



VALIDATION OF THE REVISED TEST ANXIETY SCALE AND THE FRIEDBEN TEST ANXIETY SCALE IN A SPANISH SAMPLE

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Resumen: Se examinan en una muestra de universitarios españoles las propiedades psicométricas de dos cuestionarios recientes dirigidos a evaluar la ansiedad ante los exámenes: la Escala Revisada de Ansiedad ante los exámenes (*Revised Test Anxiety Scale*, RTA; Benson & El-Zahhar, 1994) y la Escala FRIEDBEN de Ansiedad ante los Exámenes (*FRIEDBEN Test Anxiety Scale*, FTA; Friedman & Bendas-Jacob, 1997). La estructura factorial de ambos cuestionarios fue replicada en general, aunque hubo problemas con algunos ítems. Los datos sobre la validez convergente, divergente y predictiva de ambos cuestionarios y de sus subescalas fueron satisfactorios, excepto para las subescalas Pensamientos Irrelevantes para el Examen de la RTA y Miedo al Desprecio Social de la FTA. La fiabilidad interna de las subescalas Preocupación y Síntomas Corporales de la RTA fue baja. Se concluye que con su formulación actual, ambos cuestionarios no parecen adecuados para su uso en población universitaria.

Palabras Clave: FTA, RTA, Ansiedad ante los exámenes, Cuestionarios, Propiedades psicométricas

Abstract: The psychometric properties of two recent questionnaires designed to measure test anxiety - the Revised Test Anxiety Scale (RTA) (Benson & El-Zahhar, 1994) and the FRIEDBEN Test Anxiety Scale (FTA) (Friedman & Bendas-Jacob, 1997) - were tested in a sample of Spanish university students. In general, the factor structure of both questionnaires was replicated, although there were problems with some items. Data regarding the convergent, divergent and predictive validity of both questionnaires and their sub-scales were satisfactory, except for the sub-scales *Test-Irrelevant Thinking* on the RTA and *Fear of Social Disapproval* on the FTA. The internal reliability of the *Worry* and *Bodily Symptoms* subscales of the RTA was low. It is concluded that in their current form neither questionnaire seems suitable for using with university students.

Key words: FTA, RTA, Test anxiety, Questionnaires, Psychometric properties

Título: Validación de la Escala Revisada de Ansiedad ante los exámenes (RTA) y de la Escala FRIEDBEN de Ansiedad ante los Exámenes en una muestra española

Introduction

Two widely used measures of test anxiety are the Test Anxiety Inventory (Spielberger, 1980) and the Reactions to Tests questionnaire (Sarason, 1984). Benson, Moulin-Julian, Schwarzer, Seipp and El-Zahhar (1992) sought to combine the strong points

of these questionnaires. To this end they eliminated the 34 items from both that were either redundant or failed to load on any factor, and, using an international sample (North American, German and Egyptian subjects), developed a shorter scale of 18 items which they called the Revised Test Anxiety Scale (RTA). According to a principal axis analysis with oblique rotation the RTA continues to present the same four factors as the Reactions to Tests questionnaire: two cognitive (*Worry* and

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Test-Irrelevant Thoughts) and two emotional (*Tension* and *Bodily Symptoms*). This structure was confirmed by factor analysis in a new international sample.

Subsequently, Benson and El-Zahhar (1994) sought to improve the accuracy of the RTA by trying several new items, especially on the *Bodily Symptoms* dimension, which had only three items. The outcome of this was a 20-item scale in which two old items were replaced and a further two new items were added to the *Bodily Symptoms* factor. The structure of the original four factors was confirmed by factor analysis in a new sample. Data from Hagtvet and Benson (1997) with a North American sample and from McIlroy, Bunting and Adamson (2000) with an Irish sample have also lent support to the structure, although this was only achieved by allowing three items to load on more than one factor (items 8, 17 and 19 in the study of Hagtvet and Benson, and items 2, 7 and 11 in that of McIlroy et al.).

