, seriousness, and bad mood for research on the emotion of exhilaration. Definitions of the concepts are undertaken and the construction strategy for the State-Trait-Cheerfulness-Inventory (STCI) is outlined. The pilot version with 40 items was administered to altogether more than 800 subjects. Empirical analyses of the concepts included the study of the homogeneity of the items in both inter- and intraindividual variation, the identification of sub-clusters, and the demonstration of the sensitivity of items for mood alterations. The standard state form with 10 items per scale, i.e. the STCI-S<30> was developed based on the data of a construction sample (N = 595) utilizing five criteria for the selection of items. The internal consistency of the scales proved to be satisfactory in various independent subject samples and the expected scale intercorrelations emerged. The factor structure of the items appeared to be highly generalizable across different sources of variation, gender, nationality (USA vs. Germany), and time spans covered. A joint factor analysis of the state and trait items yielded factors of cheerfulness, seriousness, and bad mood both as traits and states with the homologous concepts correlating positively. Convergence of states and traits was also obtained for peer-evaluation data. Finally, the possible range of variation in the three scales across different (experimentally manipulated or naturally occurring) conditions was explored.

Introduction

In everyday language we often use phrases like to be in good humour, in the mood for laughing, out of humour, ill-humoured, in a serious mood or frame of mind etc. to refer to states of enhanced or lowered readiness to respond to humour or act humorously. However, while the trait of "sense of humour" (referring to habitual individual differences in appreciation, initiation, or laughing at humour) received much attention, there is no explicit conceptualization of humour (or lack of it) as a state yet.

However, the recently introduced state-trait model of exhilaratability considers actual dispositions that moderate the impact of humour (but also of other stimuli, such as tickling or laughing gas) on positive affect and laughter. It was proposed to label this emotion exhilaration and to use the term exhilaration according to its Latin root (hilaris = cheerful) to denote either the process of making cheerful or the temporary rising and fading out of a cheerful state (Ruch, 1993). The concept of exhilaratability was put forward to refer to the fact that the threshold for exhilaration varies both inter- and intraindividually.

Within this framework, it was postulated that cheerfulness, seriousness and bad mood affect the individual's actual or habitual degree of exhilaratability. More precisely, it was claimed that the three concepts represent actual (state) and habitual (trait) dispositions for lowered (cheerful) and enhanced (seriousness, bad mood) thresholds for the induction of exhilaration or other forms of humour behavior. In other words, for individuals in a cheerful state, the elicitation of exhilaration/amusement will be facilitated, while individuals in a more

serious frame of mind or in a bad mood will be less readily inclined to laugh or smile at a given stimulus.

Definition of cheerfulness, seriousness, and bad mood as states

As pointed out above, the formal definition of the concepts relates to the location of the threshold for the induction of exhilaration or other forms of humour behavior. While in the operational definitions of the three states care was taken to keep the state and traits concepts parallel, it was not intended to put forward and test a structural model as has been done for the trait concepts (see Ruch, Köhler, & van Thriel, 1996). Basically, two elements entered the definition of the content of the state items. First, the perception of the presence of the qualities referred to in the core facets of the trait definitions (e.g., prevalence of cheerful, merry etc. or grumpy, grouchy mood states) formed the major part of the substance of each state.

Second, the more action-oriented trait facets were represented, if possible, by felt action tendencies. For example, while one trait cheerfulness facet describes a habitually low threshold for smiling and laughter, state cheerfulness relates to the awareness of a temporally changed readiness for displaying these behaviors. Likewise, the definition of trait seriousness includes that the high scorer perceives even everyday happenings as important and considers them thoroughly and intensively (rather than treating them superficially). States of high and low degrees of seriousness, differ with respect to the amount to which one is prepared or mentally set for such immediate actions. The difference between an affective and a mental state becomes very apparent here: while in the former the subject reflects on a quality of felt actual state with an affective tone (typically being located on a pleasure—displeasure dimension), in the latter the affective tone is not salient and the quality is reflected upon.

Thus, state cheerfulness was designed to represent the segment of positive affectivity presumably related to exhilaratability. Like for the trait scale, no explicit separation of cheerfulness and hilarity/merriment was undertaken, but the whole span between them was considered*. Thus, individuals high in that state describe themselves as being in good spirits, in a mirthful mood, or feeling merry. Furthermore, they also report their awareness of changed readiness for displaying behavior typical for state cheerfulness (sample items: I could laugh at the drop of a hat, I am ready to have some fun). Finally, the aspect of being in good humour (or in good mood) was tentatively considered for two reasons. Given a general bipolar factor (of being in good vs. bad humour) emerges, it can be expected that items referring to this content would be the best markers. Also, being in good mood might be the common denominator of cheerfulness and hilarity and being located between them (thus perhaps providing the link for tying the two clusters together).

State-seriousness is understood as a quality of the frame of mind; i.e., an actual mental attitude. State-seriousness denotes the readiness to perceive, act, or communicate seriously. In a state of high seriousness the individual is attentive, perhaps immersed in deep thought, involved in something perceived as really important (as distinguished from something frivolous), applies a sober or objective perspective or style, is earnest in purpose, and not mentally set for levity or amusement. While other states are signified by seriousness, like

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* In Lersch's (1962) phenomenological account, these two concepts share the elements of inner brightness, lightness, and relaxation. However, while cheerfulness is more inward, hilarity tends to be contingent on the outer world. The former is placid, composed and more restrained, the latter is associated with scatter, diversion, levity, frivolity, and lack of reflection and contemplation.

grave, sedate, or solemn, these terms are too specific for certain situations to be used as general markers of seriousness. While there were many opposites proposed (e.g., serious vs. playful; seriousness vs. frivolity/levity; serious vs. humorous), here seriousness is understood as a unipolar concept. (Sample items: I am in a serious frame of mind, I'm prepared to do a task in earnest, I am in a sober frame of mind, I am in thoughtful mood, I'm not prepared for any silliness or nonsense).

State-bad mood was defined, like the homologous trait, by the two elements of sadness/melancholy and ill-humour. Both seem to be important facets of exhilaratability, because the presence of these negative affective states might impair or inhibit the generation of positive affect, albeit for different reasons. While an ill-humoured person (like the serious person) may not want to be involved in humour, the person in a sad mood may not be able to do so even if he or she would like to be. Also, while the sad, gloomy, or downhearted person is not antagonistic to a cheerful group, the ill-humoured, sullen, crabby, or cross one may be. Thus, the item pool will relate to these two qualities, associated action tendencies, and to general bad mood, which should provide a link between them (sample items: I am in a bad mood, I am sad, I am in a grumpy mood, I don't feel like laughing).

The states are not orthogonal; on the contrary, the three concepts are expected to be more highly correlated as states than as traits. Ruch et al. (1996) discussed the pattern and strength of the relationship among the three concepts (both as states and traits) and the factors moderating this relationship. In short, it is expected that cheerfulness (as an affective state) will be negatively correlated with both state seriousness (as a frame of mind) and, more highly so, with state bad mood. These correlations might be increased in size for non-salient situations (in the course of everyday life, baseline measurements in experiments) than for situations in which these states are induced. For example, after having enjoyed a series of jokes, an individual's degree of cheerfulness will be high and the degree of seriousness low. During working periods or problem solving, the serious state will be pronounced, but cheerfulness may be both high and low.

