Validity and reliability of the Bermond–Vorst Alexithymia Questionnaire

Harrie C.M. Vorst *, Bob Bermond

University of Amsterdam, Department of Psychology, Room 506, Roetersstraat 15, 1018 WB, Amsterdam, The Netherlands

Abstract

The aim of this research is to establish the validity and reliability of the Bermond–Vorst Alexithymia Questionnaire (BVAQ). The BVAQ consists of five subscales, each comprising of eight items. The subscales are denoted Emotionalizing, Fantasizing, Identifying, Analyzing, and Verbalizing. The validity of the instruments was investigated by comparing results of psychometric analyses in three language groups. In addition BVAQ scores were correlated, for comparison, with the TAS-20 test scores and with measures of psychological problems. Two studies were carried out.

In the first study the BVAQ was administered to a sample of Dutch students ($n = 375$), a sample of French-speaking Belgian students ($n = 175$), and a sample of English students ($n = 129$). Cronbach's alpha was found to be about the same in the three samples (means of subscales about 0.79; total scales about 0.85). Principal components analyses of the 40 items revealed comparable five-factor solutions in the three samples. The mean total score of UK students differs about 0.29 SD from that of the Dutch and Belgian students. The intercorrelations of subscales were the same in the three samples. However, principal components analyses of the subscale scores of the English subjects revealed a different factor structure compared to that in the other samples.

In the second study, the BVAQ and the Dutch version of the TAS-20 were administered to 430 Dutch students. Correlations between (sub)scales of the Dutch BVAQ and (sub)scales of the TAS-20 support the validity of the BVAQ. The validity of the BVAQ is further supported by correlations between BVAQ scores and measurements of psychological problems. © 2001 Elsevier Science Ltd. All rights reserved.

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* Corresponding author. Tel.: +31-20-5256875; fax: +31-20-6390026.
E-mail address: ml-vorst@macmail.psy.uva.nl (Harrie C.M. Vorst).

1. Introduction

1.1. Definition of alexithymia

The alexithymia concept stems from the field of emotions and psychosomatics. In the late 1940s, MacLean (1949) described that in a large proportion of patients with psychosomatic complaints, the reported emotional experience is deficient in that it is not characterized by the expected full conscious symbolic and verbal elaboration. This deficiency may result in problems during psychoanalysis-based therapy (Groen & Bastiaans, 1951; Ruesch, 1948). Nemiah and Sifneos (1970) describe the characteristic aspects of these patients' emotional experiences. "(1) These patients manifested either a total unawareness of feelings or an almost complete incapacity to put into words what they were experiencing. (2) The associations of the majority of the patients were characterized by: (a) a nearly total absence of fantasy or other material related to their inner, private mental life of thoughts, attitudes and feelings; and (b) a recounting, often in almost infinite detail of circumstances and events in their environment, including their own actions." (p. 154). Later Sifneos introduced the term 'alexithymia' for this complex of features, which was "from the Greek a = lack, lexis = work, thymos = mood or emotion" (Sifneos, 1973, p. 256).

Taylor, Ryan and Bagby (1985) defined the concept of alexithymia as follows: "Alexithymic patients have difficulty identifying and describing their feelings, their cognitive style is concrete and reality-based (la pensée opératoir) and they have impoverished inner emotional and fantasy lives" (p. 191). The concept of 'la pensée opératoire' stems from Marty and M'Uzan (1963), observed as a feature in psychosomatic patients. The definition of this concept is adequately summarized in English by Krystal (1988, p. 266): "This characteristic 'operative thinking' (Marty & M'Uzan, 1963) involves a preoccupation with 'things' at the expense of object relations. The combination of impairment in the capacity for fantasy and abstract thinking, and the lack of affective clues, deprives the patient of the ability to empathize and to be emotionally involved with significant objects." This description of 'la pensée opératoire' covers many aspects of the description of alexithymia itself: impairments of affect, fantasy and empathy and further a tendency to talk about trivial details instead of reflecting on one's emotions. Since impairments in fantasy and affect are two separate features of the alexithymia concept, the tendency to talk about trivial details instead of reflecting on one's emotions, is the only remaining feature. This impaired capacity or unwillingness to reflect upon (or analyse) one's emotions seems to accentuate the remaining preoccupion with concrete things and trivial details. For these reasons we included the (impaired) capacity to analyse one's emotions as a separate subscale.

Taylor's definition is very close to the original description of Nemiah and Sifneos (1970). Both Nemiah and Sifneos (1970) and Taylor et al. (1985) refer to four essential elements: (1) a reduction or incapacity to experience emotions; (2) a reduction or incapacity to verbalize emotions; (3) a reduction or incapacity to fantasize; and (4) an absence of tendencies to think about one's emotions. In therapeutic situations the last mentioned tendency to think about one's emotions is replaced by a tendency to endlessly sum-up details about the environment and one's own actions. Taylor et al. (1985) add one new characteristic, viz. 'the difficulty in identifying emotions', suggesting that at least in some alexithymic patients the unawareness of feelings is not absolute, resulting in vague emotional feelings which cannot be differentiated. This characteristic has since

been describe by others (Hendryx, Haviland & Shaw, 1991; Krystal, 1988), and is now generally accepted as a feature of alexithymia.

1.2. Measurement of alexithymia

Various alexithymia scales have been published. With the exception of the various versions of the Toronto Alexithymia Scale (TAS, TAS-R and TAS-20; Bagby, Parker & Taylor, 1994; Bagby, Taylor & Parker, 1994; Taylor & Bagby, 1988; Taylor, Bagby & Parker, 1992), none of these instruments meet minimal psychometric requirements. Taylor et al. (1985) developed a self-report instrument (Toronto Alexithymia Scale; TAS) to measure alexithymia. This questionnaire was improved in 1992 (TAS-R), and again in 1994 (TAS-20). The TAS-20 comprises 20 items which measure the following three factors: difficulty identifying feelings, externally-oriented thinking, and difficulty describing feelings. The TAS-20 has a number of shortcomings. Firstly, response tendencies may occur because the scales are not composed of balanced indicative and contra-indicative items. Secondly, the three alexithymic factors measured by the TAS-20 are covered by different numbers of items [seven, five, and eight items]. Thus some factors contribute more to the TAS-20 total alexithymia scores than others. Furthermore, three instead of the five identified factors are measured. The TAS-20 does not therefore provide a comprehensive operationalization of alexithymia. The absence of the factors 'reduced fantasizing' and 'reduced experiencing of emotional feelings' is unfortunate because these factors have been described as essential alexithymic traits by various authors (Flannery, 1977; Krystal, 1988; Mann, Wise & Shay, 1992; Martin, Pihl, Young, Ervin & Tourjam, 1986; Nemiah & Sifneos, 1970; Parker, Taylor & Bagby, 1992, 1993; Sifneos, 1973, 1991; Weinryb, Gustavsson, Åsberg & Rössel, 1991). As it is limited to three factors, the TAS-20 does not provide a full assessment of various aspects of alexithymia.

In 1992, Bermond and Vorst developed the Amsterdam Alexithymia Scale (AAS) (Bermond, Vorst, Vingerhoets & Gerritsen, 1999; Vingerhoets, van Heck, Grim & Bermond, 1995). During the construction, the original definitions of Taylor et al. (1985) are strictly followed. The designations of the alexithymia dimensions provided by Taylor et al. (1985) correspond to those of Bermond and Vorst in the following way.