The reported correlations between the factors *Worry*, *Tension* and *Bodily Symptoms* oscillate between .61 and .82, while those between *Test-Irrelevant Thoughts* and the other factors range from .18 to .69 (Benson & El-Zahhar, 1994; Hagtvet & Benson, 1997). In the study by Benson and El-Zahhar (1994) a model with a second-order factor (test anxiety) explained these high correlations between certain factors. This factor was mainly a function of the *Worry*, *Tension* and *Bodily Symptoms* dimensions. In a similar way to these previous studies McIlroy et al. (2000) found correlations ranging from .58 to .77 between the factors *Worry*, *Tension* and *Bodily Symptoms*, but much lower correlations (-.10 to .33) between *Test-Irrelevant Thoughts* and the other factors.

The internal consistency (Cronbach's alpha) of the total and the sub-scales of the new RTA was shown to be good in a North

American sample (range: .76-.91), but lower, especially on two of the sub-scales, in an Egyptian sample (*Total*: .84; *Worry*: .60; *Tension*: .77; *Bodily Symptoms*: .73; *Test-Irrelevant Thoughts*: .68) (Benson & El-Zahhar, 1994).

In contrast to the attention paid to the factor structure of the RTA its convergent, divergent and predictive validity have not been studied. McIlroy et al. (2000) studied the predictive utility of the four factors with respect to the combined score obtained on three exams. They found that the two cognitive factors, but not the two emotionality ones, were significant negative predictors of the combined score, and continued to be significant predictors of exam performance after controlling for the performance achieved in previous exams.

Also during the 1990s Friedman and Bendas-Jacob (1997) developed the FRIEDBEN Test Anxiety Scale for the general population and, particularly, adolescents. The initial items were suggested by 17-year-old students according to the thoughts, feelings and actions which they believed characterised people with high and low test anxiety. An initial version of 33 items was subsequently reduced to 23 items and an analysis of common factors with oblique rotation yielded three factors: *Fear of Social Derogation*, *Cognitive Obstruction* (interference with cognitive functioning) and *Tenseness*.

The internal consistency (Cronbach's alpha) of the total and the three sub-scales of the FTA has proved satisfactory (range: .81-.91). In terms of validity, the FTA shows correlations of .82 (girls) and .84 (boys) with the Test Anxiety Inventory. It has also been shown to be significantly correlated with peer evaluations of the degree to which test-related stress is experienced (*Total*: .54; *Fear of Social Derogation*: .52; *Cognitive Obstruction*: .64; and *Tenseness*: .78).

Given the above, the present study had two basic aims: (a) to determine whether the factor structures of the RTA and the FTA could be replicated in a Spanish sample; and (b) to obtain data regarding the internal consistency and the convergent, divergent and predictive validity of the two questionnaires. Except for internal consistency, there is no such information for the RTA and that available for the FTA is very limited. It was expected that the different sub-scales and the total score of the two inventories would correlate highly with other measures of test anxiety, both those administered together with them and those administered later during a real examination, and that these correlations would be greater than those obtained with respect to other questionnaires measuring different constructs (depression, fear of negative evaluation, health anxiety and general aggression).

Method

Participants

Two samples of students from the University of Barcelona's Faculty of Psychology were used. They were all taking a compulsory third-year module: Intervention in Clinical and Health Psychology. The first sample comprised 192 students who completed all but two (the State-Trait Anxiety Inventory and the Fear Thermometer) of the questionnaires during one of their classes, 1.5 months prior to the second continuous assessment examination of the module. Of this group 44 were men and 148 women, the mean age being 23.9 years ($SD = 5.7$). The second sample comprised 124 students from among the original 192 who sat the second continuous assessment examination of the module toward the end of the academic year. Of this group 24 were men and 100 women, the mean age being 23.6 years ($SD = 5.8$).

Measures

Four self-report scales related to test anxiety were used, along with another four which measure different constructs. The measures were as follows:

Revised Test Anxiety Scale (RTA) (Benson et al., 1992; Benson & El-Zahhar, 1994). This comprises 20 items scored from 1 (almost never) to 4 (almost always) according to the frequency with which each is experienced. The items are distributed in four sub-scales: *Worry*, *Tension*, *Bodily Symptoms* and *Test-Irrelevant Thoughts*.