The two forms of humourlessness will be positively correlated; however, while bad mood situations may be associated often with a serious frame of mind, the reverse does not have to be true. States of seriousness do not have to be accompanied by a negative mood level. The intercorrelation of serious and bad mood states may increase in response to humorous events; the failure to induce exhilaration in state serious individuals may increase their level of bad mood as well.

The State-Trait-Cheerfulness-Inventory (STCI)

Aim of the State-Trait-Cheerfulness-Inventory (STCI) is to provide a reliable, valid, and economic assessment of cheerfulness, seriousness, and bad mood both as (actual) states and (habitual) traits. While the component (or long) and standard forms of the trait part (STCI-T) were presented recently (Ruch et al., 1996), the present article describes the development and construction of the state part (STCI-S).

Development of the pilot form STCI-S<40>

The lexicon was consulted to generate a complete pool of terms relating to the three concepts. Basically, synonyms of key terms were searched and they were used as new entries to search further relevant terms. This was reiterated until terms were suggested that clearly were outside the boundaries of the content areas of the three concepts as described above.

Also terms were excluded that were too general (e.g., happy) or of too high intensity to be unlikely to occur in the research settings (e.g., jubilant).

The choice of item format (full sentences rather than a catch phrase-format [e.g., anxious, angry, sad]) was guided by two considerations. Firstly, full sentences provide more richness in describing the subjects' actual state, which was especially necessary for the assessment of seriousness (due to a lack of content saturated adjectives). While this item format is suitable to describe the quality of the current mood state, it additionally allows subjects to reflect on the current mental style, to indicate what actions they are prepared for, or to reflect what kind of actual preferences or desires they have at the moment. Secondly, full sentences also allow the expression of the negation of facts; however, it was not of interest to pursue a balanced keying of the items. Because of the antithetical nature of the concepts a negatively keyed cheerfulness item, for example, could also be seen prototypical for seriousness or bad mood. While the sentence I feel like laughing might indicate cheerfulness, its negation (I don't feel like laughing) might well indicate sadness. Therefore, negations were only used when they represented standing expressions used in everyday language.

In general, it was attempted to write short items, however, state seriousness items typically were longer (averagely 5.8 words per item). Before items were exposed to subjects, they were evaluated according to the criteria outlined by Angleitner, John, and Löhr (1986): ambiguity, abstractness, comprehensibility, self-reference, and evaluation. A four-point answer format (strongly disagree = 1, moderately disagree = 2, moderately agree = 3, strongly agree = 4) was employed.

The construction of the STCI profited from the existence of two precursors. Both state and trait form of a cheerfulness inventory were developed by students in seminars supervised by the senior author and were used to study the dimensionality of the domain. The first state form, comprising 10 cheerfulness synonyms only, was found to be unidimensional. The second precursor, containing 35 items, included the two presumed opposites of cheerfulness, seriousness and sadness, and failed to constitute a general factor in the four samples tested (N = 350 students). On the basis of extensive lexical study and the meanwhile undertaken conceptualization of exhilaratability, one, two, and four further items were written for cheerfulness, seriousness, and bad mood, respectively. Three items were reformulated and two control items were eliminated. These 40 items form the pilot version (i.e., the STCI-S<40>). There are 15, 13, and 12 items for the assessment of cheerful, serious, and bad mood states, respectively. A total score of state exhilaratability was considered tentatively which is composed of the sum of the three scales with the scores of seriousness and bad mood being reflected.

Construction of the state version — STCI-S

The empirical part of this paper is composed of the two sections of the empirical foundation of the concepts and of the subsequent construction of the STCI-S. As regards the former, it needs to be verified that state exhilaratability is composed of the three separable dimensions of cheerfulness, seriousness, and bad mood. Furthermore, it will be examined whether sub-clusters of the concepts can be distinguished reliably. The nature of these clusters will be identified by item content, formal item characteristics (i.e., loadings, mean), and by their location on Wundt's (1903) descriptive dimensions of feelings (i.e., pleasantness—unpleasantness, excitation—quietness, strain—relaxation). At this point the decision about the make up of the concepts will be made by defining their boundaries (i.e., what clusters to incorporate).

While for the trait concepts the proof of the homogeneity of the items across subjects (i.e., the interindividual variation) is crucial, for state concepts the uniform change of items across situations (i.e., intraindividual variation) is equally important. Thus, the examination of the homogeneity of the items will enclose the study of both interindividual and intraindividual variation. While the former utilizes the conventional R-technique, the intraindividual analysis requires an ipsativation of scores to eliminate the differences in mood level among the subjects. This analysis will utilize natural fluctuations of states as occurring over a given time span.

As regards the construction of the STCI-S<30>, the selection of items will be based on a combination of explicit theoretical and empirical criteria. In general, a concept-guided strategy in item reduction will be preferred to a purely empirical selection of items, although indices derived from factor and item analysis as well as indices of sensitivity to change will be considered.

Five criteria were considered suitable for the selection of items. First, the corrected item-total correlation should be significant and exceeding .30. Second, the corrected item-total correlation with the own scale should exceed the ones of any other scale for at least .05. Third, items should be sensitive to change; i.e., it will be examined whether the mean of an item increases significantly from a control condition to the condition when its corresponding state is induced. Fourth, in order to prevent ceiling effects in experimental mood manipulations the item difficulty should not be too high; more precisely, the item mean in resting conditions should not exceed 3.25 (which is the equivalent of .75 on a scale from zero to one). Fifth, the scale should be balanced as regards its components; i.e., the whole span of contents covered by the concept should be considered and all facets selected should be represented by an equal number of items.

As regards the third criterion, for the construction of the standard state form a "Gedanken-" experiment will be utilized. Subjects are not really exposed to or tested in state relevant situations, but they are instructed to imagine state relevant prototypical situations as described in different scenarios. It was expected that these prototypically designed scenarios idealize the respective mood states and — in combination with the type of task — reduce interindividual variance relating to differential sensibility of certain elicitors. In order to cover the span of the concepts as outlined above several scenarios were written per scale. In detail, there were two (cheerfulness, hilarity), three (earnestness, pensiveness, soberness), and two (melancholy, ill-humour) scenarios for the cheerfulness, seriousness, and bad mood constructs, respectively. For control purposes, a neutral scenario was depicted, too. The key terms used in the STCI-S items were excluded from the scenarios.

The psychometric characteristics of the constructed state scale will be tested for stability by using several independent replication samples. Furthermore, the stability of the factor structure (substitution of samples) and its generalizability across different populations (males vs. females; different nationalities), different sources of variation (interindividual vs. intraindividual differences), and different time spans (how did you feel last week, last month, last year) will be examined. Finally, the range of cross-situational variation in the state scales is examined.

