ORIGINAL RESEARCH

Spanish version of the Thought-Action Fusion Questionnaire and its application in eating disorders

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Purpose: The aims of the study were to analyze the psychometric properties of the Spanish version of the Thought-Action Fusion Questionnaire (TAF-SP), as well as to determine its validity by evaluating the relationship of the TAF-SP to different instruments.

Patients and methods: Two groups were studied: one comprising 146 patients with eating disorders; and another a group of 200 students.

Results: Three factors were obtained: TAF–Moral; TAF–Likelihood-others; and TAF–Likelihood-oneself. The internal consistency of the TAF-SP was determined by means of Cronbach's α coefficient, with values ranging between 0.84–0.95. The correlations with other instruments reflected adequate validity. The three-factor structure was tested by means of a linear structural equation model, and the structure fit satisfactorily. Differences in TAF-SP scores between the diagnostic subgroups were also analyzed.

Conclusion: The TAF-SP meets the psychometric requirements for measuring thought-action fusion and shows adequate internal consistency and validity.

Keywords: thought-action fusion, cognitive distortions, validation, eating disorders

Introduction

Research on obsessions and obsessive–compulsive disorders (OCD) has laid a base for the understanding of their different cognitive distortions, abnormal behaviors, and experiences. Besides concepts such as the exaggerated sense of responsibility, anger, thought control, added responsibility, and unfinished tasks, the psychological fusion of thoughts and actions has been shown to be a main factor in the 'anatomy of obsessions.'[1] Fusion refers to the psychological phenomenon in which the patient appears to regard the obsessional activity and the forbidden action as being morally equivalent.[1] For example, if a person has a thought about cheating on his or her partner, he or she might feel that the mere fact of thinking this is morally equivalent to actually cheating on her or him.

It has been suggested that some patients with OCD experience thought-action fusion (TAF), in which thoughts, particularly unwanted intrusive thoughts, are interpreted as having special significance.[1] Since the pioneer work of Rachman,[1] research has been providing support for that hypothesis.[2–5] As a result, two components have been proven with respect to TAF: (1) the belief that having the thought makes it more likely that a given behavior will actually occur (TAF–Likelihood); and (2) the moral equivalence between a thought and the possible behavior that follows from it (TAF–Moral). In the first case, for example, if a husband with this belief experiences an intrusive thought of his wife being killed, he feels that his wife is at greater risk of being killed because

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he has experienced the thought. As he has placed his wife in danger, he may feel that it is his responsibility to prevent harm coming to her, perhaps by mentally neutralizing the thought. In the second example, if a doctor with this belief experiences the intrusive thought that he is going to let his patient die, he is likely to feel as though he is as morally responsible as if he had really let his patient die. It is possible that the doctor interprets such an intrusion as revealing his true nature, that is, "only perverse people have this type of thought; I am perverse," or "perhaps I really wanted to do this; I am perverse."

The experience of TAF, the phenomenon whereby one has difficulty separating cognitions from corresponding behaviors, has implications in several disturbances such as eating disorders (EDs), OCD, generalized anxiety disorder, and panic disorder.[6] The domain regarding importance of thoughts in ED may be closely linked to the domain regarding control over thoughts, as is the case in OCD. As with patients with OCD who experience intrusive thoughts, patients with ED can interpret their main preoccupations (eating, shape, weight) as an indication that they are going crazy and losing control of their mind.[7] It has also been observed that individuals with pathological eating attitudes showed more TAF characteristics than those with less pathological eating attitudes.[8]

After having described the TAF, a questionnaire to assess it was developed.[5] Initially, the TAF questionnaire yielded three factors in a sample of students because TAF–Likelihood was split into two factors: TAF for events happening to other people (TAF–Likelihood-others), and TAF for events happening to oneself (TAF–Likelihood-oneself). The moral type of TAF (TAF–Moral) emerged as a cohesive factor. The factors were all moderately intercorrelated ($r = 0.32–0.35$). In a sample of OCD patients, the best factor solution yielded two factors (TAF–Moral and TAF–Likelihood), which were correlated ($r = 0.44$). This correlation has been confirmed by another study.[9] Thus, it is accepted that TAF–Moral and TAF–Likelihood are distinct but related constructs, and there is some evidence from non-clinical samples suggesting that Likelihood-oneself and Likelihood-others are distinct constructs.[9] The revised version contained 19 items: 12 moral, four Likelihood-for-others, and three Likelihood-for-oneself. Internal consistency of the Moral and Likelihood (other and oneself) subscales was excellent for all the samples (Cronbach's α coefficient ranged from 0.85 to 0.96). Another adaptation study[10] has reported two factors (TAF–Likelihood and TAF–Morality) in a sample of undergraduate students.

Despite having described a similar bias (Thought-Shape Fusion [TSF]) in EDs, the relationship between the domains

'importance of thoughts' and 'control over thoughts' and EDs needs to be more deeply explored specifically considering TAF. Thus, the general aim of the present study was to analyze the psychometric properties, factor structure, and internal consistency of the Spanish version of the Thought-Action Fusion Questionnaire[5] (TAF-SP) in a sample of patients with EDs. A further objective was to analyze the relationships between the TAF-SP and different instruments so as to analyze the validity of the questionnaire.