FRIEDBEN Test Anxiety Scale (FTA) (Friedman & Bendas-Jacob, 1997). Although this instrument is designed mainly for adolescents its authors consider that it could also be useful for adult students. It comprises 23 items which are scored from 1 to 6 according to the degree to which subjects identify themselves with the statement. It includes three sub-scales: *Fear of Social Derogation*, *Cognitive Obstruction* and *Tenseness*. The order of the items was randomised, as in the original article they are ordered within each sub-scale.

State-Trait Anxiety Inventory, state part (STAI-S) (Spielberger, Gorsuch & Lushene, 1970). This part of the questionnaire aims to measure anxiety in a specific situation. It comprises 20 items scored from 1 (not at all) to 4 (very much so) to which students responded according to how they had felt during a real examination they had just sat. According to data presented by Spielberger et al. (1970), the total score of the STAI-S and that of each one of its items (except one in men) discriminated significantly between the condition of responding under standard instructions (how do you feel at this moment?) and the condition of students responding in terms of how they believed they would feel just prior to the final examination in an important

course. Similarly, the total score of the STAI-S and that of each one of its items (except two in men and one in women) discriminated between a relaxed condition and another in which students responded to the Terman Concept Mastery Test presented as a relatively easy intelligence test.

Fear Thermometer (FT). Each student evaluated the degree of anxiety experienced during the examination on a scale of 1 (no anxiety) to 10 (maximum anxiety).

Depression, Anxiety and Stress Scales - 21-item version (DASS-21) (Lovibond & Lovibond, 1995). In the original version, subjects score from 0 to 3 the severity/frequency with which they have experienced each of the 21 negative emotional symptoms during the previous week. However, for the present study the instructions were adapted and the item statements were rewritten in the present tense in order to evaluate the experience of these symptoms in general. Of the three 7-item scales (Depression, Anxiety and Stress) only the first was used. In a Spanish sample, the internal consistency (Cronbach's alpha) of the Depression scale has been .84. The scale has correlated highly with other measures of depression (range: .77-.81) and these correlations have been stronger than those with measures of anxiety (range: .55-.56). The scale has discriminated between clinical and non-clinical samples, and between people with depressive disorders and those with anxiety disorders (Bados, Solana & Andrés, in press). There are no data for test-retest reliability, but the 8-week temporal stability of the Depression scale of a trait version of the original DASS (42-item) has been .70 (Lovibond, 1998).

Fear of Negative Evaluation Scale - Brief Version (FNE-BV) (Leary, 1983). This aims to measure the cognitive component of social anxiety by means of twelve items which are scored on a scale of 1 (not at all characteristic of me) to 5 (extremely

characteristic of me). The internal consistency (Cronbach's alpha) of the FNE-BV has been .92 and the 4-week test-retest reliability, .75. The scale has correlated significantly with measures of social anxiety (range: .32-.35).

Health Anxiety Questionnaire (HAQ) (Lucock & Morley, 1996). This comprises 21 items, scored on a frequency scale from 0 (never or almost never) to 3 (most of the time), and measures anxiety or worry associated with health. The internal consistency (Cronbach's alpha) of the HAQ has been .90 and the 4 to 7-week test-retest reliability, .95. The HAQ has correlated significantly with measures of trait anxiety and depression (range: .38-.64), and has discriminated among non-clinical samples, medical patients and clinical psychology patients; it also has discriminated between patients with hypochondria and patients with anxiety disorders.

Aggression Questionnaire (AQ) (Buss & Perry, 1992). This aims to measure the motor, emotional and cognitive components of aggression. It comprises 29 items that are scored from 1 to 5 according to the degree to which subjects believe the statement is characteristic of them. Although four factors have been identified (physical aggression, verbal aggression, anger and hostility), only the total score was used (general aggression). In a Spanish sample, the internal consistency (Cronbach's alpha) of the total score has been .82 and the 5-week test-retest reliability, .81. The total score has correlated significantly with measures of trait anger (.53) and general hostility (.59). Correlations have been stronger with the Hostility (.68) and Impatience (.53) sub-scales of the Jenkins Activity Scale in comparison with the Job Involvement (.26) and Hard Driving (.16) sub-scales (García-León et al., 2002).

Procedure

The RTA and the FTA were translated into Spanish by two bilingual Spanish psychologists. The Spanish version was then translated back into English by a bilingual English teacher. Next, the original version of both scales was compared with the English version backtranslated from Spanish, and the few discrepancies which appeared were resolved through discussion among the three translators.