Taylor et al.	Bermond–Vorst
(3) "emotional live"	Emotionalizing
(4) "fantasy"	Fantasizing
(1) "identifying feelings"	Identifying/Differentiating/Insight
(5) "concrete and reality-based cognitive style (la pensée opératoire)"	Analyzing
(2) "describing feelings"	Verbalizing

The correspondence is generally close with the possible exception of dimension (5). The terms "concrete and reality-based cognitive style (la pensée opératoire)" is taken from the diagnostic parlance associated with alexithymia. Bermond, Oosterveld and Vorst (1994) selected a designation that matched the interpretation of the items of the scale. They argued that the trait is not a cognitive style ('la pensée opératoire'), but a low level of analyzing one's emotions. This incapacity

of analyzing one's own emotions leaves the impression of a deficiency in emotional interests, a preoccupation with trivial details, and a concrete and reality-based cognitive style. Moreover, all items of the TAS measuring 'la pensée opératoire' consist of items concerning the (lack of a) tendency to analyze emotional problems (Taylor et al., 1985). So, the main difference here lies more in the designation of the dimension rather than its content. The Bermond–Vorst Alex-ithymia Questionnaire (BVAQ) is an extension of the AAS. The BVAQ consists of two parallel versions (A and B) of 20 items each and an extended test (A + B) of 40 items. The five subscales of both parallel versions (A and B) each consists of two indicative and two contra-indicative items.

In co-operation with researchers in various countries the BVAQ was translated into English, French, Italian, Spanish, German, Polish, and Russian. Each translation was carried out follow-ing the recommendations in the literature (Hulin, 1987; Jackson, 1991; Sperber, Devellis & Boehlecke, 1994; Trandis, 1976). Specifically, an initial translation was carried out by one or two native speakers who are experts in the domain of the subject matter. The translated questionnaire was back-translated by professional translators, who were instructed by the second author. Dif-ferences between the original items and the back-translated items were evaluated by the second author. The second author discussed the significance of the differences with the back-translator. The discussion resulted in proposed improvements, which were implemented with the approval of the original translators.

1.3. Research aims

To establish the reliability and validity of the BVAQ two studies were carried out. In the first study, the BVAQ was administered to a Dutch, a French-speaking Belgian, and an English sam-ple of students. The aim of the research was to compare the psychometric qualities of the instru-ment, and to establish its reliability and validity in these three language groups. The results are reported in terms of means and standard deviations of scores, indices of uni-dimensionality and consistency, intercorrelations of subscales, and factor structures.

In the second study, the Dutch version of the BVAQ and the Dutch translation of the TAS-20 were administered to a group of Dutch psychology students. The aim of this study was to estab-lish the validity of the Dutch BVAQ by analyzing the structure of the scales of the Dutch BVAQ, by relating the (sub)scales of the BVAQ to the TAS-20 scores, and finally by relating (sub)scales of both instruments with measures of psychological problems.

2. Study 1

2.1. Method

2.1.1. Subjects

In the first study, three groups of subjects participated: a group of Dutch students, a group of French-speaking Belgian students, and a group of English students. The Dutch sample consisted of 375 psychology students at the University of Amsterdam aged between 18 and 51 (mean = 21.3; SD = 11.2). Of these 375 subjects, 249 were women (66%). The BVAQ was completed during a group session. The Belgian sample consisted of 175 students at the University of Louvain la

Neuve aged between 19 and 63 (mean = 20.6; SD = 4.0). Of the 175 subjects, 147 were women (84%). The BVAQ was administered in several small group sessions. The students received payment for completing the questionnaire. The English sample consisted of 129 students aged between 18 and 48 (mean = 21.4; SD = 4.7). Ninety-three of the 129 subjects were women (72%). The BVAQ was completed during small group sessions. Like the Belgian students, these subjects received payment for completing the questionnaire.

2.1.2. Instruments

2.1.2.1. Bermond–Vorst Alexithymia Questionnaire (BVAQ). The Bermond–Vorst Alexithymia Questionnaire (BVAQ) was designed to measure the five dimensions of alexithymia mentioned above (Bermond et al., 1994). These dimensions are conceptualized as continuously varying latent traits. The questionnaire consists of two parallel forms (A and B), both including 20 items. Both parallel forms constitute an extended form (40 items). Each dimension is measured by four items in form A and in form B, and by eight items in form AB. The five subscales in both parallel scales (A and B) consist of two indicative items (positively formulated in reference to the trait) and two contra-indicative items (negatively formulated in reference to the trait). The five latent traits are the following.

- Emotionalizing (Emotionalizing): the degree to which someone is emotionally aroused by emotion inducing events. An examples of an item in this scale is: "When something totally unexpected happens, I remain calm and unmoved" (neg).
- Fantasizing about virtual matters (Fantasizing): the degree to which someone is inclined to fantasize, imagine, day-dream, etc. An example of an item in this scale is: "Before I fall asleep, I make up all kinds of events, encounters and conversations" (pos).
- Identifying the nature of one's own emotions (Identifying): the degree to which one is able to define one's arousal states. An examples of an item is: "When I am distressed, I know whether I am afraid or sad or angry" (pos).
- Analyzing one's own emotional states (Analyzing): the degree to which one seeks out explanations of one's own emotional reactions. An examples of an item is: "I hardly ever go into my emotions" (neg).
- Verbalizing one's own emotional states (Verbalizing): the degree to which one is able or inclined to describe or communicate about one's emotional reactions. An example of an item is: "I find it difficult to verbally express my feelings" (neg).

The scoring of the items is such that high subscores are indicative of a high proneness to alexithymia. Respondents react to the items using rating scales with five response categories varying from (1) 'definitely applies to me' to (5) 'in no way applies to me'. The scores of the subscales of forms A and B range from 4 to 20. The scores of the subscales of form AB range from 8 to 40. The total alexithymia scores range from 20 to 100 (A or B), or from 40 to 200 (form AB).

2.2. Analyses

The Dutch, Belgian and English data were analyzed using standard psychometric procedures. The distribution, consistency and uni-dimensionality of the scores of the subscales were established.

The differences of (sub)scale means between language groups was expressed in terms of Cohen's effect size d (differences between mean scores of two groups divided by the mean standard deviations of both groups). Values of $d = 0.2$, $d = 0.5$, and $d = 0.8$ were considered to be small, moderate and large effects, respectively (Cohen, 1977). The uni-dimensionality of the subscales was assessed by fitting a single common factor model to the data of each subscale. LISREL 8 was used to this end (Jöreskog & Sörbom, 1993). The internal structure of the total set of items was evaluated by means of principal components analyses. In view of the five dimensions of alexythymia, a five-factor structure was expected. The intercorrelations among the subscales are reported and the factor structure of the subtest scores was investigated by means of principal components analyses. At the second-order factor level, two-factors were expected: an affective dimension of a conscious awareness of the arousal of emotions (Emotionalizing and Fantasizing) and a cognitive dimension of conscious interpretation of emotions (Identifying, Analyzing and Verbalizing). The hypothesis of this second-order two-factor structure was based on Bermond's conception of two types of alexithymia. The implications of this two-factor model of subscales will be explicated in the general discussion. The relations between sex and age and (sub)scales of the BVAQ were investigated also. On the basis of previous results (Noël & Rimé, 1988), positive correlations between age and alexithymia were expected. Despite the stereotypic assumption that males are less emotional than females, the relationship between gender and alexithymia remains somewhat unclear. Noël and Rimé (1988) describe eight studies concerning this issue. Three of these produced significant results, two supported the expected gender effect and one did not. Using the BVAQ subscale scores, we hope to obtain a more detailed picture concerning the relationship between gender and alexithymia. If gender has an effect on subscale scores, a five-factor model will be fitted for both sexes separately, to control for potential bias of unequal gender distributions of the samples.