Subjects

Construction sample I (across subjects). This sample included 595 German participants (243 men and 352 women) aged from 14 to 83 years (M = 33.81, SD = 15.04). They were heterogeneous with respect to sociodemographic variables. About two thirds of them were students, the others were adults of the Düsseldorf and Berlin area. This sample answered the

STCI-S<40> under resting conditions (e.g., baseline measures in experiments) and additionally answered the STCI-T<122> (They formed the construction sample for the long and standard form of the STCI-T; see Ruch et al., 1996). Construction sample I was used for the study of interindividual variations.

Construction sample II (across situations). This sample consisted of 100 German students of the Heinrich-Heine-University of Düsseldorf and their relatives (47 men and 53 women). Their ages ranged from 18 to 51 years (M = 26.05, SD = 7.78). This sample was used for studying intraindividual variations of the STCI-constructs. In order to ascertain some variability, subjects answered the STCI-S<40> once a day at predetermined times on eight successive days. Testing times were morning (until noon), midday (12 a.m. - 3 p.m.), afternoon (3 - 6 p.m.), and evening (after 6 p.m.). In order to eliminate interindividual variance, item intercorrelations were computed across the eight administrations for each subject separately. These matrices were averaged across all subjects forming the mean item intercorrelation matrix subsequently subjected to factor analysis.

Furthermore, subjects of construction sample II also received modified versions of the state part to allow for testing the generalizability of the factor structure across different time spans. Three different versions, the STCI-S<40>(w), STCI-S<40>(m), and STCI-S<40>(y), were generated by changing the instructions from "how do you feel right now" to "how did you feel last week", "… last month", "… last year", respectively. The past tense was used to better suit the instructions (e.g., "I am cheerful" was then "I was cheerful"). The four-point answer format was kept.

Construction sample III. This sample consisted of 35 German students of the Heinrich-Heine-University of Düsseldorf and their relatives (15 men and 20 women). Their ages ranged from 23 to 61 years (M = 33.03, SD = 12.24). They were given a test-booklet containing the eight prototypical scenarios, stapled alternately with eight STCI-S<40>, and they additionally filled in the STCI-T<106>. While the first description was always the neutral scenario, the following state relevant scenarios were permutated in seven different orders. Each version of the test-booklet was filled in by five subjects who were instructed to stipulate the most likely mood state of an average person in each state relevant scenario.

Sample IV. Twenty German adults (11 men and 9 women), aged from 23 to 60 years (M = 34.95, SD = 13.30) were asked to estimate all items of the STCI-S<40> on the three Wundt dimensions of feelings (pleasantness—unpleasantness, excitation—quietness, strain—relaxation). They were provided detailed descriptions of the meaning of these three dimensions, three anchored bipolar visual analogue scales of 100mm length (with anchors at -50, 0, and +50), and the item list (in five permutations). Subjects were instructed to first decide which side of the bipolar dimensions applies (e.g., pleasantness or unpleasantness) and then estimate the extent to which this dimension characterizes the item content. Subsequently these ratings were measured in mm and transformed into scores from 1 to 100.

Replication sample I. Subjects were 86 male and 102 female adults aged 16 to 74 years (M = 31.71, SD = 14.24 years), filling in the STCI-S<40>. The inventory was administered at the beginning of experiments, i.e. under resting conditions.

Replication sample II. Subjects were 329 adults (151 men, 178 women), participating in different studies conducted at the University of Düsseldorf, aged 18 to 66 (M = 29.30, SD = 10.67 years). The subjects filled in (among other inventories) the final standard form STCI-S<30> (under resting conditions); 283 of these Ss additionally filled in the STCI-T.

American sample. This sample included 209 undergraduate students (118 women and 91 men) of the University of Central Oklahoma tested in small groups during class. Mean age was 27.70 years (SD = 9.19, range 17 to 58 years). They filled in the international version of the STCI-S (i.e., the STCI-S<45i>; Ruch, Köhler, Deckers, & Carrell, 1994). The translation included several steps (documented in Ruch et al., 1996) and utilized bilinguals and native

speakers of English. The 40 items of the German state part were supplemented by five newly written items positioned at the end of the inventory. While this was done to balance the number of items per scale and to represent the pool of English terms relevant for the concepts more comprehensively, the present analysis considers only those 30 items that entered the German standard version.

Empirical foundation of the concepts

In the following we will examine whether the proposed three factor structure can be found in the study of both inter- and intraindividual variation. We will determine whether components can be identified for each construct and in both samples. The nature and the localization of these components will help to sharpen the conceptualization of the three constructs.

Study of inter- and intraindividual variation

Principal components analyses were performed for the items of the STCI-S<40> in construction samples I and II. A strong first bipolar factor of state exhilaratability appeared in both analyses (explaining 39.20%, 46.30% of the variance), loaded positively by cheerfulness and negatively by seriousness and bad mood items. As expected, being in good mood/humour loaded most highly positively in both samples whereas the negative pole was marked by items referring to not feeling like laughing, feeling downhearted, being in a humourless state, or in a grumpy mood.

However, a general factor solution was not considered for two reasons. First, there were several items that did not load substantially in both solutions. Second, for both the inter- and intraindividual analyses, the Scree-test suggested the retention of three factors which explained 54.50% (Eigenvalues: 15.70, 3.15, 2.94, 1.27, and 1.02) and 57.00% (Eigenvalues: 18.53, 2.59, 1.66, 1.06, and .97) of the variance, respectively. The position of the items in the three-dimensional factor space (Varimax solution) is displayed in Figure 1a and 1b.

Insert Figure 1 about here

Figure 1 shows for both construction samples that the three constructs have distinct locations in the three-dimensional space. While both seriousness and bad mood are located opposite to cheerfulness, they are distant themselves. The identification of clusters in the three-dimensional space was based on visual inspection aided by cluster analysis and consideration of item content*. Both analyses suggested three neighboring but separate components of cheerfulness. Lersch's (1962) distinction of cheerfulness and hilarity/merriment is resembled by the fact that items referring to a more shallow and outwardly directed hilarity (6 items) are separated from those reflecting a more calm and composed cheerful mood (5 items). Not surprisingly, the former cluster also contains the

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* Both loading matrices entered a Ward's cluster analysis and items were clustered according to their proximity (Euclidean distance) in the three-dimensional space. While both solutions yielded the identical number of clusters which additionally were highly similar as regards their item composition, in case of discrepancies the clustering based on sample I was preferred because of its better theoretical fit. Thus, in both Figure 1a and 1b items were graphically grouped according to that solution.

items referring to the actions tendencies which merge well with states of feeling merry and chipper. The third cluster of general well-being was composed of three items relating to non-specific aspects of positive mood. While it contained items marking the general factor (including being in good mood/humour), it was not located between the clusters of hilarity and cheerful mood.

The two components of bad mood, sadness/melancholy (5 items) and ill-humour (5 items) indeed formed separate but very proximate clusters. The few general bad mood items merged with the latter cluster. The seriousness items were more scattered. Three clusters of earnestness, pensiveness, and soberness appeared to be identifiable, however, the low number of items does not allow a definite interpretation.

