

Running Head: ALEXITHYMIA AND ITS MEASUREMENT

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(1999). Alexithymia and its Measurement: Confirmatory Factor Analyses of the Twenty-Item Toronto Alexithymia Scale and the Bermond-Vorst Alexithymia Questionnaire.

*European Journal of Personality*, 13, 511-532.

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Research reported in this paper was supported by grants FRFC 8.4510.94 and 2.4546.97 from the Belgian National Fund for Scientific Research and by a grant from the Fonds de Développement Scientifique of the University of Louvain. It was also facilitated by the support granted by the Commissariat Général aux Relations Internationales (Belgium) and the British Council. Olivier Luminet is post-doctoral researcher at the Belgian National Fund for Scientific Research and NATO research fellowship. We gratefully acknowledge the help of Abdessadek El-Ahmadi for his technical support in analysing the data. We also wish to thank Victoria Lee, Tom Liggett, and Paul Lattimore in their help in collecting the data. Finally, we thank R. Michael Bagby, Bob Bermond, and Harrie Vorst for their comments on an earlier draft of this article.

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*Abstract*

*Alexithymia refers to the difficulties an individual has in experiencing and expressing feelings. The twenty-item Toronto Alexithymia Scale (TAS-20) and the Bermond-Vorst Alexithymia Questionnaire (BVAQ) with two parallel versions of 20 items have been constructed to measure it. The present study compared the psychometric properties of these two self-report questionnaires in English ( $N = 290$ ) and French ( $N = 322$ ) language versions. Confirmatory factor analysis was used to examine the fit between the hypothesised factors and the data. Results revealed a better fit to the data for the second version of the BVAQ (BVAQ-20 B) for both language versions as compared to the TAS-20, the whole BVAQ, or the first version of the BVAQ (BVAQ-20 A). Additionally, the factor comparison of both language versions indicated that only the factorial structure of the BVAQ-20 B was replicable across languages. Concurrent validity of the questionnaires is discussed.*

Alexithymia and its Measurement: Confirmatory Factor Analyses of the Twenty-Item Toronto Alexithymia Scale and the Bermond-Vorst Alexithymia Questionnaire

The concept of alexithymia emerged from clinical observations of psychosomatic patients. These patients were described as predominantly unimaginative and as often manifesting difficulties in verbal and symbolic expression of emotion (Ruesch, 1948). Psychoanalytic treatment was impeded for them because of a lack of emotional awareness, paucity of inner experiences, concreteness of thinking, and externalised style of living (Horney, 1952 ; Kelman, 1952). The French psychoanalysts Marty and de M'Uzan (1963) coined the term "pensée opératoire" to indicate the trait characterising psychosomatic patients according to which they generally report on experienced events and on their own actions and behaviours without affective or emotional connotations.

The significance of these observations was not fully acknowledged until Sifneos (1972) proposed the concept of alexithymia to label them. Alexithymia literally means "lack of words for emotion". According to Sifneos' definition, three features characterise the alexithymic person: (a) a difficulty in recognising, identifying and describing emotions, and in distinguishing between emotional states and bodily sensations; (b) an impaired symbolisation, as evidenced by a paucity of fantasies and other imaginative activity; and (c) a preference for focusing on external events rather than inner experiences. Initially, alexithymia was thought to be closely linked to psychosomatic disease, although the specificity of this link was later questioned. Alexithymia was found to be associated with non-psychosomatic pathologies such as substance abuse, post-traumatic stress disorder, eating disorders, and somatisation disorders (e.g., Jimerson, Wolfe, Franko, Covino and Sifneos, 1994; Taylor, 1984; Taylor, Parker and Bagby, 1990; Krystal, 1988). Nowadays, alexithymia is more generally viewed as a cognitive style of language and of thoughts characterised by a deficit in the processing of emotional information, or as a deficit of affect regulation (Taylor, Bagby and Parker, 1997). The idea of a specific category of people called alexithymics was also dropped. Alexithymia is now considered as a

syndrome acting as a continuum (Taylor *et al.*, 1997). The concept of alexithymia has led in recent years to an increasing amount of research within the personality domain. To name a few, this research has examined the links between alexithymia and emotional awareness (e.g., Lane, Ahern, Schwartz and Kaszniak, 1997), mood monitoring and mood labelling (Swinkels and Giuliano, 1995), or emotional intelligence (Bagby, Taylor and Parker, 1994)

Since the initial introduction of the concept, systematic investigations have been undertaken and researchers have been concerned with developing reliable and valid instruments for its measurement. Numerous techniques as diverse as a questionnaire to be completed by a clinician after interviewing the participant (the Beth Israel Hospital Questionnaire, BIQ, Sifneos, 1973), self-report questionnaires (e.g., the Schalling Sifneos Personality Scale, SSPS, Apfel and Sifneos, 1979; the MMPI Alexithymia Scale or MMPI-AS, Kleiger and Kinsman, 1980; Shipko and Noviello, 1984), a standardised interview technique (the Alexithymia Provoked Response Questionnaire, APRQ, Krystal, Giller and Cicchetti, 1986), projective tests (the SAT9, Cohen, Demers-Desrosier and Catchlove, 1983; the Rorschach test, Acklin and Alexander, 1988; Acklin and Bernat, 1987), and content analysis techniques (Gottschalk and Gleser, 1969; Taylor and Doody, 1982; Von Rad, Lalucat and Lolas, 1977) have been proposed. However, these instruments suffer from methodological flaws, or from lack of adequate validation data, or from both (for a review, see Noël and Rimé, 1988; Parker, Taylor, Bagby and Thomas, 1991).

Two instruments stand out for the quality of their psychometric construction. One of them is the Toronto Alexithymia Scale (TAS, Taylor, Ryan and Bagby, 1985), a self-report instrument intended to assess five traits derived from a literature review about alexithymia (Taylor, 1984). The five theoretically-derived features are: (a) difficulty describing feelings; (b) difficulty distinguishing feelings and bodily sensations; (c) lack of introspection; (d) social conformity; and (e) paucity of fantasy life and of dreams. However, factor analytic studies have not always confirmed the expected factor structure. Two successive revisions of the scale (see Taylor, 1994) have led to the twenty-item Toronto Alexithymia Scale (TAS-20; Bagby, Parker and Taylor, 1994; Bagby, Taylor *et*

*al.*, 1994) in which all items directly assessing social conformity, daydreaming and other imaginal activity were eliminated. This latter factor was eliminated due to correlations with social desirability. The TAS-20 evidenced a three-factor structure comprising the following factors: (a) Difficulty identifying feelings; (b) Difficulty describing feelings to others; and (c) Externally-oriented thinking. The factor structure was confirmed in clinical and nonclinical samples (Bagby, Parker *et al.*, 1994).