Materials and methods
Participants
Participants were a group of ED patients and a group of students, the former comprising 146 participants with a diagnosis, according to the *Diagnostic and Statistical Manual of Mental Disorders*, 4th edition, text revision (DSM-IV-TR) criteria,[11] of anorexia nervosa (n = 82), bulimia nervosa (n = 33), or EDs not otherwise specified (EDNOS) (n = 31). This clinical group included 18 men (12.32%) and 128 women (87.68%), with a mean age of 23.25 years (± standard deviation [SD] 8.79). In the anorexia nervosa subgroup, the mean body mass index (BMI) was 16.21 kg/m^2 (SD 1.22), in the bulimia subgroup it was 22.32 (SD 1.78), and for those with EDNOS it was 23.12 (SD 0.79). None of the patients presented severe comorbid psychopathology at the time of the study, and all had clinical characteristics that enabled them to be treated as outpatients. Patients received treatment in the Eating Disorders Unit of the Institute of Behavioral Sciences in Seville (Spain). Patients were diagnosed by means of a structured interview according to DSM-IV-TR[11] criteria on two occasions: they were initially assessed by a clinical psychologist, and then subsequently interviewed by a psychiatrist. Only those cases with diagnostic agreement were accepted.

The group of students comprised 200 participants with no history of psychological disorder. This group included 50 men (25%) and 150 women (75%), with a mean age of 23.05 years (SD 8.37). The student group was recruited from three Spanish universities (University of Seville, Universidad Nacional de Educación a Distancia, and Pablo de Olavide University in Seville), and from a high school in Écija (Seville). Patients and students had similar demographic characteristics with respect to educational level and socioeconomic status.

Measures
Thought-Action Fusion Questionnaire
The TAF Questionnaire measures the fusion between thought and action. It comprises 19 items organized into

three subscales: TAF–Moral (12 items), TAF–Likelihood-others (four items), and TAF–Likelihood-oneself (three items). The first of these evaluates the moral interpretation of certain thoughts and actions. The likelihood subscales assess the belief that thinking about an unacceptable or problematic action makes it more likely that this action will actually be carried out (by others or oneself). Each item is scored from 0 to 4 (where 0 = not at all and 4 = totally) according to how much the subject agrees with its content. The original TAF Questionnaire study obtained the above-mentioned three factors in a group of students, whereas in the group of obsessive patients the best solution involved the two factors also mentioned (TAF–Moral and TAF–Likelihood) above. The values of Cronbach's α coefficient ranged from 0.85 to 0.96, for the moral and likelihood subscales (both for others and oneself), in all the samples. The TAF-SP was obtained by conducting a translation and back translation procedure, without any overlap across the members who performed the translation and the back translation. The questionnaire is shown in the Supplementary materials in both English (A) and Spanish (B).

Eating Disorders Inventory-2

The Eating Disorders Inventory-2 (EDI-2)[12] is a self-report questionnaire with 11 subscales (drive for thinness, bulimia, body dissatisfaction, ineffectiveness, perfectionism, inter-personal distrust, interoceptive awareness, maturity fears, asceticism, impulse regulation, and social insecurity), the scores of which provide a profile that can be compared with norms for patients and the normal population. The internal consistency of the test ranges between 0.83 and 0.92 in patient samples, and between 0.65 and 0.93 for various non-clinical samples. Test–retest reliability ranges between 0.41 and 0.97 depending on the sample. The inventory has shown adequate construct validity. The Spanish version was used.

State–Trait Anxiety Inventory

The State–Trait Anxiety Inventory (STAI)[13] is a 40-item self-report questionnaire that measures state anxiety (STAI-S) and trait anxiety (STAI-T). Items are scored from 0 to 3 (where 0 = 'not at all' and 3 = 'a lot'). As regards reliability and discriminant validity, the STAI items show a sufficient ability to discriminate and differentiate (between age, sex, and anxiety levels) and have good internal consistency (between 0.90 and 0.93 for the STAI-S and between 0.84 and 0.87 for the STAI-T). The convergent validity with respect to other measures of anxiety ranges from 0.58 to 0.79. The present study used the Spanish version of the STAI.[14]

Beck Depression Inventory

The Beck Depression Inventory (BDI)[15] measures the intensity of depression and is used as a screening test in the general population. It is a self-report instrument comprising 21 items and four response levels (0–3 for each item). The scores obtained are linked to three categories: absence of depression (0–9), dysthymia or mild depression (10–15), and depression (over 15). The BDI has shown adequate reliability (0.93) and a convergent validity between 0.62 and 0.66. The present study used the Spanish version of the BDI.[16]

Symptom Checklist-90-Revised

The Symptom Checklist-90-Revised (SCL-90-R)[17,18] is a self-report inventory that measures nine dimensions of psychological symptoms and three global indices of distress. The main scales are somatization, obsessive–compulsive, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation, and psychoticism. There is another subscale, referring to miscellaneous symptoms, with a low factor loading and whose content does not fit within the other subscales. The SCL-90-R also includes three global indices of distress that measure the severity of general psychopathology: (1) the Global Severity Index, which measures the degree of general distress; (2) positive symptom total (PST), which refers to the number of symptoms reported by the subject; and (3) positive symptom distress index (PSDI), which measures the intensity of symptoms and relates general distress to the number of symptoms. The values of Cronbach's α coefficient range from 0.81–0.90, and the instrument shows adequate concurrent and predictive validity.