In the first stage all the questionnaires, except for the STAI-S and the Fear Thermometer, were administered to the 192 students enrolled in the Intervention in Clinical and Health Psychology module. In the second stage (1.5 months later) the STAI-S and the Fear Thermometer were administered to 411 students of the abovementioned module after they had sat the corresponding final examination. This group included 124 students from the original sample of 192. The temporal reference period for responding to the STAI-S and the Fear Thermometer was the examination which had just been sat.

Data analysis was performed using SPSS for Windows, version 11.0.

Results

Factor analysis. The sample of 192 students was subjected to an exploratory factor analysis using principal axes extraction and promax oblique rotation (the results with oblimin were practically identical). In the case of the RTA it should first be pointed out that although all its items correlated significantly with the total of scale, three of them (numbers 4, 7 and 13) did not reach the .30 value and four (numbers 4, 7, 9 and 13) only correlated significantly with a few of the other items (from 4 to 6 depending on the item). Four items (numbers 2, 4, 7 and 9) gave a mediocre Kaiser-Meyer-Olkin value of sample adequacy

(< .70). Three items (numbers 1, 2 and 4) had negligible communalities (< .20).

Four factors were extracted in an attempt to replicate previous studies. The four factors accounted for 38.1% of the variance and their eigenvalues after rotation were 3.195, 3.036, 2.344 and 2.343. The correlations between the factors were: .58 (*Tension - Bodily Symptoms*), .39 (*Tension - Worry*), -.006 (*Tension - Test-Irrelevant Thoughts*), .45 (*Bodily Symptoms - Worry*), .12 (*Bodily Symptoms - Test-Irrelevant Thoughts*) and .25 (*Worry - Test-Irrelevant Thoughts*). As Table 1 shows, the items generally loaded on the expected factor; however, three of them (numbers 1, 2 and 4) did not load on any factor (according to the criterion that the loading value was $\geq .30$), one (number 20) tended to load similarly on both *Tension* and *Worry* (difference $\leq .10$ between the factor loadings) and one (number 5) loaded mainly on *Tension* but also on *Worry*.

When the Kaiser criterion was combined with the Cattell scree plot only two or three factors were yielded. The two-factor solution was difficult to interpret, while the three factor one only differed from that of four factors in three aspects: the items from *Tension* and *Bodily Symptoms* loaded on the same dimension (*Emotionality*), item 2 loaded on the factor *Worry* and item 5 only loaded on *Tension* (and not on *Worry*). The correlations between the factors were: .54 (*Emotionality - Worry*), .002 (*Emotionality - Test-Irrelevant Thoughts*) and .22 (*Worry - Test-Irrelevant Thoughts*).

With respect to the FTA, both the *a priori* criterion, which aimed to replicate the three factors identified in the original study, and the combination of the Kaiser criterion with Cattell's scree plot yielded three factors. These accounted for 42.6% of the variance and their eigenvalues after rotation were 5.191, 4.497 and 3.614. The

correlations between the factors were: .44 (*Fear of Social Derogation - Tenseness*), .37 (*Fear of Social Derogation — Cognitive Obstruction*) and .47 (*Tenseness — Cognitive Obstruction*). Table 2 shows that the items generally loaded on the expected

factor, although four (numbers 5, 11, 15 and 20, all from the *Cognitive Obstruction* sub-scale) proved problematic; they all tended to load on more than one factor, although three failed to reach a value of .30.

Table 1. RTA Items With Factor Loadings From Principal Axis Analysis With Oblique Rotation.