The second promising instrument is the Bermond-Vorst Alexithymia Questionnaire (BVAQ, Bermond and Vorst, 1998). The BVAQ evolved from the Amsterdam Alexithymia Scale (AAS, Bermond, Vorst, Gerritsen and Vingerhoets, 1994), a 20-item questionnaire intending to assess five elements of alexithymia. Bermond and Vorst extended the questionnaire with the purpose of having two parallel versions. This led to the 40-item Bermond-Vorst Alexithymia Questionnaire (BVAQ, Bermond and Vorst, 1998). Factor analyses conducted on large groups of students confirmed the existence of five factors with highest loadings for the a priori assigned items (Bermond and Vorst, 1998). These factors were respectively defined as: (a) Verbalising, or the degree to which someone is able or inclined to describe or communicate about his or her emotional reactions; (b) Fantatising, or the degree to which someone is inclined to fantasise, imagine, daydream; (c) Identifying, or the degree to which someone is able to define his or her arousal states; (d) Emotionalising, or the degree to which someone can be emotionally aroused by emotion inducing events; and (e) Analysing, or the degree to which someone is looking for explanations of one's own emotional reactions.

For both personality assessments and research purposes, there is a need of a reliable and valid measure of alexithymia. Of the available instruments, TAS-20 (Bagby, Parker *et al.*, 1994; Bagby, Taylor *et al.*, 1994) and BVAQ (Bermond and Vorst, 1998) have been developed with proper regard to theoretical and empirical considerations, and adequate psychometric properties have been reported for both. The present study compared the psychometric properties of these instruments with confirmatory factor analyses. Moreover, as these two questionnaires are available in English and French, we also tested how well

the factorial structures of the two language versions compared. Finally, we examined their concurrent validity and factorial interrelations.

## Method

### Participants and procedure

The initial English-speaking sample consisted of a total of 305 British students (75 males; 224 females; 6 respondents failed to report their gender). They were recruited from four different sources. One hundred and forty-one participants (46%) were recruited through classes of psychology at the University of Manchester, 48 (16%) through the Bolton Institute for Higher Education (Bolton, UK) and 14 (5%) among the students of psychology classes at the University of Central Lancashire (Preston, UK). All these students completed both TAS-20 and BVAQ at one session in a class room. One hundred and one participants (33%) were recruited by announcements placed in different places of the University of Manchester. A small reward (£5) was offered for their participation. They completed the two alexithymia questionnaires at home at the same time. The alexithymia data collected on this sample were part of other studies reported elsewhere (Bermond and Vorst, 1998; Bermond, Vorst and Oort, 1998; Luminet, Zech, Rimé and Wagner, 1998). Fifteen participants were eliminated due to a missing value in at least one item of the questionnaires. The final English-speaking sample (English sample) consisted of 290 students (72 males; 213 females; 5 respondents failed to report their gender). Their mean age was 22.35 years (SD = 5.87).

The initial French-speaking sample consisted of 380 Belgian students recruited from three different sources. One hundred and ninety-six participants (52%) filled out the questionnaires while attending a class on personality psychology at the University of Louvain. They completed the BVAQ in the psychology classroom. The TAS-20 was completed in the same circumstances one week later. The alexithymia data collected on this sample were part of other studies reported elsewhere (Bermond and Vorst, 1998;

Bermond *et al.*, 1998; Luminet *et al.*, 1998). One hundred and fifty participants (39%) were recruited among psychology students of the University of Louvain in the framework of another study (Luminet and Panier, 1996). Finally, 34 participants (9%) were recruited among students in a nursing college in Brussels in the context of a third study (Vergracht, 1997). These latter two groups completed both TAS-20 and BVAQ at one same session. Fifty-eight participants were eliminated due to a missing value in at least one item of the questionnaires so that the final French-speaking sample (French sample) consisted of 322 students (60 males; 262 females). Their mean age was 20.51 (SD = 2.67).

### Instruments

The twenty-item Toronto Alexithymia Scale (TAS-20, Bagby, Parker *et al.*, 1994; Bagby, Taylor *et al.*, 1994) is a 20-item self-report measure. Each item is rated on a five-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree), with five items negatively keyed. The translation in French was achieved by Triffaux, Anseau, Wauthy, Schuerch and Bertrand (1994) with the use of the translation and back-translation method.

The Bermond-Vorst Alexithymia Questionnaire (BVAQ, Bermond and Vorst, 1998) is a 40-item self-report measure which comprises two parallel versions each of 20 items. Each item is rated on a five-point Likert scale, ranging from 1 (strongly agree) to 5 (strongly disagree), with half of the items positively keyed and half negatively keyed. For each of the five factors, a high score is indicative of alexithymia. However, the names adopted for these factors--Verbalising, Fantatising, Identifying, etc.--suggest the reverse. To avoid this ambiguity, we adopted throughout this paper the following names respectively: Difficulty verbalising, Difficulty fantasising, Difficulty identifying, etc. First constructed in a Dutch version, the translations into French and English were accomplished by Bermond *et al.* (1998) with the use of the translation and back-translation method.

### Statistical analyses

As both alexithymia questionnaires were constructed with regard to specific theoretical concerns, we conducted confirmatory factor analyses on the hypothesised factor structures (e.g., Bentler, 1989; Jöreskog and Sörbom, 1989).