2.3. Results and discussion

2.3.1. Distribution, consistency and uni-dimensionality of scales

Table 1 contains the results of the analyses of the scores on the three versions of BVAQ form AB (Dutch, French, English). This Table contains the means, standard deviations and various measures of consistency. These measures include the mean of item intercorrelations r(ii), mean of corrected item-test correlations r(ir), Cronbach's Alpha and the correlation between parallel forms A*B. The uni-dimensionality of subscale scores was assessed by means of the Chi-square goodness of fit index, Goodness of Fit Index (GFI), and the Adjusted Goodness of Fit Index (AGFI). The samples differ with respect to the means. The Dutch and the Belgian samples differ on two subscales of the BVAQ: Emotionalizing ($d = 0.29$) and Verbalizing ($d = -0.29$). The Dutch and the English samples differ on four subscales: Emotionalizing ($d = -0.33$), Identifying ($d = -0.70$), Analyzing ($d = -0.23$) and Total BVAQ ($d = -0.29$). Finally, the Belgian and English samples differ with respect to Fantasizing ($d = -0.25$), Identifying ($d = -0.54$), Analyzing ($d = -0.31$) and Total BVAQ ($d = -0.27$).

There were hardly any differences in indices of consistency between countries or versions. The means of r(ii) of the subscales of the three instruments are 0.35, 0.34, and 0.32, respectively; the mean r(ir) are 0.52, 0.49, and 0.51; the mean alphas are 0.79, 0.79, and 0.77; the mean correlations between forms (A*B) are 0.69, 0.72, and 0.68, respectively. The formal chi-square tests of

the uni-dimensionality of subscales was significant in all cases implying that the hypothesis of uni-dimensionality is not supported. However, except for the subscale verbalizing, the GFI and AGFI suggest that uni-dimensionality is tenable (mean AGFI equals 0.87, 0.82, and 0.82, respectively; for verbalizing AGFI equals 0.76, 0.67, and 0.61, respectively). The values of RMSEA suggest a satisfactory fit in three cases ($0.05 \leq RSMEA \leq 0.08$), a moderate fit in three cases ($0.08 < RSMEA \leq 0.10$), and an unsatisfactory fit in nine cases ($RSMEA > 0.10$).

The results of form A and B of the three BVAQs can be summarized as follows. The mean indices of consistency of the five subscales in the Dutch sample are 0.61 (form A: $0.49 \leq alpha \leq 0.77$) and .68 (form B: $0.65 \leq alpha \leq 0.76$). In the Belgian sample, these means equal 0.55 (form A: $0.44 \leq alpha \leq 0.69$) and 0.67 (form B: $0.49 \leq alpha \leq 0.73$). In the English sample, finally, means are 0.58 (form A: $0.43 \leq alpha \leq 0.78$) and 67 (form B: $0.56 \leq alpha \leq 0.74$). Of the 30 tests of the single common factor model seven are significant. The mean AGFI over all tests is 0.94. The subscales Emotionalizing A, Emotionalizing B, Verbalizing A, and Identifying B do not appear to be uni-dimensional in the Dutch sample. The subscales Verbalizing A and Identifying B are not uni-dimensional in the Belgian sample. The subscales Verbalizing A is not uni-dimentional in the English sample.

Table 1
Distribution, consistency and uni-dimensionality of scales of Dutch, French and English BVAQ form AB[a]

Scale	Mean	SD	Mean r(ii)	Mean r(ir)	Cronbach's alpha	cor A*B	chi-square (df = 20)	GFI	AGFI	RMSEA
Dutch BVAQ ($n = 375$)										
Emotionalizing	18.28	5.46	0.28	0.45	0.75	0.65	107.87	0.93	0.87	0.11
Fantasizing	16.19	6.17	0.39	0.56	0.82	0.76	88.48	0.94	0.90	0.10
Identifying	17.72	5.64	0.29	0.46	0.76	0.62	73.30	0.95	0.91	0.08
Analyzing	13.68	4.68	0.31	0.48	0.77	0.65	72.95	0.95	0.91	0.08
Verbalizing	20.49	7.65	0.46	0.63	0.87	0.79	186.57	0.86	0.76	0.15
Total BVAQ	86.36	17.66	0.13	0.33	0.85	0.81				
French BVAQ ($n = 175$)										
Emotionalizing	16.77	4.78	0.25	0.37	0.71	0.67	50.64	0.93	0.88	0.09
Fantasizing	15.64	6.38	0.34	0.56	0.80	0.78	73.50	0.90	0.82	0.12
Identifying	18.54	6.02	0.31	0.50	0.78	0.68	50.90	0.94	0.89	0.13
Analyzing	13.37	4.08	0.32	0.42	0.79	0.65	69.81	0.91	0.84	0.12
Verbalizing	22.71	7.50	0.46	0.58	0.87	0.80	134.97	0.82	0.67	0.18
Total BVAQ	87.03	15.81	0.13	0.28	0.85	0.84				
English BVAQ ($n = 129$)										
Emotionalizing	16.58	4.84	0.21	0.42	0.67	0.54	38.13	0.93	0.88	0.08
Fantasizing	17.10	6.11	0.39	0.52	0.83	0.80	67.01	0.88	0.79	0.14
Identifying	21.81	6.10	0.32	0.49	0.79	0.71	34.78	0.94	0.89	0.12
Analyzing	14.78	4.97	0.25	0.50	0.72	0.56	28.57	0.95	0.91	0.10
Verbalizing	21.20	7.49	0.41	0.63	0.85	0.79	116.22	0.79	0.61	0.19
Total BVAQ	91.48	17.46	0.10	0.33	0.81	0.77				

[a] Low value of (sub)scale indicates high trait and low alexithymia; high value of (sub)scale indicates low trait and high alexithymia.

2.3.2. Internal structure of items

The structure of the items of BVAQ was investigated using principal components analyses. In view of the hypothesized five-factor model, a five-factor solution was forced in analyzing all 40 items. Table 2 contains the results of the PCA of the three versions of form AB of the BVAQ. Only loadings higher than 0.30 are shown.