Three further seriousness items relating to being humourless and not prepared for non-bona fide interaction merged with a negatively keyed cheerfulness item and a sadness item forming a cluster of humourlessness (or lack of exhilaratability). These items were pure markers of the first factor in the unrotated solution. Finally, one item of each bad mood and seriousness was located off the main cluster.

In order to illuminate the differences among these clusters, their items means, factor loadings (on unrotated general factor and Promax reference structure), and profile in the Wundtian dimensions of feeling are presented in Table 1.

Insert Table 1 about here

The well-being cluster is different from hilarity and cheerfulness as regards the higher item mean, a lower loading on the cheerfulness factor, and a negative loading on bad mood. Furthermore, while it lacks the excitation of cheerfulness and hilarity, it is more characterized by relaxation than they are.

All seriousness clusters are located around the scale midpoint of 2.5. While they mark the seriousness factor equally well, they differ with respect to their second loadings on both the cheerfulness and bad mood factors, i.e., they are different in their antagonism to cheerfulness and their strength of positive association with bad mood. They do not differ much on the Wundtian dimensions of feeling.

The two bad mood clusters have the lowest means, don't differ much in their loadings, but ill-humour seems to be a more excited state than melancholy is. A state of humourlessness is more unpleasant than seriousness but less so than bad mood; its degree of excitation is comparable to ill-humour (and different from all other bad humour states), and its degree of strain is higher than for the seriousness clusters but lower than for the bad mood clusters. The humourlessness cluster is loaded by all three factors (this is better expressed by the primary factor loadings of -.60, .48, and .49).

The make-up of the concepts: Decisions on eliminating clusters

It is evident that a general factor solution is not tenable. The existence of a humourlessness cluster and its location in the diagonal of all three factors supports the assumption that there are different elements involved in that state. One can be too low in cheerfulness, too high in seriousness, too high in bad mood, or there may be double or triple combinations of them. The consideration of the three states (as compared to a general good humoured vs. bad humoured factor) allows one to study the relative contribution of these three elements to humourless behavior. Conversely, being in good humour combines aspects of presence of cheerfulness and absence of bad mood. While a good humour vs. bad humour dimension

might be a successful predictor of humour behavior, it does not consider (or allow one to study) the differential contribution (or involvement) of cheerfulness, seriousness, and bad mood. (Interestingly, there is no item of being in good humour loading on all three factors.)

Therefore, the decision was made not to consider these two clusters in the definition of the respective concepts. Thus, the concept of cheerfulness comprises the items of the cheerful mood and hilarity clusters. Seriousness covers the span from earnestness to soberness. The concept of bad mood is composed by the sadness/melancholy and ill-humour items.

Study of item sensitivity

In order to evaluate the discriminatory power of the STCI-S items, one-way ANOVAs with the eight scenarios as repeated measurement factor were computed for each of the 40 STCI-S items separately. Furthermore, for the items of the three states planned comparisons were computed testing the difference between the control condition and the weighted mean of the homologous scenarios.

This test yielded significant differences ($p < .05$) for all items. All changes were positive and ranged from .25 to 2.24 points with medians of 1.1 for cheerfulness and seriousness items, and 2.0 for bad mood items. The range of means of cheerfulness items in the two homologous scenarios was from 3.46 to 3.97 (compared to 2.23 to 3.66 in the neutral scenario). The seriousness items were boosted from the control scenario (1.77 to 2.77) to the three serious scenarios (2.17 - 3.97), too, and so were the bad mood items (control: 1.26 - 1.89; bad mood scenarios: 2.31 - 3.91). While the results document that the whole item pool fulfills the criterion of being sensitive to mood alterations, the amount of change of an item will not be considered for item selection because it is affected by ceiling effects (some cheerfulness items had high means already in the neutral condition).

Development of the standard form STCI-S<30>

An item analysis was performed for the pilot version (STCI-S<40>) in construction sample I and it turned out that the psychometric characteristics for the total item pool were already quite good; Cronbach's Alpha was .94, .86, and .93 for cheerfulness, seriousness, and bad mood, respectively. However, some corrected item-total correlations (citc) were smaller than .30, and some correlations with other scales were higher than the ones with the own scale. Hence, cheerfulness correlated too highly negatively with both seriousness and bad mood ($r = -.56$ and $-.70$), while the latter were highly positively correlated ($r = .57$). One cheerfulness item additionally violated the fourth criterion with an item mean of 3.31.

Items were eliminated iteratively if they did not match one of the former mentioned criteria. Based on the results of construction sample I, 5 (cheerfulness), 3 (seriousness), and 2 (bad mood) items were eliminated in a stepwise procedure leaving the three scales with 10 items each. Table 2 gives the psychometric characteristics for the three scales of the standard form STCI-S<30> in construction sample I, but also in replication samples I and II*.

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* In the final standard form STCI-S<30> one seriousness item ("I'm not prepared for any silliness or nonsense") violating the second criterion by showing a high negative association with cheerfulness in some analyses (see below) was substituted. The newly added item proved to be a good marker for state seriousness. In replication sample II the corrected item-total correlation was .57 and the correlations with cheerfulness and bad mood were low (-.20 and .07, respectively).

Insert Table 2 about here

Table 2 shows that the elimination of items did not impair the quality of the scales. Cronbach's Alpha remained high, and the mean corrected item-total correlations (citc) increased for all scales. As expected, the scales' intercorrelations clearly decreased; in particular so in replication sample II. While the size of the correlations still seems to justify the combining of the three scales into an index of total state exhilaratability, this finding also gave impetus to discard state exhilaratability as a scale. The results of the three samples are comparable; also, the rank order of item means was fairly stable for the three scales (CH: $\underline{r}$ = .96; SE: $\underline{r}$ = .78; BM: $\underline{r}$ = .73).

While the scale means for cheerfulness and seriousness indicate an average intensity of these states, the average item difficulty for bad mood is marked below the theoretical item mean of 2.5. In construction sample I the median of the scale is 13 suggesting a positively skewed distribution of bad mood under resting conditions, which, however, failed to be significant.

There were no sex differences in the three states. While age correlated with state seriousness (e.g., construction sample I: $\underline{r}$ = .24, d.f. = 593; $\underline{p}$ < .001), this relationship disappeared ($\underline{r}$ = .03) once trait seriousness was partialled out.

Coefficient Alpha was computed for facets and turned out to be high for cheerfulness (replication sample II: cheerful mood: .90; hilarity: .86) and bad mood (melancholy/sadness: .89; ill-humour: .89), while – partly due to the lower number of items – being lower for the seriousness facets (earnestness: .78; pensiveness: .78; soberness: .62).