Assessment of the model of measurement. For each of the two questionnaires, the hypothesised factor structure was tested for its fit with the observed covariance structure of the measured variables. The SAS CALIS Procedure (Version 6.09; Hartmann, 1990) was used for this purpose. A null model chi-square was used to test the absence of structure in the observed variables. The goodness-of-fit between the hypothetical model and the actual data was evaluated using multiple criteria, as each of them has strengths and weaknesses (Cole, 1987; Marsh, Balla and McDonald, 1988). First, a chi-square test assessed whether the data were generated by the proposed model, or that the model is consistent with the pattern of covariation among the observed variables. A significant chi-square suggests that a significant amount of actual covariance between measures remains unexplained by the model (i.e., a poor fit). Nonsignificance, therefore, implies that the model provides a good fit to the data. However, several problems plague the use of the chi-square statistic, including its sensitivity to violations of normality and its relation to sample size (i.e., with large sample size, very small discrepancies between the expected and actual correlations will produce a significant chi-square). This was corrected by computing, as a second index, a ratio between the model chi-square and the degrees of freedom (df). This ratio indicates the fit of the model per degree of freedom used. This measure was proposed in an early application of structural modelling (Wheaton, Muthén, Alwin and Sommers, 1977). Conforming to indications from the literature (cf. Carmines and McIver, 1981; Wheaton, 1988), a threshold value of 2 was adopted. Two additional indicators of fit included, on the one hand, a Goodness of Fit Index (GFI) which estimates the extent to which the sample variances and covariances are reproduced by the hypothesised model and, on the other hand, a GFI adjusted for degrees of freedom (AGFI). A GFI which exceeds .90 and an AGFI which exceeds .85 are commonly used as indications of a good fit (Stevens, 1996). A fifth measure which evaluated the discrepancy per df between the model and the data was Steiger's root mean square error of approximation (RMSEA, see Steiger, 1990). Practical experience has led researchers to consider that a value of the RMSEA equal or inferior to .05 indicates a close fit of the model in relation to the degrees of freedom (Browne and

Cudeck, 1993). Finally, a Comparative Fit Index (CFI) examined in how far the fit was improved by using the hypothesised model over the null model (Bentler, 1989). The CFI is a measure of covariation in the data reproduced by the model. A value greater than .90 indicates an acceptable fit.

Comparison of the language versions. For each of the two investigated instruments, similarity of factor structure of the two language versions was assessed by comparing the covariance matrices using a LISREL 7.0 (Jöreskog and Sörbom, 1989) procedure. Two hypotheses were tested in each case: (a) the equality of loadings in the samples, and (b) the equality of factorial correlations in the samples. For the first hypothesis, a model where only loadings are identical was compared with a less restrictive model where all loadings, factorial correlations and error variances are left free. For the second hypothesis, we compared a model where all loadings, factorial correlations and error variances are identical with a less restrictive model where only factorial correlations are left free. For each hypothesis, the difference between the chi-square of the models relative to the difference of their degrees of freedom indicated whether one can assume equality of factor structure between the two samples.

Concurrent validity. In view of the conceptual similarity between the two questionnaires, specific predictions could be made regarding correlations expected between some of their factors. These predictions tested using correlations between the scales and subscales of the two questionnaires.

Scale-subscale correlations. Correlations between each subscale and the total scale after subtraction of the subscale the factor in question refers to (corrected total score) as well as intercorrelations between subscales were computed in order to examine the relations between subscales of each questionnaire.

## Results

Assessment of the model of measurement

For the TAS-20, the goodness-of-fit was tested for the three-factor model observed by Bagby and colleagues (Bagby, Parker *et al.*, 1994; Bagby, Taylor *et al.*, 1994) and for the BVAQ, it was tested for the five-factor model proposed by Bermond and Vorst (1998). Each item in both TAS-20 and BVAQ was always considered to be a measure of a single latent factor. A summary of fit indices of the confirmatory analyses for both samples is presented in Table 1.

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Insert Table 1 about here

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TAS-20. As can be seen in Table 1, the chi-square goodness-of-fit was significant for the English sample as well as for the French. Although AGFI met the standard criteria, each of  $\chi^2 / df$  ratio, GFI, RMSEA, and CFI was just below these criteria. The confirmatory factor loadings of this model for each of the items for both samples are presented in Table 2. Statistical significance figuring in this table should be qualified because of the high number of participants ( $N = 290$  in the English sample and  $N = 322$  in the French sample). According to Stevens (1996), with a sample size of 300, loadings below .30 should be considered as low. As can be seen in Table 2, in the French version, item 7 did not load significantly and item 3 did not reach Stevens' criteria on the a priori factor labelled as Difficulty identifying feelings. For factor Difficulty describing feelings, all items in both language versions loaded significantly on the a priori factor. Finally, for factor Externally-oriented thinking, item 16 and item 20 loaded below the value of .30 in the English version. This was the case again for item 20 in the French version. These items might have yielded low parameter estimates because of non-normal distributions. This explanation can be rejected as for each of them the skewness and kurtosis<sup>1</sup> ranged between - 1 and + 1.

Thus, in the two language versions, the goodness-of-fit between the three-factor model of the TAS-20 and the data was not fully satisfactory.

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Insert Table 2 about here

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BVAQ. This questionnaire was developed by its authors under a theoretical assumption of independence of the five factors it includes. A priori, a model with orthogonal factors should have been tested in the confirmatory analysis. However, we considered that two conditions militated against this solution. First, as will be documented later in this section, the empirical findings do not fully confirm the assumption of independence of the BVAQ factors (see Table 7). Second, for statistical reasons, an independent model would necessarily fit less with the data than a dependent one. As one of the purposes of the present study is to compare the psychometric properties of the TAS and the BVAQ, it seemed preferable to adopt for the latter a dependent model as was done for the former.

Although the parameter estimates of all items of the BVAQ-40 in both language versions significantly loaded on each of the a priori factors ( $p$ 's < .001), almost none of the indices of fit for the BVAQ-40 reached the standard criteria (see Table 1). Compared to what was evidenced for the TAS-20, the BVAQ-40 thus appears to offer a poorer fit with its model for a majority of indices. The difference in degrees of freedom between the TAS-20 model ( $df = 167$ ) and the BVAQ-40 one ( $df = 730$ ) can account for this observation. A better comparability would be achieved in considering the two 20-item versions of the BVAQ separately ( $df = 160$  for each).