Generally the solution in each sample displays the expected structure. Thirteen percent of the loadings (Sixteen of all loadings associated with 12 items) do not agree with the expectation. The percentage of variance explained by the factors equal 46%, 45% and 46% in the three samples. Using Multi-Group Confirmative Factor Analyses the expected five-factor model was fitted on the data, restricting factor loadings, error terms, intercepts, correlations between factors and factor means to be invariant over samples. The hypotheses of equal factor structures of the items in the three samples were rejected (form AB: chi-square = 5148.45; df = 2450; $P = 0.00$; form A: chi-square = 1373.47; df = 620; $P = 0.00$; form B: chi-square = 1428.70; df = 620; $P = 0.00$). However, most other fit indices indicate that the hypothesized models do fit quite well (form AB: ratio chi-square/df = 2.10, GFI = 0.58, root mean square error of approximation (RMSEA) = 0.070, 90% confidence interval: 0.067–0.073, P-value for test of close fit (RMSEA < 0.05) = 1.00; form A: ratio chi-square/df = 2.22, GFI = 0.75, RMSEA = 0.073, 90% confidence interval: 0.067–0.080, P-value for test of close fit = 1.00; form B: ratio chi-square/df = 2.30, GFI = 0.75, RMSEA = 0.076, 90% confidence interval: 0.070–0.082, P-value for test of close fit = 0.99).

2.3.3. Internal structure of subscales

The internal structure of the subscales of the BVAQ in the three languages was analysed by comparing the intercorrelation matrices of the subscales (Table 3).

There are small, but insignificant differences in correlations between the samples. The hypothesis of equal correlation matrices in the three samples is tenable (chi-square = 36.27; df = 30; $P = 0.20$). The other fitting indices indicate close fit: GFI = 0.96, root mean square error of approximation RMSEA = 0.018 (90% confidence interval RMSEA: 0.0–0.036) and the P-value of the test of close fit is (RMSEA < 0.05): 1.00. Also, the correlation matrices of the short forms are not significantly different (form A: chi-square = 31.14, df = 30, $P = 0.41$, GFI = 0.97, RMSEA = 0.0075, 90% confidence interval RMSEA: 0.0–0.030, P-value of the test of close fit = 1.00; form B: chi-square = 41.86, df = 30, $P = 0.07$, GFI = 0.95, RMSEA = 0.024, 90% confidence interval RMSEA: 0.0–0.040, P-value of the test of close fit = 1.00).

Table 4 contains the results of the principal components analysis of intercorrelations of scales. In the three samples the expected two-factor solution is reported. The expected two-factor structure containing a cognitive factor (F1) and an affective factor (F2) was observed in the Dutch and the Belgian samples. The subscales Analyzing, Identifying and Verbalizing load on the cognitive factor, the subscales Emotionalizing and Fantasizing load on the affective factor. In the English sample a different pattern of loadings was observed. The subscales Emotionalizing, Fantasizing and Identifying load on the first factor. The subscale Analyzing loads on the second-factor and the subscale Verbalizing loads on both factors. The variance explained is 62%, 55% and 59% in the case of the Dutch, the French and the English versions, respectively.

The hypothesis of a common, two-factor solution with invariant factor loadings over groups was fitted using Multi-Group Confirmative Factor Analysis. This hypothesis does not need to be rejected formally (Form AB: chi-square = 31.86; df = 39; $P = 0.06$). Most other fit indices indicate

Table 2
PCA Rotated Factor Matrix of items of Dutch, French and English BVAQ form AB[a]

	Dutch version					French version					English version				
	F1[b]	F2[c]	F3[d]	F4[e]	F5[f]	F1[b]	F2[c]	F3[d]	F4[f]	F5[e]	F1[b]	F2[c]	F3[d]	F4[e]	F5[f]
v01	0.71					0.57					0.73				
v06	0.65					0.71					0.69			0.35	
v11	0.78					0.72					0.81				
v16	0.63					0.60		0.30			0.62				
v21	0.69					0.73					0.73				
v26	0.68					0.69					0.64				
v31	0.77					0.73					0.73				
v36	0.56					0.66					0.53			0.30	
f02		0.51					0.60					0.59			
f07		0.70					0.59					0.59			
f12		0.82					0.69					0.67			
f17		0.50					0.54					0.41			
f22		0.81					0.72					0.74			
f27		0.77					0.79					0.74			
f32		0.66					0.68					0.65			
f37		0.63					0.76					0.66	0.31		
i03			0.47					0.64					0.61		
i08			0.50					0.58					0.70		
i13			0.66					0.63					0.50		−0.31
i18			0.63					0.56					0.53		
i23			0.57			0.39		0.48					0.48		
i28			0.65					0.74					0.74		
i33			0.61					0.60					0.78		
i38			0.55					0.66					0.53		
a05				0.54					0.40	0.30	0.31			0.58	
a10				0.68						0.53				0.56	
a15				0.49						0.52				0.60	
a20			0.32	0.65						0.50				0.59	
a25			0.32	0.35						0.69				0.50	
a30				0.60						0.58				0.45	0.33
a35				0.69						0.76				0.61	
a40				0.61						0.50				0.67	
e04					0.57				0.51						0.58
e09					0.64				0.66						0.66
e14					0.58				0.58						0.52
e19		0.32	−0.38		0.30	0.37	−0.33		0.36						0.31
e24					0.63				0.50		0.34				0.46
e29					0.67				0.62						0.67
e34					0.60				0.38						0.55
e39					0.65				0.62						0.63

[a] Varimax rotated PCA solutions after Kaiser normalization.
[b] Verbalizing.
[c] Fantasizing.
[d] Indentifying.
[e] Analyzing.
[f] Emotionalizing.

that the hypothesized models do fit quite well (Form AB: GFI = 0.96; ratio chi-square/df = 0.82; root mean square error of approximation (RMSEA) = 0.048, 90% confidence interval RMSEA: 0.0–0.08, P-value for test of close fit (RMSEA < 0.05) = 0.98). However, in this analysis a Heywood case of negative variance in Emotionalizing has to be prevented by fixing this parameter at zero. In the following analyses, with constrains on intercepts, error terms, correlations between latent traits, and factor means, respectively, being invariant over groups, the hypotheses of a same structure over groups has to be rejected. Most indices indicate insufficient fit of more constrained models on the data (RMSEA ≥ 0.10).

2.3.4. Relations with sex and age

In Table 3 the Pearson product moment correlations are reported between age and sex of the respondents and their scores on the subscale and total scale of BVAQ form AB. The correlations are very similar over language groups. In all three groups, sex correlated significantly with the

Table 3
Intercorrelations of scales and correlations with sex and age of Dutch, French and English BVAQ form AB[a]

	Emotionalizing	Fantasizing	Identifying	Analyzing	Verbalizing	TOTAL5
Dutch BVAQ (n = 375)						
Emotionalizing	1.00					
Fantasizing	0.21**	1.00				
Identifying	−0.02	−0.04	1.00			
Analyzing	0.28**	0.04	0.39**	1.00		
Verbalizing	0.20**	0.04	0.39**	0.43**	1.00	
Sex (n = 371)	−0.39**	0.02	−0.03	−0.10	−0.05	−0.17**
Age (n = 371)	0.04	0.19**	−0.19**	−0.10	−0.08	−0.04
French BVAQ (n = 175)						
Emotionalizing	1.00					
Fantasizing	0.16	1.00				
Identifying	−0.10	0.06	1.00			
Analyzing	0.08	0.18*	0.25**	1.00		
Verbalizing	0.03	0.02	0.24**	0.29**	1.00	
Sex (n = 175)	−0.26**	0.04	−0.04	0.02	−0.02	−0.08
Age (n = 175)	0.14	0.10	−0.02	−0.07	0.02	0.06
English BVAQ (n = 129)						
Emotionalizing	1.00					
Fantasizing	0.15**	1.00				
Identifying	−0.04	−0.03	1.00			
Analyzing	0.36**	0.28**	0.10	1.00		
Verbalizing	0.29**	0.12	0.21*	0.42**	1.00	
Sex (n = 126)	−0.37**	−0.12	0.07	−0.13	−0.12	−0.21*
Age (n = 126)	0.14	0.22*	−0.03	−0.01	−0.05	0.08

[a] Significant value *P ≤ 0.05; **P ≤ 0.01; low value of (sub)scale indicates high trait and low alexithymia.