In order to describe the profile of the three states in the Wundtian dimensions of feeling, $\underline{t}$-tests (mean rating in the three dimensions tested against the theoretical mean of 50, for the 10 items of a scale) were computed for data in sample IV. The results suggested that state cheerfulness is characterized by pleasantness ($\underline{M}$ = 16.71; $\underline{p}$ < .001), excitation ($\underline{M}$ = 30.59; $\underline{p}$ < .001), and relaxation ($\underline{M}$ = 57.81; $\underline{p}$ < .01). Seriousness is perceived as a slightly strained state ($\underline{M}$ = 42.40; $\underline{p}$ < .05) but indifferent to hedonic tone ($\underline{M}$ = 52.41) and excitation—quietness ($\underline{M}$ = 45.65). Finally, bad mood is a state of unpleasantness ($\underline{M}$ = 84.49; $\underline{p}$ < .001) and strain ($\underline{M}$ = 32.90; $\underline{p}$ < .001), but not particularly excited ($\underline{M}$ = 43.19). Thus, while cheerfulness and bad mood are opposite on the dimensions of pleasantness—unpleasantness, and strain—relaxation, they are not so on excitation—quietness.

Stability and generalizability of the factor structure

Principal components analyses of the 30 items were performed for construction samples I and II, the two replication samples, the three time spans datasets, and the American sample. For each sample, the Scree-test suggested the retention of three factors, explaining from 52.8 to 66.2% of the variance (see Figure 2).

Insert Figure 2 about here

Figure 2 clearly shows that the course of Eigenvalues was highly similar in the different samples, the major differences being the magnitude of the first (and third) factor. Hence, for each analysis three factors were extracted and rotated according to the Varimax and Promax routines. Inspection of the factor loadings confirmed that the three factors of cheerfulness, seriousness, and bad mood clearly emerged in each sample.

The results of construction sample I served as a reference in the test of the similarity of factor structures. For that sample the homologous factors and STCI-S<30> scales correlated .99 for all three concepts underscoring the proximity of the theoretically postulated and empirically found dimensions. The factors were loaded highly (mean: .60) by the items of the homologous scales and the second loadings typically were low (ranging from -.31 to .21). Tucker's Phi coefficients for pairs of homologous factors of construction sample I and the other seven samples are given in Table 3. Furthermore, the congruence of factor structures found for males and females of construction sample I was determined as well.

Insert Table 3 about here.

Table 3 confirms that the structure of the items constituting the STCI-S<30> is highly generalizable (even without target rotation maximizing similarity) across different conditions. However, in two comparisons comparably lower coefficients emerged which need a closer inspection. While the cheerfulness and bad mood factors derived for the time span of a week were loaded homogeneously high by the homologous items, the size and sign of second loadings of some heterologous items fluctuated. While the application of the German 30-item key to the English pilot version of the STCI-S yielded good congruence coefficients for cheerfulness and bad mood (median of item congruence = .97 and .99, respectively), two seriousness items had anomalous loadings and will not be included in the yet to be constructed final English version (median of the other eight items = .92). However, most importantly, the factor structure of inter- and intraindividual variation was highly similar as expressed in Tucker's Phi coefficients in the range from .96 to .98 for factors and from .80 to 1.0 (median of .99) for items.

State-trait relationship

One core assumption associated with the state–trait model of exhilaratability (Ruch, 1994) claims that the traits represent the disposition for the respective states; e.g., individuals high and low in trait cheerfulness will differ with respect to the frequency, duration, and intensity of occurrences of state cheerfulness. However, homologous states and traits should also be distinguishable from each other. Thus, it needs to be demonstrated empirically that a joint factor analysis of state and trait items yields separate but positively correlated factors for homologous states and traits.

Joint factor analysis of the state and trait items

Principal components analyses of the joint itempools of the STCI-T<60> and STCI-S<30> were performed for construction sample I (being based on a large sample of N = 595) and replication sample II (utilizing the final version of the STCI-S).

Six factors were extracted in both the construction (Eigenvalues: 20.58, 6.73, 6.37, 4.28, 2.37, 2.20, 1.98, 1.59, 1.34, and 1.27) and the replication (Eigenvalues: 22.79, 7.62, 5.56, 4.03, 2.88, 2.66, 1.98, 1.52, 1.51, and 1.37) sample. They explained 47.25% and 50.60% of the variance, respectively, and were obliquely rotated. The three constructs both as states and traits were clearly identifiable in the Promax solutions of both samples. The average loading of the items of a scale on the corresponding factor ranged from .47 to .59 in the construction sample, and from .43 to .66 in the replication sample. Generally, the items of the state part

did not load highly on the homologous trait factor, and vice versa, the items of the trait part did not load highly on the homologous state factor; the highest second loadings (absolute) ranged from .08 to .36 (construction sample) and from .09 to .23 (replication sample)*. Thus, the homologous states and traits are separable. It is of importance to note that in the replication sample the newly written item showed the highest loading on the state seriousness factor (.54) and only negligibly second loadings on the other factors (< .20). The intercorrelations among the primary factors are given in Table 4.

Insert Table 4 about here.

Table 4 shows that the intercorrelations among the primary factors yielded the expected pattern. In the submatrices containing the state–trait correlations, the diagonals (i.e., state–trait correlation of homologous factors) yielded the highest coefficients. While the homologous factors were positively correlated in both samples, the coefficients were higher in the construction sample. Within the states and traits, the three factors showed the expected pattern of relationship: Cheerfulness correlated negatively with seriousness and, more highly so, with bad mood, while these were positively correlated themselves. A similar pattern was also found across states and traits; e.g., trait cheerfulness correlated negatively with state seriousness and state bad mood. However, the coefficients were lower and suggested that trait seriousness is not related to the affective states.

Convergence of states and traits in peer-evaluation data

The above reported results give first support to the assumption that the three trait dimensions of cheerfulness, seriousness, and bad mood represent dispositions for the respective mood states. However, an unambiguous test of the hypothesis should use data from different sources. For example, the employment of self- and peer-assessment of the traits would prevent the alternative interpretation of positive correlations of homologous concepts emerging only due to semantic overlap.

Subjects of construction sample II additionally answered the STCI-T<106> and were instructed to find three well-known acquaintances to fill in the peer evaluation form of the STCI-T<106>. Furthermore, as reported above, mood states were assessed on eight successive days of a week. The trait scores were correlated with each of the eight administrations separately (the resulting coefficients were averaged) and with a score for aggregated mood level (sum over eight days). Finally, subjects filled in the three modified versions of the STCI-S (with instructions for "last week", "last month", and "last year"). The correlations are given in Table 5.

Insert Table 5 about here

Table 5 shows for the self-reported traits the expected low positive correlations with the homologous states as assessed on eight consecutive days; the magnitude of the averaged

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* The high second loading was caused by one state seriousness item that loaded on the trait seriousness factor in both samples (the second highest second loading of a state seriousness item were .19 and .13 in the two samples). This item proved to be sensitive to experimental manipulations of state seriousness and thus was kept in the scale.

zero-order correlations is comparable to the coefficients reported in Table 4. As expected, these convergent correlations increased for the aggregated states (total score across eight days) and for the longer lasting time spans. Correlations among heterologous states and traits yielded the expected pattern in every case and were much lower (average of .30) than the average coefficient for homologous pairs (.49).