Procedure

After giving informed consent for the study, the participants in the ED group completed the questionnaires in individual sessions with no time limit; this was done in the usual therapeutic context. The therapist was present at the start, instructed patients how to complete the questionnaires and, having ensured they understood, left them in a suitable setting for responding to the task. Any queries the patients might have were dealt with at the end, without the therapist seeing the responses being given; thus the therapist was not present while the questionnaire was being completed and did not examine the responses. All participants (both clinical participants and students) volunteered to take part in the study and none received any kind of recompense for participation. In all cases, anonymity was guaranteed and, in the non-clinical sample, data were collected in group sessions. In this case,

each group comprised 15–20 participants, and two psychologists were present to collect the data following the same procedure. With respect to socio-demographic characteristics and mental health status of patients, these data were taken from the Eating Disorders Unit records. For the students, a brief questionnaire was used to assess these data, including the history of possible psychological disorders.

Results

Factor structure, internal consistency, and correlations among several subscales and the TAF-SP

Before the factor analysis was performed, some assumption tests were applied: the sample size was adequate with respect to the exploratory factor analysis and there were no missing data. Some outliers were detected by means of boxplots and they were excluded. With respect to multicollinearity and singularity, the tolerance values in all cases were >0.3, and after calculating the squared multiple correlations none were equal to 1, so singularity was not present. If factor analysis is used descriptively, then assumptions about distributions are not essential.[19,20]

A separate exploratory factor analysis was performed for the two groups (all ED patients and 115 students) using the principal axis analysis with varimax rotation. Several indicators of the high degree of inter-relationship between

the variables confirmed the relevance of this analysis. In the sample of patients, Bartlett's test of sphericity gave $\chi^2 = 1,632.42$ ($P < 0.0001$), while the Kaiser–Meyer–Olkin (KMO) index of sample adequacy was 0.840. In the group of students, Bartlett's test gave $\chi^2 = 1,782.45$ ($P < 0.0001$) and a KMO index of 0.832. The number of factors was determined by considering those with eigenvalues above 1, through examination of the scree plot, and with the parallel analysis.[21] As a result of the parallel analysis, following the current recommendation on how to use the eigenvalue that corresponds to a given percentile, such as the 95th of the distribution of eigenvalues derived from the random data,[22–24] three factors were considered to be significant. In both samples, the best solution for the principal axis analysis of the 19 items of the TAF-SP revealed three factors that corresponded to the sections identified by its authors: TAF–Moral, TAF–Likelihood-others, and TAF–Likelihood-oneself. These three factors accounted for 55.58% of the variance in the sample of patients, and 56.26% in the group of students.

Table 1 shows the rotated factor loadings, the explained variance and the accumulated variance for both samples.

The first factor, which explains 24.32% and 26.40% of the total variance (in the patient and student groups, respectively), comprises 12 items that refer to the Moral part of the questionnaire. The second factor explains

Table 1 Factor structure (principal axes with varimax rotation) and explained variance of the Spanish version of the Thought-Action Fusion Questionnaire in the patient group and the student group

Item	Patients with EDs			Group of students		
	Factor 1	Factor 2	Factor 3	Factor 1	Factor 2	Factor 3
TAF1	0.651	−0.141	0.105	0.465	0.118	0.126
TAF2	0.649	0.044	0.074	0.464	0.102	−0.051
TAF3	0.687	0.087	−0.054	0.427	0.012	−0.035
TAF4	0.572	0.035	0.112	0.542	0.007	−0.067
TAF5	0.593	0.061	0.137	0.740	0.042	−0.005
TAF6	0.604	0.091	0.163	0.730	0.118	−0.005
TAF7	0.518	0.042	0.051	0.705	−0.004	0.021
TAF8	0.638	0.078	−0.069	0.782	0.105	−0.030
TAF9	0.697	0.010	0.138	0.568	0.139	0.170
TAF10	0.754	0.081	0.071	0.653	0.066	0.140
TAF11	0.599	0.120	−0.007	0.722	0.066	0.029
TAF12	0.556	0.004	0.037	0.671	0.039	0.058
TAF13	0.127	0.866	0.127	0.046	0.910	0.079
TAF14	0.228	0.860	0.228	0.142	0.894	0.127
TAF15	0.259	0.866	0.259	0.115	0.975	0.134
TAF16	0.196	0.889	0.196	0.117	0.822	0.130
TAF17	0.108	0.141	0.803	0.053	0.138	0.722
TAF18	0.143	0.282	0.735	0.136	0.036	0.890
TAF19	0.079	0.182	0.604	0.089	0.205	0.782
Explained variance	24.320	17.970	13.290	26.400	17.885	11.982
Accumulated variance	24.320	42.290	55.580	26.400	44.285	56.267

Abbreviations: EDs, eating disorders; TAF, thought-action fusion.