Item	Factor			
	1	2	3	4
RTA Tension Scale				
6. I worry a great deal before taking an important exam	.948	-.212	.004	.005
12. I am anxious about tests	.562	.188	.003	-.001
5. During tests I feel very tense	.489	.346	.002	-.001
20. I worry before the test because I do not know what to expect	.312	.104	.260	-.001
4. I start feeling very uneasy just before getting a test paper back	.141	-.001	.181	-.005
RTA Bodily Symptoms Scale				
17. While taking a test my muscles are very tight	.281	.588	-.007	-.005
18. I have difficulty breathing while taking a test	-.124	.551	.006	-.110
15. My mouth feels dry during a test	.002	.518	.002	.004
16. I sometimes find myself trembling before or during tests	.287	.444	-.187	.000
10. I get a headache during an important test	-.003	.409	.136	.113
RTA Worry Scale				
8. While taking tests, ... thinking how much brighter the other people are	.007	-.010	.626	-.111
11. While taking a test, I often think about how difficult it is	-.007	.148	.519	.001
19. During the test I think about how I should have prepared for the test	-.004	.004	.431	.173
3. During tests I find myself thinking about the consequences of failing	.139	.008	.377	.002
2. I seem to defeat myself while taking important tests	.009	-.005	.296	.010
1. Thinking about my grade in a course interferes with my work on tests	.195	.004	.006	.005
RTA Test-Irrelevant Thinking Scale				
7. During tests I find myself thinking of things unrelated to the material	.005	-.129	-.004	.888
9. I think about current events during a test	-.001	-.001	-.004	.882
14. During tests I find I am distracted by thoughts of upcoming events	-.114	.260	.005	.618
13. While taking tests I sometimes think about being somewhere else	.125	-.107	.008	.441

Note. Items are from Further refinement and validation of the Revised Test Anxiety Scale by Benson and El-Zahhar, 1994, *Structural Equation Modeling*, 1, 203-221. Items are grouped according to its original factor on the RTA. Factor loadings > .30 are presented in boldface type. RTA = Revised Test Anxiety Scale.

Table 2. FTA Items With Factor Loadings From Principal Axis Analysis With Oblique Rotation

Item	Factor		
	1	2	3
FTA Social Derogation Scale			
22. If I fail a test I am afraid I shall be rated as stupid by my friends	.854	-.005	.008
19. If I fail a test I am afraid people will consider me worthless	.780	.006	.006
17. I am worried that failure in tests will embarrass me socially	.779	.002	-.004
13. I am very worried about what my teacher will think or do if I fail his or her test	.761	-.008	-.008
4. If a fail a test I am afraid my teachers will derogate me	.758	-.007	-.173
12. If a fail a test I am afraid my teachers will believe I am hopelessly dumb	.683	-.005	.003
9. I am worried that all my friends will get high scores... and only I will get low ones	.581	.125	-.122
1. I am worried that if I fail a test my parents will not like it	.415	-.006	.208
FTA Tenseness Scale			
18. I am very tense before a test, even if I am well prepared	-.002	.878	-.007
21. During a test my whole body is very tense	-.141	.865	-.003
7. I am terribly scared of tests	.120	.628	.003
6. While I am sitting in an important test, I feel that my heart pounds strongly	.003	.586	-.189
23. During a test I keep moving uneasily in my chair	-.107	.582	.004
2. I arrive at a test with no serious tension or nervousness	.001	-.537	-.104
FTA Cognitive Obstruction Scale			
14. I usually function well in tests	.007	.010	-.737
10. During a test I feel I'm in good shape and that I'm organized	.153	.008	-.677
3. During a test my thoughts are clear and I neatly answer all questions	-.000	.003	-.638
8. I feel my chances are good to think and perform well in tests	-.003	-.003	-.591
16. During a test it's hard for me to organize what's in my head in an orderly fashion	-.000	.176	.407
20. In a test I feel like my head is empty, as if I have forgotten all I have learned	.008	.217	.297
5. I feel it is useless for me to sit for an examination, I shall fail no matter what	.212	-.003	.264
11. I feel I just can't make it in tests	.304	.290	.254
15. Before a test it is clear to me that I'll fail no matter how well prepared I am	.010	.293	.206

Note. Items are from Measuring perceived test anxiety in adolescents: A self-report scale, by Friedman and Bendas-Jacob, 1997, *Educational and Psychological Measurement*, 57, 1035-1046. Items are grouped according to its original factor on the FTA. Factor loadings > .30 are presented in boldface type. FTA = FRIEDBEN Test Anxiety Scale.

It is possible that the factorial structure of the RTA and FTA can change according to sex. That is why we decided to repeat the factor analysis with women (the number of males was very small). The results with the RTA were almost identical. The only differences were that item 17 (...muscles very tight) loaded similarly on the *Bodily Symptoms* and *Worry* factors, and that item 16 (...trembling) loaded higher on *Worry* than on *Bodily Symptoms*.