More importantly, a convergence between states and traits could be found for the peer-evaluation data as well. The coefficients were all significant and — for individual states — only slightly (.05 on the average) lower than for the self-reports. Not surprisingly, this difference increased for the aggregated states (.07) and the longer lasting states (.19). Again, the expected pattern of correlation among heterologous states and traits emerged and they were lower (average of .23) than the average coefficient for homologous pairs (.35). Thus, the peer-evaluation data provide support for the hypothesis that traits represent the dispositions for the respective states.

Variations in states

The three states of cheerfulness, seriousness, and bad mood vary intraindividually; they oscillate around a mean mood level which differs interindividually according to the individual's location on the homologous trait. However, exposure to certain conditions will raise or lower certain states more or less uniformly; e.g., the engagement in situations perceived as being important will boost the degree of state seriousness and the level of state cheerfulness will be elevated during birthday parties. While it has been demonstrated that the items of the STCI-S are susceptible to change in prototypical imagined situations, it needs to be confirmed that the STCI-S is able to reflect changes in mental and affective states in real life situations.

The scale means in the construction and replication samples (see Table 2) are remarkably stable; however, these subjects were tested in non-salient situations (mostly resting conditions, baseline measures in experiments) and hence it was not expected that the state profile is different. In order to examine the possible range of variations in the scales, further assessment of the three states was undertaken in states of possible altered mood covering naturally occurring mood changes (e.g., in everyday life, such as diurnal variations due to type of weather, success or failure), unobtrusively induced mood changes (e.g., exposing subjects to rooms of different "atmosphere"; experimenter's personality), more or less obtrusively induced mood changes (e.g., experimenter's social behavior; experimental treatments, presentation of humour), and chemically induced mood changes (i.e., inhalation of nitrous oxide, "laughing gas").

Table 6 gives a brief overview of the mood profiles of some selected situations. Only results are included in which at least one scale is different from the baseline (pre-post comparison) or a control group in the expected way.

Insert Table 6 about here

Table 6 shows that there is a considerable range in means for all three scales even among the real life situations. Means in state cheerfulness varied from about 19 (after exposure to situations inducing bad mood) to 35 (sober women during carnival festivities; male volunteers after inhaling nitrous oxide [subgroup of 11 smiling or laughing subjects only]). Level in cheerfulness was also elevated among soccer fans before an easy to win game on TV and after exposure to jokes and cartoons, a clowning experimenter, and an audiotape of

interviews of a catching cheerful quality. Induction of state seriousness lowered state cheerfulness slightly.

State seriousness means ranged from 14 (the carnivalists) to 27 (subjects starting a two-hour mental work). The task of giving explanations of sayings increased and decreased the degree of state seriousness depending on whether this needed to be done in a precise (i.e., interpreting its meaning) or playful way, respectively. Furthermore, seriousness increased when listening to catching audiotapes of a serious (but also bad mood) quality and decreased in some cheerful situations. State-seriousness was lower during the evening.

Bad mood means were typically low and ranged from 11 (the carnivalists; inhalation of nitrous oxide) to 24 (among soccer fans after the German national team dropped out of the 1994 World Championship competition). Bad mood was increased experimentally by an audiotape of a catching bad mood quality (but not by the serious tape), and decreased (sometimes) after the successful induction of cheerfulness. Interestingly, the high bad mood among the peeved soccer fans was not accompanied by an increase of seriousness, confirming the relative independence of these two states.

Nevertheless, the changes of states observed in real life typically did not approach the peaks of the imagined mood states of an average person in the different prototypical scenarios (sample IV). However, since most of the studies conducted so far were mainly interested in increasing Ss' state exhilaratability (by inducing a cheerful state), no intense induction of the antagonistic mood states was undertaken.

Conclusions

The present article confirms that the items making up the state concepts of cheerfulness, seriousness, and bad mood are homogeneous across individuals and situations. The factor structure is replicable (substitution of subject sample) and generalizable across samples of different nationality and across length of the time span of the mood covered. The items sensitively reflect changes in both imagined responses to prototypical situations and perceived own feeling state as naturally occurring or experimentally induced. The intended changes work in both directions, an uplift of state exhilaratability can be documented and so can its repression.

The constructed scale has reasonable psychometric characteristics and it is applicable to assess longer lasting levels in affective and mental states. This might be of interest, for example, when the stress-buffering role of humour (or trait cheerfulness) on mood level needs to be examined (e.g., Martin & Lefcourt, 1984). The examination of the validity of the state scale will be the subject of further studies.

Now that the standard forms of both the state and trait part of the STCI are constructed, it is possible to examine some fundamental postulates regarding the relationship between the homologous (and heterologous) states and traits. For example, it was postulated that trait cheerfulness represents the disposition for the frequency, intensity, duration, threshold, and robustness of state cheerfulness. Also, it can be examined whether elevated levels of cheerful mood represent not only an enhanced readiness to laugh but also have a facial component. Darwin (1872, p. 212) assumed for a person in high spirits or a cheerful state that "though he may not actually smile, [he] commonly exhibits some tendency to the retraction of the corners of his mouth". Coding of facial actions of subjects watching funny movies in prior experiments (e.g., Ruch, 1995) led to the informal observation that during stages of high density of punch lines the subjects' enjoyment displays did not entirely fade out but remained at elevated levels for extended periods of time. These zygomatic major actions did not differ in intensity and largely exceeded the upper limit of duration of felt smiles (Frank & Ekman,

1993). It might be hypothesized that these more tonic changes in zygomatic major (and orbicularis oculi) action represent elevated levels of state cheerfulness.

The relevance of the STCI-S in the realm of humour needs to be examined empirically. The splitting up of the good vs. bad humour distinction into three correlated components allows the investigation of the relative contribution of mental and affective factors in the appreciation and creation of humour (or the lack of it). The experimental manipulation of the three states should allow for a testing of causal hypotheses relating to the role of the states in the induction of exhilaration and laughter.

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Table headings

Table 1. Description of the item clusters by their means, factor loadings, and profiles in the Wundtian dimensions of feeling

Table 2. Psychometric characteristics and intercorrelations of the scales of the STCI-S<30>

Table 3. Congruence (Tucker's Phi) of homologous factors in different samples as compared with construction sample I

Figure captions

Figure 1. The location of the 40 items in a varimax-rotated factor space for inter- (a) and intraindividual (b) variation

Figure 2. Eigenvalue plot for all eight samples (and the percentage of explained variance)

Table 1. Description of the item clusters by their means, factor loadings, and profiles in the Wundtian dimensions of feeling

Cluster	N_i	M/N_i	SD	PC1	CH	SE	BM	PL—UP	EX—QU	ST—RE
well-being	3	3.12	.21	.77	.41	.14	-.36	14.90	53.67	74.08
cheerfulness	5	2.71	.18	.73	.59	.08	-.10	17.10	29.43	57.81
hilarity	6	2.47	.20	.63	.60	-.04	.08	18.47	34.14	57.40
earnest	3	2.42	.05	-.54	-.15	.56	-.04	49.32	49.03	42.22
sober	3	2.45	.48	-.24	-.01	.54	-.15	56.20	44.93	40.93
pensive	3	2.50	.14	-.42	.17	.62	.14	46.43	45.78	45.42
melancholy	5	1.54	.08	-.67	.01	.05	.60	84.80	47.92	34.19
ill-humoured	5	1.50	.09	-.70	-.04	-.01	.61	84.18	38.46	31.61
humourless	5	2.14	.49	-.64	-.31	.20	.13	72.13	42.57	36.85

Notes. N_i = number of items per cluster; PC1 = first unrotated principal component; PL-UP = pleasantness—unpleasantness, EX-QU = excitation—quietness, ST-RE = strain—relaxation.