17.97% and 17.88% of the total variance (in the patient and student groups, respectively) and consists of a further four items that refer to the Likelihood-others part of the questionnaire. Finally, the third factor explains 13.29% and 11.98% of the total variance (in the patient and student groups, respectively) and refers to the Likelihood-oneself part of the questionnaire.

The internal consistency of the TAF-SP and its subscales was analyzed by means of Cronbach's α coefficient. The Moral factor had α = 0.87 in the group of patients and α = 0.93 in the group of students. The corresponding values for the Likelihood-others factor were α = 0.94 and α = 0.95. The values for the Likelihood-oneself were α = 0.90 and α = 0.84. Overall, the questionnaire (TAF-SP total) yielded α = 0.88 for patients and α = 0.90 for students. The correlation among the three factors ranged between 0.25 and 0.29 in the sample of patients and between 0.20 and 0.27 in the sample of students. Finally, the means of the inter-item correlations were 0.31 and 0.28, for patients and students respectively.

Confirmatory factor analysis

Despite expecting a structure similar to that obtained in previous adaptation studies, when a test is developed and/or adapted it is strongly recommended that a confirmatory factor analysis be performed.[25] Thus, in order to test the three-factor model, a confirmatory factor analysis was performed, taking the previous whole sample (n = 261). Considering previous results, the well determined factors in the exploratory test and the fact that traditional 'recipes' about the sample size have no solid base, this sample was considered appropriate.[25] The three-factor structure was tested by means of linear structural equation model. Following the recommendation that a model be judged by a number of different criteria, we used the chi-square (χ^2), χ^2/ degrees of freedom (df) <4, goodness-of-fit index (GFI) ≥0.85, adjusted GFI (AGFI) ≥0.80, root mean squared residual (RMR) ≥0 and ≤0.10, Tucker–Lewis index (TLI) ≥0.95, comparative fit index (CFI) ≥0.95, and root mean standard error of approximation (RMSEA) <0.08.[24,26–29] As a result, the three-factor model fit satisfactorily, as shown in Table 2.

Test–retest reliability

The results of test–retest reliability of the mean scores on the TAF-SP over the 3-week period were $r_{xx'} = 0.86$ and $r_{xx'} = 0.79$ for the patient and student samples, respectively; these results indicate a positive and significant correlation between the two scores ($P < 0.01$). Furthermore, an adequate temporal stability over the 3-week period was shown. The paired samples t-test revealed no significant differences. Finally, the Cronbach's α coefficient gave values of 0.85 and 0.87 (in the patient and student samples, respectively) in the second administration.

Descriptive statistics for the applied measures and differences between groups

Table 3 shows the mean and SD obtained from the two samples for the different variables analyzed. As the variables did not fit a normal distribution, the Mann–Whitney U test was performed, which revealed significant differences in all cases. The values of the effect size indexes (Cohen's d) ranged from 0.46 to 0.79, these being medium–large effects. Cohen[30] defines d_s of 0.2, 0.5, and 0.8 as small, medium, and large effects, respectively.

Correlation with related scales

In the sample of patients, the correlations between the TAF-SP and the obsessive–compulsive subscale of the SCL-90-R were positive and significant ($P < 0.01$). Specifically, the correlation between the obsessive–compulsive subscale and the TAF-SP Moral was 0.42. The values for the TAF-SP Likelihood-others and TAF-SP Likelihood-oneself were 0.43 and 0.51, respectively. For the students, the corresponding correlations were 0.33, 0.27, and 0.38, respectively ($P < 0.01$).

Analysis of the association between TAF-SP scores and the various subscales of the EDI-2 is particularly important as the latter evaluates symptoms that usually accompany anorexia and bulimia nervosa; indeed, it provides scores on 11 subscales that are clinically relevant to EDs. As can be seen in Table 4, the correlations were positive and significant ($P < 0.01$) with all the subscales of the EDI-2.

Table 2 Confirmatory factor analysis of three-factor model of Spanish version of the Thought-Action Fusion Questionnaire

Model	Model-test			Fit statistics					
	χ^2	df	C_{min}/df	GFI	AGFI	RMR	TLI	CFI	RMSEA
CFA fit-indexes	223.2	149	1.49	0.91	0.89	0.008	0.95	0.95	0.070

Abbreviations: AGFI, adjusted goodness-of-fit index; CFA, confirmatory factor analysis; CFI, comparative fit index; C_{min}/df, chi-square/degrees of freedom; df, degrees of freedom; GFI, goodness-of-fit index; RMR, root mean squared residual; RMSEA, root mean standard error of approximation; TLI, Tucker–Lewis index; χ^2, chi-square.