As for the FTA, the only differences with regard to the total sample were that item 11 (...can't make it in tests) did not load on the *Fear of Social Derogation* factor but on *Tenseness*, and that item 15 (...I'll fail no matter how well prepared I am) loaded on *Tenseness* instead of not loading on any factor.

Analysis of reliability. Cronbach's α was used to assess the reliability of the

sub-scales and the total of each scale. For the total all the items were considered, while for the sub-scales only those which loaded significantly on each factor, and with a difference greater than .10 in the event that they loaded on more than one factor, were taken into account. The α values for the RTA were: *Total* (.81), *Worry* (.57), *Tension* (.81), *Bodily Symptoms* (.67) and *Test-Irrelevant Thoughts* (.80). The α values for the FTA were: *Total* (.72), *Fear of Social Derogation* (.86), *Cognitive Obstruction* (.74) and *Tension* (.82).

Three of the sub-scales had more items in their original form. When the α values of each sub-scale were calculated with respect to its original composition one remained the same (*Worry*, .56), one increased slightly (*Cognitive Obstruction*, .77) and the third was somewhat lower (*Tension*, .74).

Analysis of convergent and divergent validity. Table 3 shows the intercorrelations between the sub-scales of both the RTA and the FTA. These intercorrelations were low in the case of the FTA and moderate in the RTA, except when the *Test-Irrelevant Thoughts* sub-scale was involved; this sub-scale had a low correlation with *Worry* and a non-significant one with *Tension* and *Bodily Symptoms*.

Table 3 also shows the correlations between the different sub-scales of the RTA and FTA and those between these sub-scales and other questionnaires. The total of the RTA was highly correlated (.72) with the other measure of general test anxiety (FTA) and this correlation was higher than those obtained with the questionnaires not measuring test anxiety (from .20 to .30). Although the correlations were lower the same results were obtained for the sub-scales of the RTA, except for *Test-*

Irrelevant Thoughts. This sub-scale presented neither convergent nor divergent validity. In terms of the FTA, the results were similar to those for the RTA. In this case the sub-scale with problems of convergent and divergent validity was *Fear of Social Derogation*. In addition, the correlation between the *Cognitive Obstruction* sub-scale and the RTA total was lower than expected.

All the above correlations were calculated with the sample of 124 students who responded to both the general questionnaires and those administered after the examination to which they referred. Nevertheless, the correlations between the general questionnaires were practically the same or very similar in the sample of 192 students. There were only five exceptions to this: five low correlations (from -.04 to .18) in the smaller sample increased by around 0.1 and ranged from .12 to .28 in the larger sample; however, this did not affect the interpretation of results.

Analysis of predictive validity. As Table 3 shows, the RTA, the FTA and all their sub-scales—except for *Test-Irrelevant Thoughts*, *Fear of Social Derogation* and *Cognitive Obstruction*—correlated moderately and significantly with both the STAI-S and the Fear Thermometer, the two measures of test anxiety administered 1.5 months later, just after a real examination had been sat. The correlation between these two measures was .71. The *Cognitive Obstruction* sub-scale correlated significantly with the STAI-S, but not with the Fear Thermometer; the opposite was true for the *Fear of Social Derogation* sub-scale.

Table 3. Product-Moment Correlations Among Scales of RTA and FTA and Other Questionnaires

	RTA					FTA			
	Worry	Tension	Bod. S.	TIT	Total	Soc. D.	Cogn.O.	Tens.	Total
Worry	---					.389***	.454***	.348***	.572***
Tension	.386***	---				.162	.269**	.736***	.554***
Bodily S.	.371***	.559***	---			.041	.364***	.660***	.506***
TIT	.219*	.043	.070	---		.148	.307**	.082	.266**
Total	.699***	.764***	.765***	.403***	---	.292**	.504***	.698***	.717***
FTA									
Social D.	.389***	.162	.041	.148	.292**	---			
Cognit O.	.454***	.269**	.364***	.307**	.504***	.227*	---		
Tenseness	.348***	.736***	.660***	.082	.698***	.268**	.287**	---	
Total	.572***	.554***	.506***	.266**	.717***	.712***	.648***	.748***	---
STAI-S									
TM	.419***	.496***	.513***	.125	.565***	.158	.388***	.497***	.488***
	.346***	.421***	.354***	.012	.434***	.203*	.119	.413***	.366***
DASS-21									
DASS-D	.330***	-.036	.116	.238**	.228*	.216*	.282**	.148	.322***
FNE-BV	.238**	.056	.089	.125	.204*	.470***	.166	.233**	.417***
HAQ	.236**	.042	.226*	.290**	.300**	.275**	.222*	.178*	.324***
AQ	.284**	.027	.190 ⁺	.297**	.266**	.268**	.227*	.222*	.353***

Note. N = 124. * $p < .05$, ** $p < .01$, *** $p < .001$. RTA = Revised Anxiety Scale; Bod. S. = Bodily Symptoms; TIT = Test-irrelevant thinking; FTA = FRIEDBEN Anxiety Scale; Soc. D. = Social Derogation; Cogn. O. = Cognitive Obstruction; STAI-S = State-Trait Anxiety Inventory, state version; DASS-21 = Depression scale of Depression, Anxiety and Stress Scales, 21-items version; FNE-BV = Fear of Negative Evaluation-Brief Version; HAQ = Health Anxiety Questionnaire; AQ = Aggression Questionnaire.

Discussion

This study of the psychometric properties of the RTA and FTA has revealed strengths and weaknesses of both questionnaires. In terms of the FTA, the three original factors were obtained and 19 of its 23 items loaded differentially on them. However, four of the items which originally belonged to the *Cognitive Obstruction* sub-scale tended to load on more than one factor, although three of these did not reach a value of .30. Two of these items (numbers 5 and 20) had also shown double loading in the study of Friedman and Bendas-Jacob (1997). Interestingly, the content of three of the four items (numbers 5, 11 and 15) has more to do with hopelessness (not being able, failing) than with thinking and working in a

clear and organised way during examinations.

The internal reliability of the FTA and its sub-scales was acceptable or satisfactory, although lower than that reported by Friedman and Bendas-Jacob (1997) for the total (.72 vs. .91) and for the *Cognitive Obstruction* sub-scale (.74 vs. .85). The results regarding the convergent, divergent and predictive validity of the FTA and its *Tenseness* sub-scale were satisfactory, although there were problems with its other two sub-scales. In terms of predictive validity, the *Cognitive Obstruction* sub-scale correlated significantly with the STAI-S, but not with the Fear Thermometer; moreover, its correlation with the STAI-S was lower than that between this questionnaire and the FTA and its *Tenseness* sub-scale.

The results were worse for the *Fear of Social Derogation* sub-scale, its correlation with the RTA being only .29, a value similar to or less than that obtained with measures of depression, fear of negative evaluation, health anxiety and general aggression. Moreover, it was unable to predict the anxiety experienced 1.5 months later during a real examination as measured by the STAI-S; although it showed some predictive value with respect to anxiety levels as measured by the Fear Thermometer, the correlation was low (.20).

Of course, it may be that the FTA shows better properties with respect to an adolescent population, the group for which it was originally designed. For example, fear of the social consequences of failing, i.e. what parents, teachers and peers will think, may be much greater among adolescents than university students. However, in the absence of further research that is able to confirm or reject this hypothesis, our provisional conclusion is that the FTA does not seem to be a suitable measure for an adult population.

In terms of the RTA, the four original factors were replicated and 16 of the 20 items loaded differentially on them. Two items of the original *Worry* sub-scale and one from *Tension* did not load on any factor, and another item from the latter sub-scale loaded similarly on both *Tension* and *Worry*. In addition, the results were equally interpretable in terms of three factors (*Worry*, *Emotionality* and *Test-Irrelevant Thoughts*). Benson et al (1992) themselves reported that a three- rather than four-factor structure could have been obtained for the RTA (combining tension and bodily symptoms) had the exploratory factor analysis not been carried out with the aim of maintaining a four-factor structure. Furthermore, in the study by Hodapp and Benson (1997) tension and bodily symptoms

formed the same factor in a 23-item version of the RTA.