Table 2. Psychometric characteristics and intercorrelations of the scales of the STCI-S<30>

STCI-S scales	M	SD	Sk	Ku	α	citc mean	citc range	r SE	r BM
Construction sample I									
Cheerfulness	25.75	6.87	-.24	-.46	.93	.72	.60—.81	-.46	-.59
Seriousness	24.28	6.03	-.01	-.51	.85	.55	.34—.70		.45
Bad mood	15.20	6.31	1.40	1.27	.93	.73	.67—.81		
Replication sample I									
Cheerfulness	24.99	6.97	-.19	-.47	.94	.76	.62—.85	-.59	-.66
Seriousness	24.26	6.21	-.01	-.47	.86	.57	.41—.70		.56
Bad mood	16.44	6.94	.99	.14	.94	.76	.63—.83		
Replication sample II									
Cheerfulness	24.08	6.76	-.04	-.46	.93	.73	.61—.80	-.41	-.56
Seriousness	25.96	5.70	-.39	.13	.85	.55	.36—.68		.36
Bad mood	16.95	6.89	1.10	.75	.94	.75	.69—.82		

Note. Ns = 595 (German adults answering the 40 item pilot version), 188 (replication sample I) and 329 (German adults answering the final 30 item version).
Sk = skewness; Ku = kurtosis; α = Cronbach's Alpha; citc = corrected item-total correlation.

Table 3. Congruence (Tucker's Phi) of homologous factors in different samples as compared with construction sample I

	Construction sample I		
Comparison samples	Cheerfulness	Seriousness	Bad mood
Construction sample II	.97	.98	.96
Replication sample I	.98	.99	.98
Replication sample II[1]	.98	.99	.98
Time spans -week-	.95	.97	.94
Time spans -month-	.98	.98	.98
Time spans -year-	.99	.99	.97
American sample	.95	.80	.93
Males vs. females	.98	.97	.98

Note. [1] Computed for the common 29 items only.

Table 4. Primary factor intercorrelations of the joint factor analyses of the 30 state and 60 trait items

Factors	S-CH	S-SE	S-BM	T-CH	T-SE	T-BM
S-CH		-.35	-.45	.40	-.16	-.24
S-SE	-.35		.31	-.31	.35	.23
S-BM	-.45	.30		-.28	.07	.36
T-CH	.49	-.19	-.29		-.38	-.55
T-SE	-.13	.39	.07	-.27		.18
T-BM	-.35	.17	.38	-.55	.21	

Notes. Below diagonal = construction sample I, above diagonal = replication sample II. Correlations between homologous factors were italicized.

Table 5. Correlation between homologous traits and states in self- and peer-report data

	STCI-T<106> self evaluation			STCI-T<106> peer evaluation		
STCI-S	CH	SE	BM	CH	SE	BM
eight states						
averaged	.33	.27	.29	.25	.26	.24
aggregated	.52	.42	.47	.40	.39	.40
time spans						
last week	.68	.49	.52	.44	.37	.36
last month	.65	.52	.53	.44	.36	.37
last year	.57	.51	.60	.36	.29	.34

Note. N = 100 (construction sample II).
r > .20: p < .05; r > .26: p < .01; r > .32: p < .001.

Table 6. Test statistics of the STCI-S<30> scales for different situations and conditions

			Cheerfulness		Seriousness		Bad Mood	
Samples	N	Condition	M	SD	M	SD	M	SD
Construction sample I	595	BL	25.75	6.87	24.28	6.03	15.20	6.31
Construction sample II	100	morning	23.87	6.31	24.41	5.57	16.98	5.94
(diurnal variation; 8 assessments)		noon	25.42	5.73	23.51	5.16	15.37	4.63
		afternoon	25.58	6.60	23.46	5.61	16.38	5.05
		evening	25.19	6.08	22.62	5.67	16.60	5.49
women at carnival festivities	29	carnival	35.28	5.12	14.41	4.31	11.24	2.18
male soccer fans	9	pre	32.00	5.15	18.78	3.96	13.78	3.96
		post	19.22	4.38	21.11	5.65	24.22	3.49
students facing mental work	74	BL	23.97	6.83	27.14	5.22	17.86	7.51
volunteers in a humor survey	110	BL	27.15	7.09	25.05	6.14	15.15	6.91
adults at an open day of science	46	pre	25.57	5.64	26.59	5.76	15.72	6.32
attending a 5-min humor experiment		post	28.57	6.54	22.91	6.01	13.91	6.35
students in mood manipulation	48	At<CH>	28.15	7.20	20.00	6.86	15.56	7.28
experiment (both sexes)		At<SE>	21.83	6.74	24.52	7.04	17.38	6.83
		At<BM>	19.38	5.71	26.08	6.40	20.50	6.76
students in humor experiment	62	jokes	28.05	5.87	18.79	5.74	13.69	5.31
(both sexes)	32	clowning	27.41	5.24	19.56	5.81	13.69	4.50

adults in mood manipulation (Table 8. Cont.)	68	Task<se>	21.42	7.93	26.15	6.13	21.36	9.44
experiment (both sexes)		Task<pl>	25.89	5.56	22.60	5.47	15.77	6.42
male volunteers inhaling	20	BL	26.60	5.27	23.18	4.81	14.30	5.10
nitrous oxide or oxygen		Oxy	27.68	6.18	20.95	5.74	13.43	4.91
		N_2O	29.92	7.88	18.87	7.04	13.13	4.77
	11	N_2O[1]	35.00	4.62	16.26	5.96	11.22	2.32
Construction sample III	35	neutral[2]	26.11	5.62	21.49	4.31	13.54	4.80
adults stipulating mood		cheerful	36.63	4.02	15.20	4.22	10.83	2.09
during state-relevant		hilarity	38.66	3.03	13.37	4.77	10.31	0.76
situations (both sexes)		earnest	20.89	6.68	33.34	6.50	14.89	4.96
		pensive	18.89	4.34	35.74	2.48	17.29	5.28
		sober	23.34	5.05	31.03	6.25	13.74	3.55
		melancholy	11.11	2.68	33.97	3.45	33.80	5.45
		ill-humored	12.69	4.59	29.37	5.47	33.71	6.07

Notes. BL = baseline; carnival = during carnival festivities; pre = expecting a soccer match; post = after lost soccer match; At<CH>, At<SE>, and At<BM> = audiotape of interviews with catching affective (cheerful, serious, and bad mood, respectively) quality; jokes = after presentation of 35 jokes and cartoons; clowning = after interaction with a clowning experimenter; task<se> = serious explanation of sayings; task<pl> = playful explanation of sayings; Oxy = inhalation of oxygen (placebo control); N_2O = inhalation of nitrous oxide.