As can be seen in Table 1, for the first half of the BVAQ (BVAQ-20 A), the chi-square goodness-of-fit was significant for the English sample as well as for the French sample. Most indices of fit for the BVAQ-20 A were just below the standard criteria for the French sample. They reached the standard criteria for the English sample. The confirmatory

factor loadings of the model of this version are presented in Table 3. As can be seen in this table, all items of the BVAQ-20 A in both language versions significantly loaded on each of the a priori factors ( $p < .05$ ). In the French version, items 4 and item 19 of factor Difficulty emotionalising and item 5 of factor Difficulty analysing were below Stevens' criteria of .30 for a sample size of 300. Checking for normality of the distribution for these items showed that item 4 and item 19 were normally distributed (respectively,  $M_s = 2.53$  and  $3.15$ ,  $SD_s = 1.22$  and  $1.28$ , skewness = .44 and  $-.13$ , and kurtosis =  $-1.01$  and  $-1.24$ ), and that this was not the case for item 5 which had a skewed distribution ( $M = 1.36$ ,  $SD = .68$ , skewness =  $2.27$ , kurtosis =  $5.88$ ). In the English version, all items were above Steven's criteria. Thus, the five-factor structure of the BVAQ-20 A was replicable in English but, the goodness-of-fit between the relevant theoretical model and the data was not fully satisfactory in French.

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Insert Table 3 about here

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Indices for the second half of the BVAQ (BVAQ-20 B) revealed an adequate fit between the theoretical model and the data in each sample. Indeed, although the chi-square of the BVAQ-20 B was significant for both samples, each of  $\chi^2 / df$  ratio, GFI, AGFI, RMSEA ratio, and CFI met the standard criteria. The parameter estimates of the dependent model for this version are presented in Table 4. As can be seen in this table, all items of the BVAQ-20 B in both language versions highly loaded on each of the a priori factors ( $p < .001$ ), and were above Stevens' criteria of .30 for a sample size of 300. The five-factor structure of the BVAQ-20 B was thus replicable in both language versions.

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Insert Table 4 about here

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### Comparison of the language versions

In order to evaluate the similarity in factorial structure between the English and French versions in each questionnaire, we tested two hypotheses: (a) the equality of loadings, and (b) the equality of factorial correlations between the English and French versions. For the TAS-20, both hypotheses were rejected as the analyses yielded significant chi-square values (respectively for the first and the second,  $\chi^2(20, N = 612) = 61.65, p < .001$ , and  $\chi^2(3, N = 612) = 12.62, p < .01$ ). Thus, similarity of factorial structure in English and French with the TAS-20 seems not warranted.

For the BVAQ-20 A, although the hypothesis of equality of loadings was rejected  $\chi^2(20, N = 612) = 43.13, p < .005$ , the test of equality of factorial correlations yielded a non significant value,  $\chi^2(10, N = 612) = 5.80, ns$ . Loadings differed significantly in the English and French versions, probably due to the low loadings on items 4, 5, and 19 in the French version. Nevertheless, factorial correlations compared in English and in French.

Finally, for the BVAQ-20 B, both hypotheses were accepted as the analyses yielded non significant chi-square values, respectively,  $\chi^2(20, N = 612) = 11.00, ns$ , and  $\chi^2(10, N = 612) = 14.93, ns$ . Similarity of factor loadings as well as factorial correlations seems warranted with the two language versions of the BVAQ-20 B.

### Concurrent validity

The conceptual similarity between the TAS-20 and the BVAQ involves the following predictions regarding correlations between their factors. The factor Difficulty identifying feelings in the TAS-20 and the factor Difficulty identifying in the BVAQ are conceptually similar, and should therefore be intercorrelated. The same holds for the factor Difficulty describing feelings in the TAS-20 and Difficulty verbalising in the BVAQ, and for Externally-oriented thinking in the TAS-20 and Difficulty analysing in the BVAQ. It follows that only two factors in the BVAQ are predicted to be uncorrelated with the TAS-20 and its factors.

As correlations were closely similar for version A and B of the BVAQ and as version B provided better theoretical fit to the data, correlations with the TAS-20 are presented only for version B (see Table 5). Correlations between the total score of the TAS-20 and the BVAQ-20 B amounted  $r(290) = .62$  for the English version and  $r(322) = .61$  for the French one, both  $p$ 's  $< .0001$ , suggesting that the two instruments are well assessing a same construct. The moderate level of these correlations might be due to the presence in the BVAQ of two dimensions which are not shared by the TAS-20. This was confirmed when correlations were computed between total TAS-20 and BVAQ-20 B scores excluding these two dimensions. They amounted  $r(290) = .82$  in the English version and  $r(322) = .79$  in the French one, both  $p$ 's  $< .0001$ . As expected, all factors of the TAS-20 were positively correlated with the total BVAQ-20 B score. Also as expected, only the three conceptually similar factors in both questionnaires were positively and markedly correlated. The six relevant correlations ranged between .52 and .80, all  $p$ 's  $< .0001$ . Finally, consistent with their conceptual specificity, Difficulty fantasising and Difficulty emotionalising within BVAQ-20 B remained statistically uncorrelated with the total TAS-20 and low correlated or uncorrelated with the TAS-20 subscales.

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Insert Table 5 about here

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### Scale-subscale correlations

Theoretically, the factors of alexithymia are supposed to be linked with the total score of alexithymia. We thus expected positive correlations between the factors and their total score. To avoid spurious results, the correlations were computed between each factor and the total score corrected by subtraction of this factor. As can be seen in Table 6, each subscale of the TAS-20 was significantly correlated with the corrected total alexithymia score in each language version. Similarly, as can be seen in Table 7, each subscale of the BVAQ-20 B was significantly correlated with the corrected total alexithymia score in both

samples, although at a somewhat low degree for some of them. As expected, the assumption regarding the relations between alexithymia subscales and the total alexithymia score was thus supported for both questionnaires.

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Insert Table 6 and Table 7 about here

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Next, we investigated whether the pattern of intercorrelations observed in previous studies between the three subscales of the TAS-20 was replicated by the present data. In addition, we compared the TAS-20 findings in this regard with the pattern of intercorrelations observed for conceptually similar subscales in the BVAQ-20 B (see Table 6 and 7). Finally, we examined the intercorrelations involving the two subscales specific to the BVAQ-20 B.