Table 3 Mean scores on the questionnaires and Mann–Whitney test

	Patients (n = 146) M (SD)	Students (n = 200) M (SD)	U	P
TAF				
TAF–Moral	17.94 (11.72)	14.29 (11.95)	6,720.5	<0.01
TAF–Likelihood-others	1.41 (3.57)	0.48 (1.74)	7,510.0	<0.05
TAF–Likelihood-oneself	2.40 (3.44)	1.60 (2.21)	7,546.0	<0.05
STAI				
STAI-S	27.01 (13.83)	17.26 (10.69)	4,872.0	<0.001
STAI-T	32.33 (11.68)	19.16 (10.96)	3,486.5	<0.001
BDI	18.64 (12.88)	5.75 (5.90)	3,026.0	<0.001
EDI-2				
Drive for thinness	9.97 (6.67)	2.18 (3.84)	2,697.5	<0.001
Bulimia	2.70 (3.97)	0.68 (1.51)	5,670.0	<0.001
Body dissatisfaction	12.51 (7.82)	4.10 (5.21)	3,095.5	<0.001
Ineffectiveness	9.02 (7.23)	2.05 (3.36)	2,882.5	<0.001
Perfectionism	5.03 (3.51)	3.15 (3.23)	5,467.5	<0.001
Interpersonal distrust	5.02 (3.96)	2.51 (2.93)	5,142.0	<0.001
Interoceptive awareness	6.98 (5.80)	1.71 (2.81)	3,240.5	<0.001
Maturity fears	7.43 (5.23)	4.37 (3.92)	5,348.0	<0.001
Asceticism	5.62 (4.27)	2.16 (2.16)	3,883.5	<0.001
Impulse regulation	4.66 (4.99)	1.52 (3.30)	4,261.0	<0.001
Social insecurity	7.18 (5.37)	3.28 (3.89)	4,498.5	<0.001
SCL-90-R				
Somatization	1.22 (0.93)	0.71 (0.66)	5,605.5	<0.001
Obsessive-compulsive	1.56 (0.89)	0.80 (0.63)	4,153.0	<0.001
Interpersonal sensitivity	1.72 (1.02)	0.73 (0.65)	3,549.5	<0.001
Depression	1.84 (1.01)	0.71 (0.65)	3,076.5	<0.001
Anxiety	2.46 (1.38)	0.55 (0.54)	3,855.5	<0.001
Hostility	1.34 (0.97)	0.57 (0.65)	3,966.0	<0.001
Phobic anxiety	0.72 (0.74)	0.26 (0.38)	4,964.5	<0.001
Paranoid ideation	1.30 (0.84)	0.69 (0.65)	4,586.0	<0.001
Psychoticism	1.10 (0.77)	0.34 (0.42)	3,142.5	<0.001
Global Severity Index	1.61 (2.32)	0.62 (0.48)	3,145.0	<0.001
Positive symptom total	55.92 (19.87)	34.93 (20.14)	3,818.5	<0.001
Positive symptom distress index	2.13 (0.69)	1.41 (0.43)	2,998.0	<0.001

Abbreviations: BDI, Beck Depression Inventory; EDI-2, Eating Disorders Inventory-2; SCL-90-R, Symptom Checklist-90-revised; STAI, State–Trait Anxiety Inventory; TAF, thought-action fusion.

Considering the relationship with the STAI, in the sample of patients, STAI-S scores showed a positive and significant correlation with TAF-SP Moral ($r = 0.29$; $P < 0.01$) and with TAF-SP Likelihood-oneself ($r = 0.21$; $P < 0.05$). In this case, the correlation with TAF-SP Likelihood-others was not significant ($r = 0.12$).

In the sample of students, STAI-S scores showed a positive and significant correlation with TAF-SP Moral ($r = 0.37$; $P < 0.01$) and with TAF-SP Likelihood-others ($r = 0.21$; $P < 0.05$). The correlation with TAF-SP Likelihood-oneself was not significant ($r = 0.17$).

With respect to the presence of depressive symptomatology, scores on the BDI showed a positive and significant correlation ($P < 0.01$) with TAF-SP Moral ($r = 0.33$), TAF-SP Likelihood-others ($r = 0.22$), and TAF-SP Likelihood-oneself ($r = 0.42$), all in the group of patients. For the students, the correlations were lower, but also significant ($P < 0.01$) with respect to TAF-SP Moral ($r = 0.22$) and TAF-SP Likelihood-oneself ($r = 0.21$). The correlation between BDI and TAF-SP Likelihood-others was not significant ($r = 0.06$).

The final analysis concerned the relationship with the subscales of SCL-90-R (other than the obsessive–compulsive subscale), ie, somatization, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation, and psychoticism. For the ED sample, there were positive and significant correlations between the TAF-SP (Moral, Likelihood-others, and Likelihood-oneself) and all the subscales of the SCL-90-R, except for anxiety and the Global Severity Index. Table 5 shows the various correlations obtained. In the case of the students sample, there were positive and significant correlations with respect to TAF-SP Moral and TAF-SP Likelihood-oneself, but there were no significant correlations with regards to TAF-SP Likelihood-others.

Partial correlations between TAF-SP and obsessions (SCL-90-R) after controlling for the remaining variables

In order to analyze whether TAF-SP continued to show a relationship with the specific dimension of obsessions as it is measured by the SCL-90-R, the correlations were calculated again after controlling for other psychopathological variables. In the sample of patients, after controlling the remaining set of psychopathological variables studied (STAI, BDI, EDI-2, and SCL-90-R dimensions other than obsessions), the partial correlations analyzed showed that the correlations remained significant for TAF-SP Likelihood-others ($r = 0.32$; $P < 0.01$) and TAF-SP Likelihood-oneself ($r = 0.38$; $P < 0.01$). With regards to the TAF-SP Moral, the partial correlation was not significant ($r = 0.12$). After controlling for this same set of variables in the sample of students, the analysis revealed that the former correlations were not significant.