[1] subgroup of responders only. [2] quality of scenarios.

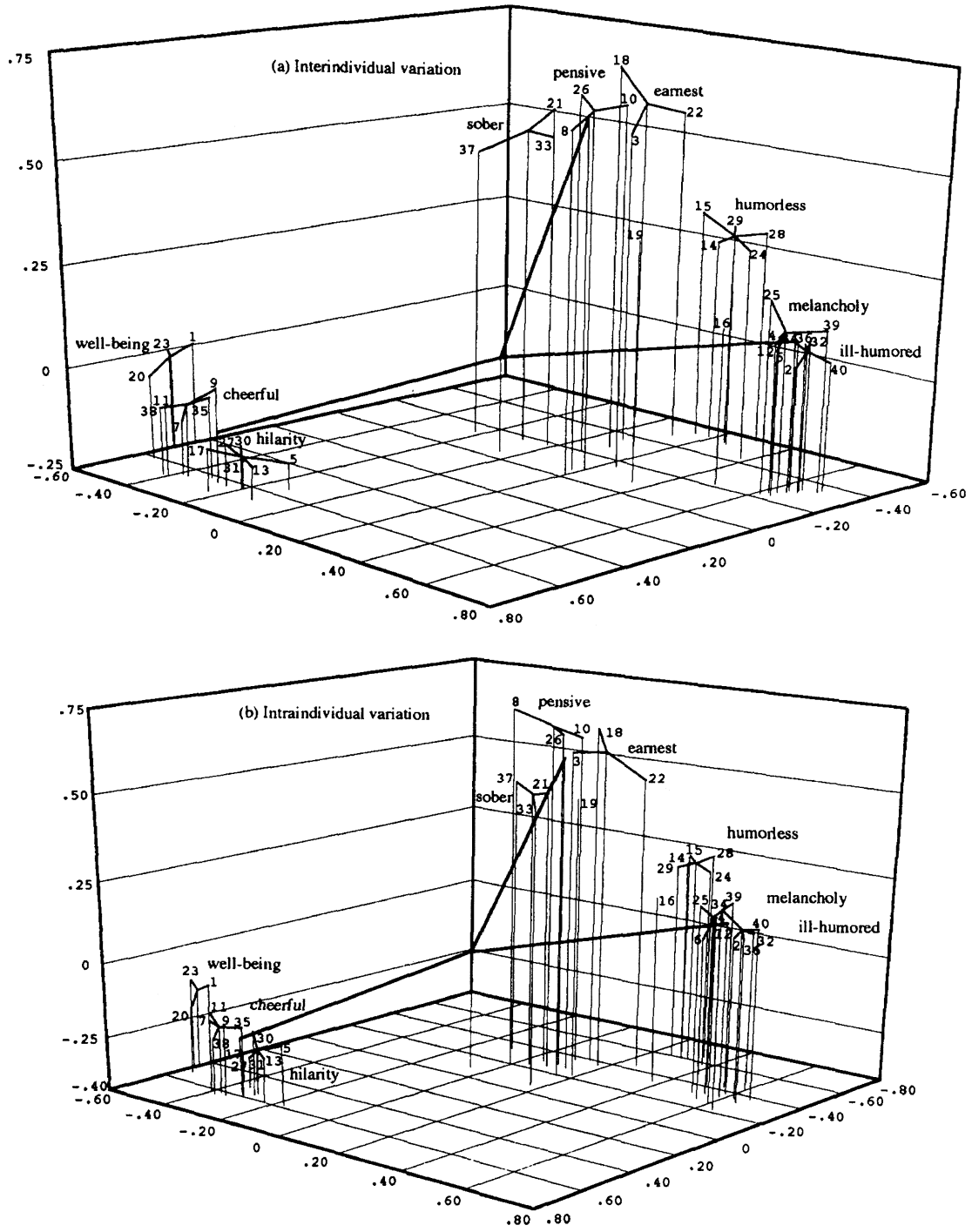

Figure 1. The location of the 40 items in a varimax-rotated factor space for inter- (a) and intraindividual (b) variation

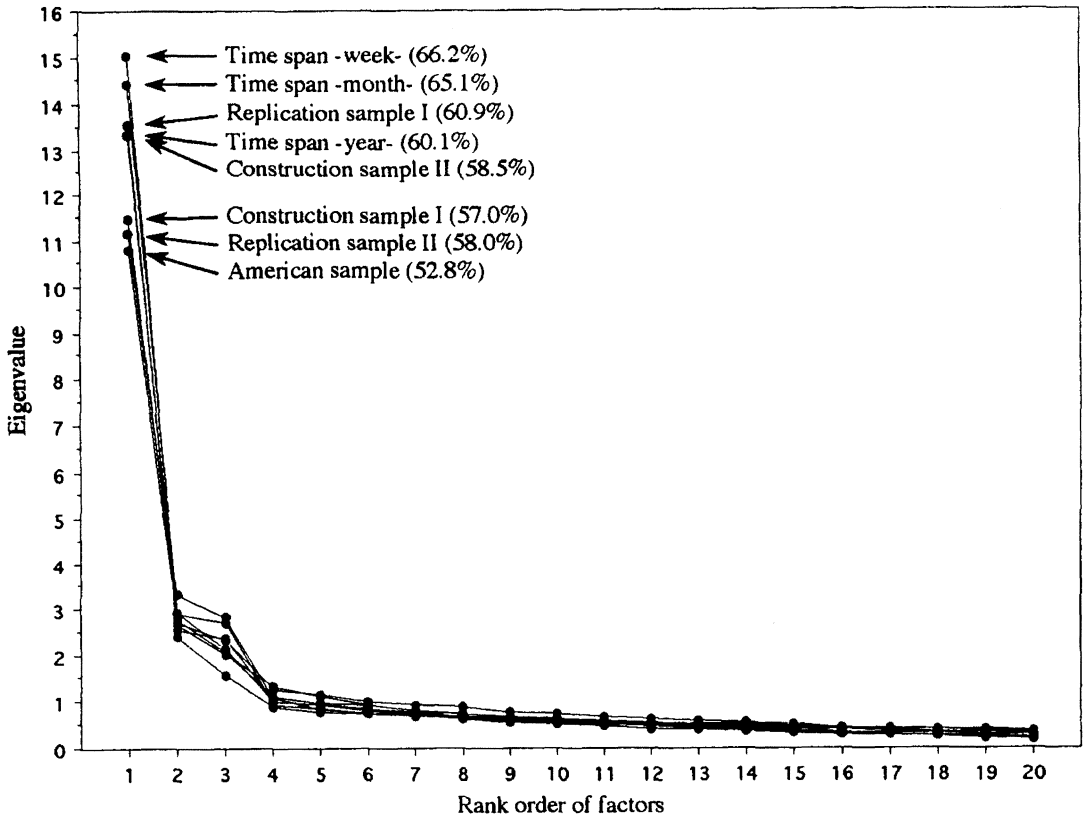

Figure 2. Eigenvalue plot for all eight samples (and the percentage of explained variance)