Previous observations using the TAS-20 revealed that a person's ability to recognise and differentiate his or her own emotions is strongly related to a person's ability to communicate his or her feelings to others (Bagby, Parker *et al.*, 1994; Parker, Bagby, Taylor, Endler and Schmitz, 1993). Consistent with these observations, the present results indicated that the subscales Difficulty identifying feelings and Difficulty describing feelings in the TAS-20 were positively correlated in both the English and the French samples. The same happened for the two corresponding subscales in the BVAQ-20 B, Difficulty identifying and Difficulty verbalising. A relation between Difficulty describing feelings and Externally-oriented thinking in the TAS-20 has also been consistently observed in previous studies (see Bagby, Parker *et al.*, 1994; Parker *et al.*, 1993) suggesting that an externally-oriented cognitive style contains little or no references to a person's inner feelings. Consistent with these observations, the present data showed that these subscales were positively correlated in both the English and the French samples for the TAS-20. The two corresponding subscales for the BVAQ-20 B, Difficulty verbalising and Difficulty analysing, were also positively correlated in both samples. Finally, as regards the relation

between Difficulty identifying feelings and Externally-oriented thinking in the TAS-20, previous studies yielded inconsistent observations (Bagby, Parker *et al.*, 1994; Parker *et al.*, 1993). In the present data, the correlation between these TAS-20 subscales was non-significant in the English sample and significant in the French one. For the BVAQ-20 B, the correlation between the two corresponding subscales, Difficulty identifying and Difficulty analysing, yielded a pattern resembling the one found for the TAS-20. Indeed, the observed value was just above the level of significance in the English sample, whereas the relation was significant in the French sample. Altogether, the pattern of intercorrelations between the TAS-20 subscales which was observed in previous studies was thus replicated in this one. In addition, the pattern of intercorrelations observed between the three conceptually similar subscales of the BVAQ-20 B closely matched the one found for the three TAS-20 subscales.

The two subscales assumed to be specific to BVAQ-20 B, Difficulty fantasising and Difficulty emotionalising, evidenced in their majority low and often non-significant correlations with the other subscales of the BVAQ-20 B. As regards BVAQ-20 B, a final observation deserved to be mentioned in that the subscale Difficulty analysing was found to be significantly correlated with all the other subscales.

## Discussion

The present study compared two alexithymia questionnaires and examined their psychometric properties. We will successively discuss the factorial structure, the comparability, and the validity and reliability of these questionnaires.

### Factorial structure of the questionnaires

As regards the TAS-20, confirmatory factor analysis revealed that most of the indices of fit were just below the standard criteria in the two samples and that some items did not load significantly on the a priori factors or were below Stevens' criteria of .30. This

suggests that the theoretical factor structure of the TAS-20 was not replicable, a conclusion which disagrees with previous results by Bagby, Parker *et al.* (1994) and Parker *et al.* (1993). However, the standard criteria used in the latter studies were less restrictive than ours. For example, Parker *et al.* (1993) adopted the criteria of  $GFI \geq .85$  and  $AGFI \geq .80$  to indicate goodness-of-fit. In addition to the moderate performances of the TAS-20 on the indices of fit, the present study failed to confirm similarity of factorial correlations and of factor loadings for the two language versions of this instrument. Two reasons might explain this. First, the goodness-of-fit in the French version was lower than in the English one. Second, the items with low loadings in the English version were not the same as those with low loadings in the French version. The indices of fit for the TAS-20 could probably be substantially increased if the items evidencing low loadings with the a priori factors would be modified. In particular, low loadings on items 3 and 7 in the French version might indicate problems with the translation of the scale.

As regards the BVAQ-40, confirmatory factor analysis also revealed that most of the indices of fit were below the standard criteria in the two samples. The same applied to the BVAQ-20 A in the French sample. Further, for the latter, similarity between language versions was reached for factorial correlations, but not for factor loadings. Here too, this may be due to the small lower fit to the data in the French version as compared to the English version, or to the low loadings found on three items in the French version. The indices of fit for this version may be substantially increased if the items evidencing low loadings with the a priori factors are modified. In particular, item 5 had a skewed distribution which might indicate either problems with the translation, or cultural differences between the English and the French samples.

Confirmatory factor analyses revealed that the second version of the BVAQ (BVAQ-20 B) provided satisfactory results for all the tests performed. Its indices of fit met the standard criteria for both language versions. The loadings of its items were all above the minimal loading required for the sample sizes. The similarity between its two language versions was warranted both for factorial correlations and factor loadings. A same five-

factor structure is thus very consistently assessed by this instrument in the English and in the French version. It is noteworthy that this high consistency between language versions was achieved despite the fact that each was independently issued from an original Dutch version. Together, these results support the quality of the BVAQ-20 B for assessing alexithymia, although further studies are obviously necessary to replicate and to extend the present findings.

### Comparability of the questionnaires

As the TAS-20 and BVAQ questionnaires intend to assess a same construct and as they rely upon a set of three conceptually similar dimensions, a major concern of the present study was to examine their comparability. Correlations between the total score of the TAS-20 and the BVAQ-20 B clearly confirmed that the two questionnaires are well assessing a similar construct, at least when the two factors specific to the BVAQ-20 B are excluded from these correlations. Indeed, in this case, the two instruments were observed to share 67% and 62% of common variance for the English and French samples respectively. When the two BVAQ specific factors were included in the correlations, the conceptual similarity between the two instruments was considerably weaker, as they then shared only 38% and 37% of the common variance in the English and the French samples respectively. Marked correlations were observed between the pairs of TAS-20 and BVAQ-20 B subscales presumed to assess similar dimensions. These correlations were always higher than those observed between subscales not supposed to assess similar dimensions. Moreover, the pattern of intercorrelations observed for the TAS-20 subscales closely matched the one for the corresponding BVAQ subscales. All these findings concur in confirming that three conceptually similar features are measured by the two questionnaires.

Two subscales are assumed to be specific to BVAQ-20 B. In support of this assumption, the BVAQ subscales Difficulty fantasising and Difficulty emotionalising evidenced only low and predominantly non-significant correlations with the total TAS-20 and with the various TAS-20 subscales. They nevertheless achieved significant positive

correlations with the corrected total BVAQ-20 B score. This confirms that, with these two factors, the BVAQ assesses something unique. The contribution of these two factors for alexithymia will thus further be discussed.