Table 4 Correlations between the Spanish version of the Thought-Action Fusion Questionnaire and the various subscales of the Eating Disorders Inventory

Subscales of the EDI-2	TAF-SP Moral		TAF-SP Likelihood-others		TAF-SP Likelihood-oneself	
	Patients	Students	Patients	Students	Patients	Students
Drive for thinness	0.18*	0.15	0.24**	0.02	0.29**	0.04
Bulimia	0.14	0.11	0.16*	0.11	0.13	0.06
Body dissatisfaction	0.16	0.12	0.28**	0.13	0.40**	0.16
Ineffectiveness	0.21*	0.23*	0.27**	0.16	0.34**	0.18
Perfectionism	0.09	0.15	0.14	0.10	0.22**	0.07
Interpersonal distrust	0.14	0.24**	0.19*	0.11	0.17*	0.04
Interoceptive awareness	0.23**	0.31**	0.24**	0.13	0.29**	0.09
Maturity fears	0.29**	0.30**	0.08	0.09	0.14	0.05
Asceticism	0.27**	0.17	0.19*	0.08	0.29**	0.04
Impulse regulation	0.18*	0.17	0.27**	0.02	0.33**	0.07
Social insecurity	0.13	0.16	0.25**	0.07	0.33**	0.04

Notes: *$P < 0.05$; **$P < 0.01$.
Abbreviations: EDI-2, Eating Disorders Inventory-2; TAF-SP, Spanish version of the Thought-Action Fusion Questionnaire.

Differences between diagnostic subgroups

A multivariate analysis of variance (MANOVA) revealed significant differences between the TAF scores of the three patient groups (anorexia nervosa, bulimia nervosa, and unspecified EDs). The means obtained for TAF-SP Moral were 20.56 (SD 10.65), 16.30 (SD 12.63), and 12.83 (SD 11.77) in the anorexia, bulimia, and unspecified ED groups, respectively; the corresponding means for TAF-SP Likelihood-others were 1.04 (SD 2.73), 2.81 (SD 2.93), and 0.87 (SD 1.03); and for TAF-SP Likelihood-oneself they were 2.03 (SD 1.97), 5.51 (SD 4.50), and 1.09 (SD 1.13), respectively. The values obtained in the MANOVA were as follows: TAF-SP Moral: $F (2, 142) = 5.63$, $P < 0.01$; TAF-SP Likelihood-others: $F (2, 142) = 3.42$, $P < 0.05$; and TAF-SP Likelihood-oneself: $F (2, 140) = 10.03$, $P < 0.0001$. Bonferroni post hoc tests indicated significantly higher scores on TAF-SP Moral in patients with anorexia than patients

with other EDs ($P < 0.01$), significantly higher scores on TAF-SP Likelihood-others in patients with bulimia than the two other groups ($P < 0.05$), and significantly higher scores on TAF-SP Likelihood-oneself in patients with bulimia than for those with other EDs ($P < 0.001$).

Appealing features

The appealing features of the TAF-SP are that it was easily administered and scored, and it required only a few minutes to be completed (mean = 3.56 minutes) with a range between 1.14 and 5.82 minutes.

Discussion

Despite that the previous study comparing non-clinical participants and patients (OCD) revealed three and two factors, respectively,[5] the current study shows a best solution of three factors for both non-clinical participants and

Table 5 Correlations between the Spanish version of the Thought-Action Fusion Questionnaire and the various subscales of Symptom Checklist (SCL-90-R)

Subscales of the SCL-90-R	TAF–Moral		TAF–Likelihood-others		TAF–Likelihood-oneself	
	Patients	Students	Patients	Students	Patients	Students
Somatization	0.24**	0.18*	0.25**	0.06	0.35**	0.25**
Interpersonal sensitivity	0.26**	0.25**	0.30**	0.12	0.49**	0.29**
Depression	0.31**	0.31**	0.23**	0.16	0.41**	0.29**
Anxiety	0.02	0.31**	0.16	0.09	0.04	0.29**
Hostility	0.24**	0.11	0.19*	0.04	0.31**	0.22*
Phobic anxiety	0.15	0.21*	0.29**	0.12	0.44**	0.31**
Paranoid ideation	0.31**	0.29**	0.25**	0.02	0.43**	0.24**
Psychoticism	0.33**	0.28**	0.27**	0.18	0.45**	0.30**
Global Severity Index	0.02	0.30**	0.07	0.12	0.10	0.30**
Positive symptom total	0.26**	0.35**	0.31**	0.17	0.44**	0.35**
Positive symptom distress index	0.30**	0.23*	0.18*	0.05	0.32**	0.13

Notes: *$P < 0.05$; **$P < 0.01$.
Abbreviations: SCL-90-R, Symptom Checklist-90-Revised; TAF, Thought-Action Fusion Questionnaire.