Table 4
PCA rotated factor matrix of scales of the Dutch, French and English BVAQ form AB[a]

Form AB	Dutch version			French version			English version		
	F1 (cognitive)	F2 (affective)	Communality	F1 (cognitive)	F2 (affective)	Communality	F1 (affective)	F2 (cognitive)	Communality
Emotionalizing	0.22	0.77	0.64	−0.11	0.78	0.62	0.70	−0.01	0.49
Fantasizing	−0.09	0.75	0.57	0.15	0.70	0.51	0.60	−0.23	0.41
Identifying	0.77	−0.23	0.65	0.69	0.31	0.57	0.76	0.26	0.65
Analyzing	0.77	0.22	0.64	0.72	−0.18	0.55	−0.11	0.88	0.79
Verbalizing	0.77	0.13	0.61	0.70	0.03	0.49	0.56	0.56	0.62

[a] Varimax rotated PCA solutions after Kaiser normalization.

scale Emotionalizing. Women tend to have lower scores on the scale of Emotionalizing. Men tend to have higher alexythimia scores. In the Dutch and the English sample low correlations were found between sex and the total scale (TOTAL5) and between age and Fantasizing. To control for potential bias of the results caused by under-sampling of men in the three groups, a two group (men vs women) Confirmative Factor Analysis was performed, restricting factor loadings, error terms, intercepts, correlations between factors and factor means to be invariant over both samples. The hypotheses of a common five-factor model for men ($n = 187$) and women ($n = 489$) were rejected (form AB: chi-square = 3502.07, df = 1590, $P = 0.00$; form A: chi-square = 853.03, df = 390, $P = 0.00$; form B: chi-square = 961.59, df = 390, $P = 0.00$). However, most other fit indices indicated a close fit of hypothesized models on the data (Form AB: GFI = 0.83; ratio chi-square/df = 2.20; root mean square error of approximation (RMSEA) = 0.042, P-value for test of close fit (RMSEA < 0.05) = 1.00; Form A: GFI = 0.92; ratio chi-square/df = 2.19; RMSEA = 0.042, P[RMSEA < 0.05] = 1.00; Form B: GFI = 0.92; ratio chi-square/df = 2.47; RMSEA = 0.047, P[RMSEA < 0.05] = 0.93).

3. Study 2

3.1. Method

3.1.1. Subjects

In the second study, 430 Dutch psychology freshmen at the University of Amsterdam participated. They were aged between 17 and 61 (mean = 22.1; SD = 5.9). Of the 430 subjects, 291 were women (67%). The BVAQ and the TAS-20 were completed during a group session.

3.1.2. Instruments

3.1.2.1. Bermond–Vorst Alexithymia Questionnaire (BVAQ). The Dutch Bermond–Vorst Alexithymia Questionnaire (BVAQ) was used in this study (for details see 2.1.2.1.).

3.1.2.2. Toronto Alexithymia Questionnaire (TAS-20). In this study the Toronto Alexithymia Scale version 20 (TAS-20) (Bagby, Parker et al., 1994) in the authorized Dutch translation by Trijsburg, Passchiers, Duivenvoorden and Bagby (Trijsburg, 1997) was used. The TAS consists of 20 items which load on three factors. These three factors are denoted F1 'Difficulty in identifying feelings' (seven items), F2 'Difficulty in describing feelings' (five items), and F3 'Externally-oriented thinking' (eight items). Fifteen items are indicative of the dimensions of alexithymia and five are contra-indicative (one in the factor 'difficulty describing feelings' and four in the factor 'externally oriented thinking'). The rating scales have five response categories varying between (1) strongly disagree and (5) strongly agree. The original TAS-20 is characterized by acceptable psychometric qualities. The reliability of the total scale equals 0.81, and the reliabilities of the three factors are 0.78, 0.75, and 0.66 (F1, F2, F3, respectively; Bagby, Parker et al., 1994). The validity of the TAS-20 is acceptable (Bagby, Taylor et al., 1994).

3.1.2.3. Measures of overstrain and abuse. In the second study, an eight-item questionnaire with five-point rating scales was used to assess overstrain and abuse during childhood. Overstrain is

assessed by means of two questions about 'feelings of stress during recent years' and 'feelings of current stress'. Abuse during youth is assessed by six questions, viz. 'During my childhood I was subjected to prolonged mental abuse', 'During my childhood, I was subjected to prolonged physical abuse', 'During my childhood I was sexually abused', 'After my fifteenth year, I was seriously mentally or physically abused', 'My daily happiness now is hindered by adverse childhood experiences ' and ' My daily happiness now is hindered by my friends' and family's experience of war'. The items have face validity and previous studies had indicated that consistency of the scales (Cronbach's alpha) is acceptable, although the alpha of 'Nervous tension' could be improved (see also results 3.3.4.).

3.2. Analyses

In this second study the distribution, the consistency, the uni-dimensionality of the scores of the subscales of the BVAQ and the TAS-20 were investigated. The internal structure of the subscales of the BVAQ was assessed by principal components analyses. In addition, the five-factor model of the BVAQ and the three-factor model of TAS-20 were tested using restricted factor analysis (Jöreskog & Sörbom, 1993). Furthermore, the correlations between subscales of BVAQ and factors of TAS-20 are reported. In view of the differences in the number of dimensions of the BVAQ (5) and TAS-20 (3), we made use of three total scores based on the BVAQ subscales. The standard total score equals the sum of all five subscales (TOTAL5). The second total score was obtained by summing the scores on the two affective subscales (Emotionalizing and Fantasizing). The third total score was calculated by summing the scores on the three cognitive subscales (Identifying, Analyzing and Verbalizing). The cognitive composite is comparable to the total score of the TAS-20. The affective composite is absent in the TAS-20. So in terms of total scores, the most accurate comparison between BVAQ and TAS-20 was made by comparing the cognitive total score of BVAQ with the total score of TAS-20.

The scores on both instruments were correlated with sex, age, and measures of nervous tension, childhood abuse and psychological problems. We further expected that being overstrained and having experienced childhood abuse would correlate differently with the affectional dimension and the cognitive dimension of alexithymia. These validity measures were used since it was assumed that alexithymia can be induced by stress and sexual abuse (Cloitre, Scarvalone & Difede, 1997; Haviland, Hendryx, Cummings, Shaw & MacMurray, 1991; Krystal, 1988; Sifneos, 1991; Taylor, 1984; Taylor, Bagby & Parker, 1993; Zeitlin & MacNally, 1993).