As mentioned in the Introduction section, the constriction of imaginative processes as assessed by the Difficulty fantasising factor was considered as a core features of alexithymia since the initial definition of the construct by Sifneos (1972). Not taking into account this aspect would neglect an essential part of the definition. Additionally, Difficulty fantasising can provide a differential diagnostic between alexithymia and personality disorders, such as schizophrenic or obsessive-compulsive disorders (Sifneos, 1996). These disorders are also characterised by flattened affects but, contrary to alexithymia, they are associated with a rich fantasy life. The theoretical structure of the BVAQ is therefore closer to the original definition of alexithymia than the one of the TAS-20. However, it should be mentioned that previous versions of the TAS-20 included a poor fantasies factor. This was later discarded because it was found markedly correlated with social desirability (see Bagby, Parker *et al.*, 1994; Taylor *et al.*, 1997). Examination of the relation between Difficulty fantasising and the corrected total BVAQ-20 B score in the present study evidenced significant but low level correlations. Also, Difficulty fantasising was neither related to Difficulty identifying, nor to Difficulty verbalising suggesting that a restrained imaginative activity is independent from a difficulty to identify and verbally re-evoked emotions. Correlations between Difficulty fantasising and the remaining subscales amounted at highest .25 in the English version and .15 in the French one. Although poor fantasies appears to be a theoretically relevant dimension in this context, the present observations suggest that this subscale does not contribute markedly to the assessed construct. No data to date are available to document the relation between the BVAQ Difficulty fantasising subscale and social desirability. This represents a needed task for future studies. If Bagby and colleague's observations were replicated, this would definitely argue against this subscale.

Difficulty emotionalising represents a new subscale which encompasses items related to the subjective experience of emotion (e.g., "Even when others are wildly enthusiastic about something, I remain unmoved"). Bermond and Vorst (1998) introduced this factor on the basis of the definition of alexithymia by Taylor *et al.* (1985). When examining the original article by Taylor *et al.* (1985), it appears that the authors indeed defined alexithymic patients with five theoretical features. They "have difficulty identifying and describing their feelings, their cognitive style is concrete and reality-based (*la pensée opératoire*), and they have impoverished inner emotional and fantasy lives [italics added]" (p. 191). However, the factor impoverished inner emotional life was neither mentioned among the characteristics of alexithymia elsewhere in the literature, nor included in any version of the TAS. Thus, the theoretical status of this dimension should further be examined. In addition, the question is raised as to whether this dimension has an empirical relation with alexithymia. In the present study, examination of the relation between Difficulty emotionalising and the corrected total score of the BVAQ-20 B evidenced significant but low level correlations and indicated that they shared only 8% and 3% of common variance respectively in the English sample and in the French one. The present data also showed that Difficulty emotionalising was not highly associated with each of the other alexithymia factors, except Difficulty analysing. Difficulty emotionalising might perhaps better be considered as a correlate of alexithymia, rather than one of the alexithymia factors. Moreover, what this construct exactly operationalises might require better specification. Whereas it is intended to assess "the degree to which someone can be emotionally aroused by emotion inducing events" (Bermond and Vorst, 1998), recent research conducted by Luminet (1997) indicated that it was well related to the subjective experience of emotions, but not to intensity of facial expression, nor to physiological arousal. The examination of the theoretical and empirical relevance of this factor for alexithymia is a needed task in the future.

#### External validity and reliability

A further concern for future studies should be to test the external validity of the BVAQ questionnaire and its factors. In particular, the construct of alexithymia has important overlaps with other individual difference constructs. The external validity of the BVAQ-20 B should thus be addressed by examining its relations with broad dimensions of personality such as those of the Five Factor model and with more specific ones such as emotional awareness, mood labelling, mood monitoring, or emotional intelligence. Examining similarities and differences with these constructs is also helpful in clarifying what alexithymia implies and what it does not. Examples of already conducted research of this type using TAS measurements illustrate the interest of this approach. Thus, consistent with the assumption that alexithymia involves a deficit in the conscious awareness of emotion (see Lane *et al.*, 1997), TAS measurements of alexithymia were consistently found negatively correlated with the Five Factor domain of Openness to experience, and in particular, with its facet of openness to feelings (Bagby, Taylor *et al.*, 1994; Wise and Mann, 1994; Wise, Mann & Shay, 1992). Using a previous version of the TAS, Swinkels and Giuliano (1995) observed that mood labelling, which refers to the ability to identify and categorise one's moods, was strongly and negatively related to the alexithymia subscales of Difficulty identifying feelings and Difficulty describing feelings as well as to the global score of alexithymia. On the contrary, they found that mood monitoring, which refers to a tendency to scrutinise and focus on one's moods, was only moderately and negatively related to the subscale of Externally-oriented thinking and unrelated to the global score of alexithymia. Thus, these data suggested the interesting conceptual specification that alexithymia does not involve a deficiency in mood monitoring, but well in mood labelling. Finally, the recently developed construct of emotional intelligence (e.g., Salovey and Sluyter, 1997) should be hypothesised as holding a negative association with alexithymia. Emotional intelligence consists of three categories of adaptive abilities: (1) appraisal and expression of emotion, (2) regulation of emotion, and (3) utilisation of emotions in solving problems (Salovey & Mayer, 1990). Consistent with the hypothesis, a recent 33 items scale

measuring emotional intelligence correlated negatively with alexithymia measured by a previous version of the TAS ( $r = -.65$ ,  $p < .001$ ) (Schutte *et al.*, 1998).

A final concern is that no data are available about the stability of the BVAQ-20 B. As regards the TAS, two recent studies with clinical populations indicate a high stability in the score of alexithymia. In one study, 54 general hospital psychiatric consultation out-patients were assessed at intake and after a 12 months follow-up on both alexithymia (measured by the TAS-26) and self-reported psychological distress (Salminen, Saarijärvi, Äärelä and Tamminen, 1994). Results indicated that whereas psychological distress was alleviated significantly either spontaneously, or with psychiatric treatment, the alexithymia scores remained constant. In another study, 104 patients with inflammatory bowel disease were followed for 6 months. The prevalence of alexithymia, measured by the TAS-20 in this disease is generally high, around 35% as compared to around 5% for the general population (Porcelli, Zaka, Leoci, Centonze and Taylor, 1995). The study aim was to examine the influences of changes in inflammatory bowel disease on both alexithymia and psychological distress (anxiety and depression). The results showed that the degree of alexithymia in patients with inflammatory bowel disease was not influenced by the level of disease activity. In contrast, measures of anxiety and depression changed with variations in disease activity. A recent study replicated these results with a non-clinical population (Martinez-Sanchez, Ato-Garcia, Corcoles Adam, Huedo Medina and Selva Espana, 1998). The study intended to evaluate the changes in the levels of alexithymia in response to the variations in the stress levels related to academic performance, in comparison with those experienced by other additional emotional and somatic variables. The results showed that alexithymia scores remained stable, not being influenced by the changes in stress level throughout time. In contrast, measures of anxiety, depression and physical symptoms varied with the level of stress experienced. Together, these data strongly suggest a high stability of the alexithymia construct. However, some traumatic situations can modify substantially the alexithymia scores for an extended period of time. In this perspective, Zeitlin, McNally and Cassiday (1993) found that rape victims scored much higher on

alexithymia than comparison individuals who were matched sociodemographically with the rape victims. Also, people who had experienced multiple assaults were more alexithymic than persons who had experienced a single assault. This suggests that alexithymia is also a state reaction to trauma. Krystal (1988) explained the relation in terms of a breakdown in affect regulating functions.