The internal reliability (Cronbach's α) of the RTA and its sub-scales was satisfactory, except for *Worry* (.57) and *Bodily Symptoms* (.67). The values were lower than those obtained by Benson and El-Zahhar (1994) in a North American sample, but similar to those reported for an Egyptian sample used in the same study (*Worry*: .60; *Bodily Symptoms*: .73). The data for the convergent, divergent and predictive validity of the RTA and three of its sub-scales (*Worry*, *Tension* and *Bodily Symptoms*) were satisfactory, but the results for *Test-Irrelevant Thoughts* were particularly problematic.

The correlation between the latter sub-scale and the FTA was only .27, similar to values obtained with respect to inventories measuring constructs other than test anxiety. Moreover, this sub-scale was not significantly correlated with the anxiety experienced 1.5 months later during a real examination, as measured by the STAI-S and the Fear Thermometer. Thus, the *Test-Irrelevant Thoughts* sub-scale lacks convergent, divergent and predictive validity.

In addition, two of this sub-scale's four items showed a correlation of less than .30 with the RTA total, three only correlated significantly with 4-6 items of the 20 included in the RTA, and two had a mediocre sample adequacy value. Furthermore, while the other three RTA sub-scales were moderately correlated among each other, *Test-Irrelevant Thoughts* was not significantly correlated with either *Tension* or *Bodily Symptoms* and only showed a low correlation with *Worry*.

Previous research has systematically observed the *Test-Irrelevant Thoughts* sub-scale to be the one which correlates least with the others, both in the RTA (Benson & El-Zahhar, 1994; Hagtvet & Benson, 1997; McIlroy et al., 2000) and the Reac-

tions to Tests inventory (Benson & Bandalos, 1992; Nasser et al., 1997; Zimmer et al., 1992). Similarly, in the study by Benson and El-Zahhar (1994) the second-order general factor (test anxiety) identified in the RTA was mainly a function of three of the four dimensions: worry, tension and bodily symptoms. On the basis of such observations these and other authors have questioned whether the *Test-Irrelevant Thoughts* sub-scale really belongs to the domain of test anxiety or if in fact it is a different construct. The data obtained in the present study strongly support the latter possibility, as do the findings of Hodapp and Benson (1997), who reported that although worry, emotionality and lack of self-confidence are components of test anxiety the same could not be said for distraction or test-irrelevant thoughts.

In two studies of the four Reactions to Tests sub-scales, it was *Test-Irrelevant Thoughts* which correlated most highly with a delay in preparing for examinations (Kalechstein, et al., 1989, cited in Flett & Blankstein, 1994) and with self-reported deficits in exam preparation (Birenbaum, 1990, cited in Flett & Blankstein, 1994). Perhaps this deficient or inadequate preparation characterises people with high scores on *Test-Irrelevant Thoughts* and may be due to a lack of motivation or poor study habits.

As a result of the problems presented by the *Test-Irrelevant Thoughts* sub-scale, it was decided to remove it and repeat the factor analysis of the remaining items. After eliminating the problematic items which continued to appear (numbers 1, 4, 10 and 20) a principal axes factor analysis with promax oblique rotation yielded two fac-

tors: *Worry* and *Emotionality* (data not shown). Thus, we are left with the two main components of test anxiety proposed by Liebert and Morris (1967) and Spielberger (1980), and the subsequent subdivision made by Sarason (1984) is thrown into question. It should also be pointed out, however, that although the internal consistency of the new *Emotionality* sub-scale was good ($\alpha = .812$) the value for *Worry* was low ($\alpha = .587$). Perhaps the solution lies in developing a new questionnaire that includes the previous dimensions along with others (such as lack of self-confidence) which, although not included in current inventories, do seem to be components of test anxiety (see Hodapp & Benson, 1997).

Finally, it should be pointed out that all the university students in this study were Spanish psychology students, and therefore it is unclear to what extent the results are generalisable to university students in general and university students in other countries. Nevertheless, we believe the results to be important as to date there have only been limited data available on the convergent validity of the FTA, and a complete lack of data regarding the divergent and predictive validity of both the FTA and the RTA, and the convergent validity of the latter. Although further studies are required to confirm the present results, it can, for the moment, be concluded that in their current form neither the FTA nor the RTA seem suitable for use with university students.

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