3.3. Results and discussion

3.3.1. Distribution, consistency and uni-dimensionality of scores

Results relating to the distribution, consistency and uni-dimensionality of scores of BVAQ and scores of TAS-20 are presented in Table 5. Subscales in these tests are composed of varying numbers of items. All subscales of BVAQ consist of eight items. The Identifying subscale of TAS-20 has seven items, the Externally-oriented thinking subscale has eight items, and the Describing subscale has five items.

The means and standard deviations of (sub)scale scores of BVAQ resemble those of Study 1 (see Table 1). The same is true of the indices of consistency and the indices of uni-dimensionality.

Table 5
Distribution, consistency and uni-dimensionality of the scales of Dutch BVAQ and the translated TAS-20[a]

Scale	Mean	SD	Mean r(ii)	Mean r(ir)	Cronbach's alpha	cor (A*B)	Chi-square[e]	GFI	AGFI	RMSEA
Dutch BVAQ ($n=430$) form AB										
Emotionalizing	18.75	5.25	0.23	0.40	0.70	0.62	107.87	0.93	0.87	0.11
Fantasizing	17.01	6.53	0.39	0.56	0.83	0.75	88.48	0.94	0.90	0.11
Identifying	16.87	5.67	0.35	0.52	0.81	0.68	73.30	0.95	0.91	0.07
Analyzing	13.66	4.58	0.36	0.53	0.81	0.72	72.95	0.95	0.91	0.09
Verbalizing	20.53	7.69	0.48	0.64	0.88	0.82	186.57	0.86	0.76	0.17
Affective comp[c]	35.76	8.95	0.18	0.38	0.78	0.72				
Cognitive comp[d]	51.06	9.04	0.24	0.46	0.88	0.85				
TOTAL (5)[e]	86.82	17.14	0.13	0.33	0.85	0.82				
Translated TAS-20 ($n=414$)										
Identification (7)	14.81	4.53	0.35	0.52	0.79		50.64	0.93	0.88	0.09
External (8)	17.22	3.96	0.17	0.31	0.60		50.90	0.94	0.89	0.12
Description (5)	11.90	4.20	0.41	0.57	0.78		73.50	0.90	0.82	0.07
TOTAL	43.93	9.12	0.16	0.36	0.79					

[a] Low value of (sub)scale indicates high trait and low alexithymia.
[b] BVAQ: df = 20; TAS-20: df = 14, 5, 20, respectively.
[c] Affective comp = emotionalizing + fantasizing,
[d] Cognitive comp = identifying + analyzing + verbalizing.
[e] TOTAL (5) = affective comp + cognitive comp.

In the case of the composite scales uni-dimensionality is not supposed. All subscales are sufficiently reliable and the violations of the uni-dimensionality do not appear to be severe. The consistency of the factors of TAS-20 is somewhat lower (especially that of the External factor).

3.3.2. Internal structure of items and subscales

The internal structure of the items of BVAQ and the items of the TAS-20 was analysed by principal components analyses. The factor solution, restricted to the expected five factors, explained 47% of the variance and generally produced the expected pattern of item-factor loadings. In total six loadings with values higher than 0.30 were observed where zero loadings were expected. A forced three-factor PCA of the TAS-20 items explained 43% of the variance. This solution produced the expected item-factor loadings with one exception (item 11) and two loadings higher than 0.30 where zero loadings were expected. The results concerning the TAS-20 agree with those presented by Bagby, Parker et al. (1994).

The five-factor model of the BVAQ and the three-factor model of TAS-20 were investigated with Restricted Factor Analysis. Formally, the hypothesized structure was rejected (BVAQ form AB: chi-square = 1793.16, df = 730; BVAQ form A: chi-square = 447.93, df = 160; BVAQ form B: chi-square = 383.15, df = 160; TAS-20: chi-square = 417.22, df = 167). However, most other fit indices indicate that the hypothesized models do fit quite well (BVAQ form AB: chi-square/df = 2.46, GFI = 0.80; AGFI = 0.78, RMSEA = 0.058; BVAQ form A: chi-square/df = 2.80, GFI = 0.90; AGFI = 0.87, RMSEA = 0.065; BVAQ form B: chi-square/df = 2.39, GFI = 0.91; AGFI = 0.89, RMSEA = 0.057; TAS-20: chi-square/df = 2.50, GFI = 0.91; AGFI = 0.88, RMSEA = 0.060).

The subscale's intercorrelation matrices of form A, form B and form AB do not differ significantly. The correlations are comparable with the correlations of subscales of form AB in the Dutch group of Study 1. Also, the principal components analyses of the subscales of the BVAQ form A, form B and form AB result in the expected two-factor solution like the Dutch group in Study 1.

3.3.3. Relations with subscales of TAS-20

In Table 6, the Pearson product moment correlations are reported of the (sub)scales of the BVAQ (form A, form B and form AB), and the (sub)scales of the TAS. The convergent validity coefficients (*underlined* in Table 6) of form A are 0.59 (identifying–identification), 0.58 (analyzing–external), 0.83 (verbalizing–description) and 0.78 (cognitive comp-TOTAL). The correlations of form B are comparable: 0.62, 0.56, 0.78, and 0.77, respectively. The correlations of form AB are somewhat higher (0.66, 0.61, 0.85, and 0.80), due to the higher reliability of the subscales of form AB.

The divergent validity coefficients are generally low in absolute values (≤ 0.2). The subscales Emotionalizing and Fantasizing and the Affective composite correlate negatively with Identification. Five of the six values deviate significantly from zero ($-0.23 \leq r \leq -0.07$). The subscale Emotionalizing and the Affective composite correlate significantly with External-orientation ($0.18 \leq r \leq 0.27$). The correlations of subscale Fantasizing and External-orientation do not differ significantly from zero ($0.05 \leq r \leq 0.08$). Likewise, the correlations of Emotionalizing, Fantasizing and the Affective composite with the Description subscale do not deviate significantly from zero ($-0.02 \leq r \leq 0.13$). The same applies to the correlations between the affective subscales and the total score of TAS-20 ($-0.09 \leq r \leq 0.15$); only one correlation is significantly different from zero ($r = 0.15$).

The pattern of correlations support the validity of the subscales of the BVAQ. The convergent validity coefficients support the validity of the cognitive subscales and the cognitive composite of the BVAQ. The support for the validity of the Verbalizing subscale and the Cognitive composite is greater than the support of the validity of Identifying and Analyzing. The divergent validity coefficients demonstrate that the affective subscales and the affective composite of the BVAQ are definitely different from the cognitive subscales of the TAS-20.

Table 6
Correlations between (sub)scales of Dutch BVAQ and translated TAS-20 ($n = 410$)[a]

	Translated TAS-20[c]			
	Identification	External	Description	TOTAL
Dutch BVAQ Form A[b]				
Emotionalizing	−0.15*	0.21**	0.01	0.02
Fantasizing	−0.19**	0.08	−0.01	−0.07
Identifying	*0.59***	0.22**	0.40**	0.57**
Analyzing	0.16*	*0.58***	0.30**	0.47**
Verbalizing	0.32**	0.28**	*0.83***	0.66**
Affective comp	−0.22**	0.18**	−0.01	−0.04
Cognitive comp	0.48**	0.45**	0.75**	*0.78***
TOTAL (5)	0.27**	0.47**	0.61**	0.62**
Dutch BVAQ Form B[b]				
Emotionalizing	−0.07	0.27**	0.13	0.15*
Fantasizing	−0.21**	0.05	−0.02	−0.09
Identifying	*0.62***	0.22**	0.38**	0.58**
Analyzing	0.21*	*0.56***	0.36**	0.51**
Verbalizing	0.22**	0.32**	*0.78***	0.61**
Affective comp	−0.20**	0.20**	0.07	0.02
Cognitive comp	0.47**	0.46**	0.73**	*0.77***
TOTAL (5)	0.25**	0.46**	0.59**	0.60**
Dutch BVAQ Form AB[b]				
Emotionalizing	−0.12	0.27**	0.08	0.09
Fantasizing	−0.22**	0.07	−0.02	−0.09
Affective comp	−0.23**	0.20**	0.03	−0.01
Identifying	*0.66***	0.24**	0.42**	0.63**
Analyzing	0.20**	*0.61***	0.36**	0.53**
Verbalizing	0.28**	0.31**	*0.85***	0.67**
Cognitive comp	0.49**	0.48**	0.77**	*0.80***
TOTAL (5)	0.28**	0.49**	0.63**	0.64**
Translated TAS-20[b]				
Identification	1.00			0.75**
External	0.10	1.00		0.60**
Description	0.45**	0.26**	1.00	0.80**

[a] Low value of (sub)scale indicates high trait and low alexithymia.
[b] Affective comp = emotionalizing + fantasizing; cognitive comp = identifying + analyzing + verbalizing; TOTAL (5) = affective comp + cognitive comp.
[c] Significant value *$P \leq 0.05$; **$P \leq 0.01$.

3.3.4. Relations with sex, age and psychic problems

In Table 7, the Pearson product moment correlations are reported of the (sub)scales of BVAQ and the TAS-20, and age, sex, the nervous tension scores (recent and current stress) and the childhood abuse scores. The psychometric analyses of the scales of nervous tension and abuse during childhood ($n=417$), were: Nervous tension: mean $= 4.41$; SD $= 2.20$; Cronbach's alpha $= 0.54$; Abused during childhood: mean $= 7.90$; SD $= 3.15$; alpha $= 0.68$.

In the Table the correlations with the two affective subscales and the affective composite of the BVAQ are presented firstly, then the cognitive subscales and the cognitive composite and finally the TOTAL5. The correlations of the (sub)scales of the TAS-20 should be compared with the correlations of the cognitive subscales and the cognitive composite of the BVAQ.

The cognitive BVAQ-scales do not correlate significantly with sex ($-0.13 \leq r \leq -0.02$) or with age ($-0.10 \leq r \leq -0.06$). Likewise, the TAS-20 factors do not correlate with sex ($-0.21 \leq r \leq 0.04$) or age ($-0.18 \leq r \leq 0.04$), except for the factor External-orientation, which is significantly correlated with gender ($r = -0.21$) and age ($r = -0.18$). Only one of the cognitive BVAQ-scales, Identifying, correlates significantly with overstrained ($r = 0.28$). The correlations of TAS-20 factors with overstrained are somewhat higher ($-0.12 \leq r \leq 0.35$). The measure of childhood abuse is not correlated with the cognitive subscales of BVAQ ($-0.06 \leq r \leq 0.06$) but with two of the TAS-20 factors ($-0.14 \leq r \leq 0.15$).

The Affective composite of the BVAQ correlates significantly with age ($r = 0.20$), nervous tension ($r = -0.22$), and gender ($r = -0.24$). However, since the subscale Fantasizing does not correlate with gender, the correlation with the Affective composite of the BVAQ is ascribed to Emotionalizing only ($r = -0.39$). Women tend to have lower scores on Emotionalizing than men. Because high scores indicate high alexithymia and low trait, this correlation means a higher emotional arousability in women. Older people tend to have higher scores on Fantasizing than younger people. People suffering nervous tension tend to have lower scores on Emotionalizing and Fantasizing.

Table 7
Correlations of (sub)scales BVAQ and TAS-20 with biographic data ($n=398$)[a]

	Sex	Age	Overstrained	Abused in youth
Dutch BVAQ form AB				
Emotionalizing	−0.39**	0.05	−0.17**	−0.04
Fantasizing	−0.02	0.25**	−0.17**	−0.03
Affective comp	−0.24**	0.20**	−0.22**	−0.04
Identifying	−0.02	−0.07	0.28**	0.06
Analyzing	−0.11	−0.10	−0.03	−0.06
Verbalizing	−0.13*	−0.00	0.02	−0.01
Cognitive comp	−0.12	−0.06	0.11	−0.00
TOTAL (5)	−0.22**	0.06	−0.02	−0.02
Translated TAS-20				
Identification	0.04	−0.07	0.35**	0.15*
External	−0.21**	−0.18**	−0.12	−0.14*
Description	−0.12	0.04	0.16*	0.03
TOTAL	−0.13*	−0.09	0.19**	0.02

[a] Significant value *$P \leq 0.05$; **$P \leq 0.01$; low value of (sub)scale indicates high trait and low alexithymia.

4. General discussion

The aim of the present studies was to investigate the validity and reliability of the Bermond–Vorst Alexithymia Questionnaire (BVAQ). The five dimensions of alexithymia, which feature in this questionnaire, have been discussed by different researchers in the literature, particularly in the early publications (Flannery, 1977; Krystal, 1988; Mann et al., 1992; Martin et al., 1986; Nemiah and Sifneos, 1970; Parker et al., 1992; Sifneos, 1973, 1991; Weinryb et al., 1991). In addition, neuro-psychological research of conscious emotional awareness supports several affective and cognitive dimensions in alexithymia (Bermond, 1997). Various self-report instruments have been designed to measure alexithymia. With the exception of the versions of the TAS, these instruments are poorly developed in the psychometric sense. The growing interest in the subject of alexithymia is therefore largely due to the work of Taylor and his associates. Their instrument, the TAS-20, has made large-scale investigation of alexithymia possible, and has served to bring alexythmia to the attention of a wide audience of scientists.

However, none of the known instruments provide a comprehensive operationalization of the five hypothesized dimensions of alexithymia. So, a new instrument is needed that measures five aspects of alexithymia as defined and that has proved measurement qualities at least as good as the TAS-20. The BVAQ can be used to measure five aspects of alexithymia. The instrument consists of two short parallel forms, each including five subscales. The subscales are balanced to control for response bias. The BVAQ has been translated into several languages. To establish the validity and reliability of the BVAQ two studies were presented.

Study 1 compares the psychometric properties of the BVAQ in a Belgian (French-speaking) sample, an English sample, and a Dutch sample. Mean differences in subtest scores were observed between the samples. The consistency reliability in the three samples were similar. The principal components analyses (PCA) of item intercorrelations in the three samples resulted in a comparable five-factor structure. Also a confirmative factor analysis of an identical five-factor model indicates a close to acceptable fit on the data of the three samples. This result is good in comparison to the fit of five-factor models in the literature. For example, the fit of the five-factor models of the well known NEO Personality Inventory is less than acceptable: $3.9 \leq$ chi-square/ df ≤ 6.4 and $0.08 \leq$ RMSEA ≤ 0.10 (Vassend & Skrondal, 1995). The same fit statistics of the BVAQ form AB are, respectively: chi-square/df $= 2.46$ and RMSEA $= 0.058$. However, some subscales of the BVAQ deviate from uni-dimensionality. If scales are not uni-dimensional the raw item scores are not equivalent. The totals of raw, unweighted item scores will represent probably more dimensions than the measure of alexithymia alone. However, the bias will be severe only if the deviations from uni-dimensionality are severe. In case of non-fitting subscales of the BVAQ, the deviations from fit are substantial, but mostly not severe as indicated by the fit indices. In any case the deviations of fit are not very different from the deviations of fit of the TAS-20. Futhermore, the practical significance of deviation from model fit is very difficult to estimate and heavily discussed in the pertinent literature. Based on the above mentioned BVAQ-values of chi-square/ df and RMSEA, we estimate provisionally that raw scale scores will not be biased strongly, as a consequence of the dimensionality of the scales. The PCA of subscale intercorrelations in the Belgian and the Dutch samples produced a clear-cut two-factor structure. The factors are identified as representing an affective component (emotional arousability and fantasy) and a cognitive component (identifying, describing and analyzing of emotions). In spite of the fact that the

intercorrelations of subscales are not significantly different, the structure of the two-factor model is not equal in the three samples. In the English sample, a different two-factor solution is observed which is difficult to interpret. The English sample differs from the Dutch and Belgian samples with respect to the mean alexithymia scores and the internal structure of subscales. A study of the measurement equivalence of the three versions of the BVAQ using a Step-Wise Multi-Group Restricted Factor Analysis revealed that these differences are due mainly to trait differences between the populations (Vorst, Oort & Bermond, 2000). A common five-factor model for men and women showed a close fit to the data, so gender is not likely a biasing factor interpreting results between and within samples. Furthermore, women were found to be more emotional than men, older people were less fantasizing, and people suffering nervous tension tended to be more emotionalizing and fantasizing. These results suggest that the affectional dimension (emotional arousability and fantasy) measures different aspects of alexithymia than the cognitive dimension.

The objective of Study 2 was to compare the BVAQ with the TAS-20 (Bagby, Parker et al., 1994). The TAS-20 comprises three factors comparable to three cognitive scales of the BVAQ. Both questionnaires were administered to a sample of Dutch students. The correlations between cognitive subscales of the BVAQ and the factors of the TAS-20 are good. The BVAQ cognitive composite and the TAS-20 total correlate highly (0.80). Given the consistencies of the scales (0.88 BVAQ and 0.79 TAS-20), the expected maximal correlation is 0.83 (Cacioppo & Tassinary, 1990). This indicates that the sum score of the BVAQ subscales Analyzing of emotions, Identifying of emotions and Verbalizing of emotions is almost statistically identical to the total score of the TAS-20. The correlations of the (sub)scales with gender and age are quite similar. So, taking the TAS-20 as the criterion, the present results strongly support the validity of the BVAQ. Moreover, it can be concluded that the TAS-20 measures the cognitive aspects of alexithymia only and not the affective dimension. The affective dimension has small correlations with the TAS-20 scales ($0.20 \leq r \leq -0.23$). Both studies (1 and 2) indicate that the affective dimensions of the BVAQ has it own significant contribution to the measurement of alexithymia.

Futhermore, one of two validity measures showed the expected relation with the BVAQ-scales. Overstrained correlated 0.28 with the BVAQ subscale Identifying emotions, and 0.35 with the factor Identification of the TAS-20, indicating that people who are under current stress are less able to know which emotions they are experiencing. At the same time overstrained people are slightly more emotional and more inclined to fantasise as indicated by the significant, but also low correlations (-0.17) of both BVAQ subscales Emotionalizing and Fantasizing with Overstrained. In contra-distinction to what was expected, the scores on the BVAQ subscales with Abuse during childhood did not reach any significance in this study. However it has been demonstrated in an other study that women, claiming to have been sexually abused during childhood, had highly alexithymic scores on the BVAQ (Moormann, Bermond, Albach & van Dorp, 1997).

From a comparison of the data of the Dutch BVAQ in Study 1 with the data of the BVAQ of Study 2 it emerges that the psychometric characteristics of the instrument are stable over these two student groups. This is the case with the distribution of subscale scores, the consistency and uni-dimensionality of subscales, the structure of subscales, the correlations between subscales of form A and form B and the correlations with sex and age.

We have three comments concerning the application of the BVAQ. Usually, in the field of alexithymia the total of subscales is applied as an indication of alexithymia. The factor analyses

of item intercorrelations clearly indicated that the expected five-factor structure is tenable. Likewise the factor structure of the TAS-20 is characterized by a three-factor model. Generally, the fitted measurement models of the BVAQ and the TAS-20 do not support the use of the total score as a uni-dimensional measure of alexithymia. The total score can of course be used as a rough indication of alexithymia, but for diagnostic purposes of individuals the profile of subscale scores are required to obtain a more finely grained assessment of alexithymia.

Secondly, the subscales of the BVAQ themselves exhibit a two-common factor (second-order) factor structure: two subscales constitute an affective composite (Emotionalizing and Fantasizing) and three subscales make up a cognitive composite (Identifying, Analyzing and Verbalizing of emotions). Because the TAS-20 is limited to three cognitive factors, use of the TAS-20 in diagnosis will emphasize the cognitive aspect of alexithymia. Bermond (1997) has suggested that two kinds of alexithymia may be distinguished. Alexithymia I is defined by a low degree of conscious awareness of emotional arousal and a low degree of emotion accompanying cognitions. Alexithymia II is characterized by a normal or high degree of conscious awareness of emotional arousal together with a low degree of accompanying cognitions. Neuro-psychological evidence has been presented for both types of alexithymia (Bermond, 1997). Since the TAS-20 measures only the reduced emotion accompanying cognitions, this instrument cannot be used to assess either type of alexithymia. The second-order two-factor solution is in concordance with the conception of the mentioned two types of alexithymia. The subscales of the extended form of the BVAQ are sufficiently reliable to be used for purposes of diagnosis of both kinds of alexithymia.

Thirdly, viewing alexithymia as a syndrome related to inabilities or difficulties in conscious handling of emotions, it can be assumed that these abilities or capabilities will exist sufficiently in people showing adaptive emotional behavior. Obviously, inabilities in these traits can have serious consequences, like in alexithymia. Since the subscales measure five important general aspects of the emotional experience, the usefulness of the BVAQ will go beyond the field of alexithymia. It may obviously be a potentially diagnostic instrument to assess a personal way of handling emotions. Probably several categories of mental illness will be related with different ways of conscious handling of emotions. For instance, people with traumatic experiences or traumatic progressing diseases can develop non-healthy ways of handling emotions (Deary, Scott & Wilson, 1997) or stress (Kohn, Gurevich, Pickering & MacDonald, 1995). People having a lack in only one of the traits measured, need not be alexithymes, but may have specific emotional problems, requiring a specific therapeutic approach.

Although the present study provides strong evidence in favor of the validity of the BVAQ, the results must be regarded as preliminary, as the data were based upon student populations only. A lot of validating research is needed before it can be concluded safely that the new questionnaire is adequate for assessing alexithymia. Research with clinical groups will especially be needed to justify the mentioned possibilities of the BVAQ.

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