### Conclusion

To sum up, the present data indicate that the second version of the BVAQ, the BVAQ-20 B evidence a better fit to the data as compared to the TAS-20, the BVAQ-40 and the BVAQ-20 A. It was also the only questionnaire for which the factorial structure was replicated in two language versions (French and English). However, before further conclusions can be drawn about the type of alexithymia questionnaire to be recommended, different issues related to the BVAQ should be explored systematically. First, the convergent and discriminant validity needs to be investigated. Second, the relation between the subscale Difficulty fantasising and social desirability deserves further studies. Third, the theoretical and the empirical status of the subscale Difficulty emotionalising needs to be clarified. Finally, external validity and reliability should be examined.

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## Footnote 1

In the French sample, respectively mean, standard deviation, skewness, and kurtosis of item 3 are 2.03, 1.18, .86, and -.36; for item 7, they are respectively 2.66, 1.18, .19, and -1.03; for item 20, respectively 2.15, 1.02, .91, and .17; and in the English sample, for item 16, they are respectively 2.21, .96, .56, and .05; and for item 20, respectively 1.95, 1.00, .82, and .17.

Table 1

Summary Fit Indices for the TAS-20 and the BVAQ for Each Language Versions

Model	Standard criteria	TAS-20		BVAQ		BVAQ-20 A		BVAQ-20 B	
		English	French	English	French	English	French	English	French
Null $\chi^2$	--	1752.18	1713.34	3409.30	4374.07	1083.96	1047.52	1392.79	1344.56
(df)		(190)	(190)	(780)	(780)	(190)	(190)	(190)	(190)
$\chi^2$	<u>ns</u>	381.36*	459.51*	1345.70*	1580.45*	266.99*	385.52*	269.77*	266.21*
(df)		(167)	(167)	(730)	(730)	(160)	(160)	(160)	(160)
$\chi^2 / df$	$\leq 2$	2.28	2.75	1.84	2.17	1.67	2.41	1.69	1.66
ratio									
GFI	$\geq .90$	.88	.87	.81	.80	.92	.89	.92	.93
AGFI	$\geq .85$	.85	.84	.79	.77	.89	.85	.89	.90
RMSEA	$\leq .05$	.067	.074	.059	.064	.048	.066	.049	.046
CFI	$\geq .90$	.86	.81	.83	.76	.88	.74	.91	.91

Note. GFI = Goodness of fit; AGFI = GFI adjusted for degrees of freedom; RMSEA = Steiger's root mean square error of approximation; CFI = Comparative fit index.

\* $p < .001$ .



Table 2

Confirmatory Factor Loadings for the TAS-20 Dependent Factors Model for Each Language Versions

A priori factors Items	Factor 1		Factor 2		Factor 3	
	English	French	English	French	English	French
<u>Difficulty identifying</u>						
<u>feelings</u>						
Item 1	.76**	.77**	.00	.00	.00	.00
Item 3	.34**	.17*	.00	.00	.00	.00
Item 6	.60**	.50**	.00	.00	.00	.00
Item 7	.51**	.11	.00	.00	.00	.00
Item 9	.74**	.78**	.00	.00	.00	.00
Item 13	.76**	.56**	.00	.00	.00	.00
Item 14	.64**	.39**	.00	.00	.00	.00
<u>Difficulty describing</u>						
<u>feelings to others</u>						
Item 2	.00	.00	.74**	.84**	.00	.00
Item 4	.00	.00	.76**	.85**	.00	.00
Item 11	.00	.00	.67**	.49**	.00	.00
Item 12	.00	.00	.63**	.52**	.00	.00
Item 17	.00	.00	.69**	.55**	.00	.00
<u>Externally-oriented</u>						
<u>thinking</u>						
Item 5	.00	.00	.00	.00	.44**	.50**
Item 8	.00	.00	.00	.00	.43**	.59**
Item 10	.00	.00	.00	.00	.62**	.31**
Item 15	.00	.00	.00	.00	.41**	.53**
Item 16	.00	.00	.00	.00	.16*	.47**
Item 18	.00	.00	.00	.00	.32**	.30**
Item 19	.00	.00	.00	.00	.72**	.51**
Item 20	.00	.00	.00	.00	.24**	.27**

\* $p < .05$ . \*\* $p < .001$ .

Table 3

Confirmatory Factor Loadings for the BVAQ-20 A Dependent Factors Model for Each LanguageVersions

A priori factors Items	Factor 1		Factor 2		Factor 3		Factor 4		Factor 5	
	English	French	English	French	English	French	English	French	English	French
<u>Difficulty verbalising</u>										
Item 1	.70**	.55**	.00	.00	.00	.00	.00	.00	.00	.00
Item 6	.64**	.64**	.00	.00	.00	.00	.00	.00	.00	.00
Item 11	.79**	.78**	.00	.00	.00	.00	.00	.00	.00	.00
Item 16	.56**	.50**	.00	.00	.00	.00	.00	.00	.00	.00
<u>Difficulty fantasising</u>										
Item 2	.00	.00	.45**	.47**	.00	.00	.00	.00	.00	.00
Item 7	.00	.00	.44**	.42**	.00	.00	.00	.00	.00	.00
Item 12	.00	.00	.69**	.65**	.00	.00	.00	.00	.00	.00
Item 17	.00	.00	.40**	.43**	.00	.00	.00	.00	.00	.00
<u>Difficulty identifying</u>										
Item 3	.00	.00	.00	.00	.59**	.45**	.00	.00	.00	.00
Item 8	.00	.00	.00	.00	.63**	.69**	.00	.00	.00	.00
Item 13	.00	.00	.00	.00	.56**	.53**	.00	.00	.00	.00
Item 18	.00	.00	.00	.00	.45**	.45**	.00	.00	.00	.00
<u>Difficulty emotionalising</u>										
Item 4	.00	.00	.00	.00	.00	.00	.60**	.24**	.00	.00
Item 9	.00	.00	.00	.00	.00	.00	.49**	.69**	.00	.00
Item 14	.00	.00	.00	.00	.00	.00	.53**	.51**	.00	.00
Item 19	.00	.00	.00	.00	.00	.00	.37**	.16*	.00	.00
<u>Difficulty analysing</u>										
Item 5	.00	.00	.00	.00	.00	.00	.00	.00	.56**	.25**
Item 10	.00	.00	.00	.00	.00	.00	.00	.00	.53**	.30**
Item 15	.00	.00	.00	.00	.00	.00	.00	.00	.51**	.42**
Item 20	.00	.00	.00	.00	.00	.00	.00	.00	.61**	.79**

\* $p < .05$ . \*\* $p < .001$ .