ED patients. These three factors are TAF–Moral (12 items), TAF–Likelihood-others (four items), and TAF–Likelihood-oneself (three items), and represent (1) the moral equivalence between a thought and the possible behavior that follows from it (TAF–Moral); (2) the belief that having the thought makes it more likely that a given behavior will actually occur referring to others (TAF–Likelihood-others); and (3) the belief that having the thought makes it more likely that a given behavior will actually occur referring to oneself (TAF–Likelihood-oneself).

In general, the validation study of the TAF-SP meets the requirements for measuring the TAF construct. The analysis of reliability showed that the TAF-SP has adequate internal consistency, both regarding the total questionnaire and for each one of the subscales. This is confirmed by the fact that the means of the inter-item correlations do not indicate any highly redundant content.[31,32] Finally, the results of the test–retest analysis were also adequate.

The present data indicate that TAF is a cognitive distortion that can be seen in both students and ED patients, as well as in OCD patients. A distortion similar to TAF has been described in the context of ED and has been termed TSF.[33] Nevertheless, in the context of ED, both TAF and TSF seem to be present as part of the cognitive distortions usually associated with those disorders.

Scores from the patient sample were higher than those of the students on the three subscales; a similar result has been found with other types of patients, for example those with OCD.[5] Nevertheless, in the current study, the ED sample distinguished between TAF–Likelihood-oneself and TAF–Likelihood-others, but in a different way comparing to OCD patients, who seem to fusion Likelihood-oneself and Likelihood-others. Both students and patients believed in TAF–Likelihood-others to a similar extent (but slightly less) than they believed in TAF–Likelihood-oneself. As was found in a previous study of students and adults (non-clinical sample), both students and ED patients in the current study considered TAF–Likelihood-others and TAF–Likelihood-oneself to work in a similar way. The second fusion proposed for OCD patients (between TAF–Likelihood-others and TAF–Likelihood-oneself) is not confirmed among ED patients, who seem to distinguish clearly between the two types of TAF–Likelihood. Despite the symptoms frequently found in common between both OCD patients and ED patients, they show different results with respect to the TAF distortion, mainly with regards to the TAF–Likelihood component.

With respect to the correlations between the TAF-SP and other instruments, which provide a measure of the different types of validity, the results show a relationship between the TAF-SP and the obsessive–compulsive subscale of the SCL-90-R, a result that was expected, based on previous studies.[5] These correlations seem to be mediated to some extent by other variables. In fact, the correlations between TAF-SP and the obsessive–compulsive subscale of the SCL-90-R become non-significant after controlling for the rest of variables in the student sample. The same applies to TAF-SP Moral in the case of the ED sample. Only the correlations between TAF–Likelihood (others and oneself) remain significant in the ED sample. This supports the association between TAF and obsessive–compulsive symptoms, which seems to occur mainly in ED patients compared with non-clinical participants. In fact, the relationship between TAF and TSF (a similar distortion, which was proposed in the context of EDs by Shafran et al[33]) has confirmed the link between ED and obsessive–compulsive pathology, insofar as both kinds of patients tend to fuse 'bad thoughts' with 'bad consequences.' Moreover, the obsessive component as measured by the TAF-SP could be related to fear, avoidance, catastrophic interpretations of body sensations, or to the importance of things, and to feelings of shame,[34] a core feature of trait anxiety that is specifically measured by the STAI.

With respect to the association between TAF-SP and SCL-90-R, the different results in the two groups could be explained by the difference between the two groups relating to the presence of associated psychopathology (in the ED group). As has been mentioned,[5] a person's thought could have real-world consequences in terms of a person's behavior and subsequent events that are influenced by that behavior. However, a person's thought does not have the same effect on another person's behavior. The presence of psychopathology (obsessive or other) could lead to TAF–Likelihood-others. TAF–Moral seems to be a more general distortion, in that it can be observed in both patients and students. TAF has been related to responsibility and guilt.[5] People with TAF–Moral, who believe that thinking something is almost as bad as doing it, are likely to feel guilty and responsible for their negative thoughts and/or the potential effects of these thoughts.[5]

Despite the notion of a common psychopathology[7,35] among ED patients, our results show that TAF varies between patients (anorectic, bulimic, and with other EDs) with different degrees of control over food intake, and as such the presence or absence of bingeing might in itself be a key factor in this regard. A recent study based on the measure of TSF among ED patients[36] revealed no differences among different subgroups, which is coherent with the notion of a common psychopathology. As far as we know, the phenomenon of

TAF has not been explored with respect to the possible differences among subgroups of ED patients. In view of these results this area warrants further study.

The present study has a number of limitations. With respect to the samples, most of the participants were women so the results cannot be generalized. It would have been appropriate to compare the results obtained in the ED group with those of a clinical group of OCD patients. This could be another line of study in the future. Another aspect to consider is the specific study of different EDs. The results show that anorectic patients have higher scores on TAF-SP Moral than the other types of patients. Vice versa, bulimic patients are more likely to present higher TAF-SP Likelihood (others and oneself) than the rest of patients. The possible importance of this issue merits further study, perhaps by analyzing differences between purging and non-purging types of each ED.

The mediating role that the considered psychopathological variables might play in the relationship between TAF and specific symptoms of ED patients could be analyzed in detail as a possible line of future study. Possible comorbid symptoms, often associated with ED, could play a role in that relationship. Another field of study could be to explore the possibility of modifying the cognitive bias referred to as TAF, not only through direct intervention but also by improving the associated symptomatology.

Finally, it is worth considering whether the phenomenon of TAF might have prognostic value (as has been suggested for TSF).

Conclusion

The TAF-SP meets the psychometric requirements for measuring TAF and shows adequate internal consistency and validity.

Acknowledgment

Disclosure

The authors report no conflicts of interest in this work.

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Supplementary materials

A. English version of the Thought-Action Fusion Questionnaire

Please rate each statement by putting a circle around the number that best describes how much you agree with the statement, or how much it is true of you. Even though some of your responses may seem irrational to you, we want to know what you think on an emotional level. Please answer every item without spending too much time on any particular item.

How much do you agree with the following statements?

0 = **Disagree strongly**;   1 = **Some**;   2 = **Much**;   3 = **Very much**;   4 = **Agree strongly**

1. Thinking of making an extremely critical remark to a friend is almost as unacceptable to me as actually saying it.
2. Having a blasphemous thought is almost as sinful to me as a blasphemous action.
3. Thinking about swearing at someone is almost as unacceptable to me as actually swearing.
4. When I have a nasty thought about someone else, it is almost as bad as carrying out a nasty action.
5. Having violent thoughts is almost as unacceptable to me as violent acts.
6. When I think about making an obscene remark or gesture in church, it is almost as sinful as actually doing it.
7. If I wish harm on someone, it is almost as bad as doing harm.
8. If I think about making an obscene gesture to someone else, it is almost as bad as doing it.
9. When I think unkindly about a friend, it is almost as disloyal as doing an unkind act.
10. If I have a jealous thought, it is almost the same as making a jealous remark.
11. Thinking of cheating in a personal relationship is almost as immoral to me as actually cheating.
12. Having obscene thoughts in a church is unacceptable to me.
13. If I think of a relative/friend losing their job, this increases the risk that they will lose their job.
14. If I think of a relative/friend being in a car accident, this increases the risk that he/she will have a car accident.
15. If I think of a friend/relative being injured in a fall, this increases the risk that he/she will have a fall and be injured.
16. If I think of a relative/friend falling ill this increases the risk that he/she will fall ill.
17. If I think of myself being injured in a fall, this increases the risk that I will have a fall and be injured.
18. If I think of myself being in a car accident, this increases the risk that I will have a car accident.
19. If I think of myself falling ill, this increases the risk that I will fall ill.

B. Spanish version of the Thought-Action Fusion Questionnaire

Por favor clasifica cada afirmación según el grado en que es verdadera para ti. A pesar de que muchas respuestas te parezcan irracionales, nosotros queremos conocer qué piensas en un nivel emocional. Por favor responde sin detenerte demasiado en cada punto.

¿En qué grado estás de acuerdo con estas afirmaciones?

0 = **En absoluto**;   1 = **Algo**;   2 = **Mucho**;   3 = **Bastante**;   4 = **Totalmente**.

1. Pensar en hacer una observación extremadamente crítica a un amigo es casi tan inaceptable para mí como el hecho de decirla.
2. Tener un pensamiento blasfemo es casi tan pecaminoso para mí como una acción blasfema.
3. Pensar en insultar a alguien es casi tan inaceptable para mí como el hecho de insultar.
4. Cuando tengo un pensamiento repugnante sobre alguien, es casi tan malo como llevar a cabo una acción repugnante.
5. Tener pensamientos violentos es casi tan inaceptable para mí como los actos violentos.
6. Cuando pienso en hacer un comentario o gesto obsceno en la iglesia, es casi tan pecaminoso como el hecho de hacerlo.
7. Si deseo el daño a alguien, es casi tan malo como hacer daño.

8. Si pienso en hacer un gesto obsceno a alguien, es casi tan malo como hacerlo.
9. Cuando pienso mal sobre un amigo, es casi tan desleal como realizar un acto malo.
10. Si tengo un pensamiento celoso, es casi lo mismo que hacer un comentario celoso.
11. Pensar en engañar en una relación personal es casi tan inmoral para mí como el hecho de engañar.
12. Tener pensamientos obscenos en una iglesia es inaceptable para mí.
13. Si pienso que un familiar/amigo va a perder su trabajo, esto incrementa el riesgo de que pierdan su trabajo.
14. Si pienso que un familiar/amigo va a tener un accidente de coche, esto incrementa el riesgo de que él/ella tenga un accidente de coche.
15. Si pienso que un familiar/amigo va a resultar herido en una caída, esto incrementa el riesgo de que él/ella sufra una caída y resulte herido.
16. Si pienso que un familiar/amigo va a enfermar, esto incrementa el riesgo de que él/ella enferme.
17. Si pienso que voy a resultar herido en una caída, esto incrementa el riesgo de que sufra una caída y resulte herido.
18. Si pienso que voy a sufrir un accidente de coche, esto incrementa el riesgo de que tenga un accidente de coche.
19. Si pienso que voy a enfermar, esto incrementa el riesgo de que enferme.