Table 4

Confirmatory Factor Loadings for the BVAQ-20 B Dependent Factors Model for Each LanguageVersions

A priori factors Items	Factor 1		Factor 2		Factor 3		Factor 4		Factor 5	
	English	French	English	French	English	French	English	French	English	French
<u>Difficulty verbalising</u>										
Item 21	.68**	.71**	.00	.00	.00	.00	.00	.00	.00	.00
Item 26	.75**	.74**	.00	.00	.00	.00	.00	.00	.00	.00
Item 31	.66**	.60**	.00	.00	.00	.00	.00	.00	.00	.00
Item 36	.62**	.66**	.00	.00	.00	.00	.00	.00	.00	.00
<u>Difficulty fantasising</u>										
Item 22	.00	.00	.78**	.51**	.00	.00	.00	.00	.00	.00
Item 27	.00	.00	.60**	.64**	.00	.00	.00	.00	.00	.00
Item 32	.00	.00	.63**	.64**	.00	.00	.00	.00	.00	.00
Item 37	.00	.00	.70**	.64**	.00	.00	.00	.00	.00	.00
<u>Difficulty identifying</u>										
Item 23	.00	.00	.00	.00	.37**	.49**	.00	.00	.00	.00
Item 28	.00	.00	.00	.00	.78**	.72**	.00	.00	.00	.00
Item 33	.00	.00	.00	.00	.65**	.64**	.00	.00	.00	.00
Item 38	.00	.00	.00	.00	.55**	.61**	.00	.00	.00	.00
<u>Difficulty emotionalising</u>										
Item 24	.00	.00	.00	.00	.00	.00	.41**	.40**	.00	.00
Item 29	.00	.00	.00	.00	.00	.00	.61**	.51**	.00	.00
Item 34	.00	.00	.00	.00	.00	.00	.55**	.50**	.00	.00
Item 39	.00	.00	.00	.00	.00	.00	.52**	.51**	.00	.00
<u>Difficulty analysing</u>										
Item 25	.00	.00	.00	.00	.00	.00	.00	.00	.34**	.46**
Item 30	.00	.00	.00	.00	.00	.00	.00	.00	.68**	.60**
Item 35	.00	.00	.00	.00	.00	.00	.00	.00	.60**	.66**
Item 40	.00	.00	.00	.00	.00	.00	.00	.00	.51**	.57**

\* $p < .05$ . \*\* $p < .001$ .

Table 5

Intercorrelations Between the Scales and Subscales of the TAS-20 and the BVAQ-20 B for Each Language Versions

Scale	BVAQ-20 B											
	Total		<u>Difficulty identifying</u>		<u>Difficulty verbalising</u>		<u>Difficulty analysing</u>		<u>Difficulty fantasising</u>		<u>Difficulty emotionalising</u>	
Subscale	English	French	English	French	English	French	English	French	English	French	English	French
TAS-20 total	<i>.62***</i>	<i>.61***</i>	<i>.58***</i>	<i>.54***</i>	<i>.65***</i>	<i>.61***</i>	<i>.42***</i>	<i>.46***</i>	.02	-.08	.11	.08
<u>Difficulty identifying feelings</u>	<i>.30***</i>	<i>.36***</i>	<i>.67***</i>	<i>.52***</i>	<i>.24***</i>	<i>.31***</i>	.09	<i>.25***</i>	-.11	-.06	-.07	-.06
<u>Difficulty describing feelings</u>	<i>.61***</i>	<i>.57***</i>	<i>.36***</i>	<i>.39***</i>	<i>.80***</i>	<i>.77***</i>	<i>.32***</i>	<i>.25***</i>	.02	.08	<i>.19**</i>	.09
<u>Externally-oriented thinking</u>	<i>.49***</i>	<i>.40***</i>	<i>.15**</i>	<i>.24***</i>	<i>.41***</i>	<i>.21***</i>	<i>.57***</i>	<i>.53***</i>	<i>.19**</i>	-.03	<i>.16**</i>	<i>.15**</i>

Note. Numbers in italics are correlations between subscales assessing similar concepts.

\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .0001$ .

Table 6

Intercorrelations Between the Subscales of the TAS-20 for Each Language Versions

	Subscale 1		Subscale 2		Subscale 3	
	English	French	English	French	English	French
Corrected Total TAS-20 Score	.32***	.44***	.51***	.44***	.26***	.22***
Subscale 1 ( <u>Difficulty identifying feelings</u> )	--	--	.41***	.47***	.09	.18***
Subscale 2 ( <u>Difficulty describing feelings</u> )			--	--	.34***	.20***
Subscale 3 ( <u>Externally-oriented thinking</u> )					--	--

\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

Table 7

Intercorrelations Between the Subscales of the BVAQ-20 B for Each Language Versions

	Subscale 1		Subscale 2		Subscale 3		Subscale 4		Subscale 5	
	English	French	English	French	English	French	English	French	English	French
Corrected Total BVAQ-20 B Score	.41***	.25***	.16**	.13*	.14*	.27***	.28***	.17**	.45***	.42***
Subscale 1 ( <u>Difficulty verbalising</u> )	--	--	.11	.04	.23***	.26***	.27***	.05	.40***	.26***
Subscale 2 ( <u>Difficulty fantasising</u> )			--	--	-.04	.05	.15**	.13*	.25***	.15**
Subscale 3 ( <u>Difficulty identifying</u> )					--	--	.02	.05	.13*	.30***
Subscale 4 ( <u>Difficulty emotionalising</u> )							--	--	.25***	.26***
Subscale 5 ( <u>Difficulty analysing</u> )									--	--

\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .