

## Psychometric Properties of the Spanish Version of the Thought-Shape Fusion Questionnaire

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The objectives of the study were to analyze the psychometric properties, factor structure and internal consistency of the Spanish version of the Thought-Shape Fusion Questionnaire (TSF-Q), as well as to determine its validity by evaluating the relationship of the TSF-Q to different instruments.

Two groups were studied: one comprising 146 patients with a diagnosis of anorexia ( $n = 82$ ), bulimia ( $n = 33$ ) or unspecified eating disorder ( $n = 31$ ), and another group of 115 undergraduates with no history of psychological disorder. All participants completed the TSF-Q, TAF-Q, EDI-2, STAI, BDI and SCL-90-R. Differences in TSF-Q scores between the diagnostic subgroups were also analyzed.

Two factors were obtained which coincided with the two sections indicated by the authors of the questionnaire: conceptual and interpretative. The internal consistency of the TSF-Q and its subscales was determined by means of Cronbach's alpha, with values ranging between .93 and .96. The correlations with other instruments reflected adequate validity. There were no significant differences between the diagnostic subgroups.

The Spanish version of the TSF-Q meets the psychometric requirements for measuring thought-shape fusion and shows adequate internal consistency and validity.

*Keywords:* thought-shape fusion, eating disorders, cognitive distortion, psychometric validation.

Los objetivos del estudio fueron analizar las características psicométricas del Thought-Shape Fusion Questionnaire (TSF-Q), su estructura factorial y consistencia interna, así como las relaciones del TSF-Q con diferentes instrumentos para determinar su validez.

Se estudiaron 146 pacientes con anorexia ( $n = 82$ ), bulimia ( $n = 33$ ) o trastorno de la conducta alimentaria no especificado ( $n = 31$ ), y un grupo de 115 estudiantes sin antecedentes de interés psicopatológico. Todos completaron el TSF-Q, TAF-Q, EDI-2, STAI, BDI y SCL-90-R. Las diferencias en las puntuaciones del TSF-Q entre los subgrupos diagnósticos fueron también analizadas.

Se obtuvieron dos factores, coincidentes con las dos secciones conceptual e interpretativa señaladas por los autores del cuestionario. La consistencia interna del TSF-Q y de sus subescalas se determinó mediante el coeficiente alfa de Cronbach, que osciló entre .93 y .96. Las correlaciones con otros instrumentos reflejaron una adecuada validez. No hubo diferencias significativas entre los subgrupos diagnósticos.

El TSF-Q, en su versión española, cubre los requisitos psicométricos para medir la fusión pensamiento-forma y presenta adecuada consistencia interna, así como una adecuada validez.

*Palabras clave:* fusión pensamiento-forma, trastornos de la conducta alimentaria, distorsión cognitiva, validación psicométrica.

Research into various mental disorders has shown the presence of cognitive distortions that can contribute to problem maintenance and, as such, should be a target of therapeutic interventions (Beck, 1995; Clark, 1986; Rachman & Shafran, 1999; Salkovskis et al., 2000). In the context of eating disorders such distortions have been reported to affect body image and increase the fear of weight gain (Cooper & Fairburn, 1992; Mizes et al., 2000). A cognitive distortion associated with an excessive sense of responsibility was also described for obsessive-compulsive disorders and was termed thought-action fusion (TAF) (Rachman, 1993; Shafran, Thordarson, & Rachman, 1996). The concept of TAF refers to the belief that certain intrusive thoughts may determine behavior, and even the belief that having such thoughts is as immoral as actually doing something forbidden (Berle & Starcevic, 2005; Rachman & Shafran, 1999). For example, if a man has a thought about cheating on his partner he might feel that the mere fact of thinking this is morally equivalent to actually cheating on her. The two components [the belief that having the thought makes it more likely that a given behavior will actually occur (likelihood TAF) and the moral equivalence between a thought and the possible behavior that follows from it (moral TAF)] (Shafran et al., 1996) can be evaluated psychometrically by the Thought-Action Fusion Questionnaire (TAF-Q).

A similar distortion to TAF has been proposed in the context of eating disorders and has been termed thought-shape fusion (TSF; Shafran, Teachman, Kerry, & Rachman, 1999). This concept comprises three components related to beliefs about the consequences of thinking about forbidden foods: a) the belief that having such thoughts makes it more likely that the person will actually gain weight or change his or her shape (likelihood TSF); b) the belief that having such thoughts is as immoral as actually eating the food (moral TSF); and c) the belief that having such thoughts makes the person feel fat (feeling TSF). In the original description of TSF the authors started from the hypothesis that people who make this distortion know rationally that thinking about forbidden foods does not really cause weight gain or changes in body shape, although this does not stop them from feeling it is so on an emotional level.

Thought-shape fusion has been experimentally induced (Coelho, Carter, McFarlane, & Polivy, 2008; Shafran et al., 1999), the conclusion being that the induction of this distortion in clinical groups leads to anxiety, guilt and the urge to engage in corrective behavior (for example, neutralizing the effect by imagining that one is doing some exercise or eating quickly, or checking for possible body changes in a mirror).

The Thought-Shape Fusion Questionnaire (TSF-Q; Shafran et al., 1999) was developed in order to measure this distortion and has shown good reliability and predictive validity. The instrument is a 34-item, self-report questionnaire for which principal components factor analysis with varimax rotation revealed two sections (conceptual and interpretative)

comprising 17 items each. The conceptual part of the questionnaire measures the three aspects of TSF (likelihood, moral and feelings), which do not appear to reflect different factors. The interpretative part refers to the interpretation the person makes when having thoughts related to eating forbidden or fattening foods. The questionnaire shows high internal consistency ( $\alpha = .95$  for the conceptual part and  $\alpha = .97$  for the interpretative) and is able to distinguish between clinical and non-clinical samples (Shafran & Robinson, 2004).

Some studies have induced TSF under experimental conditions and used the questionnaire to evaluate it (Coelho et al., 2008; Radomsky, de Silva, Todd, Treasure, & Murphy, 2002). In patients with anorexia nervosa this research has shown a TSF cognitive bias in both psychometric and experimental terms. The impact of the experimental manipulation was lower in those patients with lower scores on the TSF questionnaire. Another study of patients diagnosed with bulimia and unspecified eating disorder also showed a strong association between the severity of psychopathology and the degree of TSF (Shafran & Robinson, 2004).

It has been postulated that although they differ conceptually the different components of TSF and the interpretation of thoughts reflect a more general construct, namely, giving undue importance to thoughts related to eating, body shape and weight, and interpreting such thoughts as personally significant (Shafran & Robinson, 2004). This would be similar to the excessive emphasis placed on thoughts by patients with obsessive-compulsive disorder. In eating disorders this overemphasis on food-related thoughts seems to be a direct expression of the excessive emphasis placed on actual food intake, body shape and weight control, which suggests that it is part of the psychopathological core of these disorders. If TSF is indeed a direct expression of this overemphasis then treatment aimed at the latter could reduce the cognitive bias. Alternatively, TSF could be a factor that helps maintain the disorder, such that if a person feels enormous, simply by imagining that they have taken no exercise, it is likely that their attention will remain focused on body image and the constant need to check it. This could lead to low self-esteem, repeated checking of the body (e.g., checking in the mirror), self-criticism and failed attempts to suppress such thoughts. All this would contribute to maintaining eating, shape and weight concerns.

Although some authors have suggested the need to determine the potential differences in the type of TSF shown by patients with anorexia, bulimia and atypical disorders, grouping together all eating disorder subtypes is appropriate as a result of the transdiagnostic theory of eating disorders (Garner & Bemis, 1982; Shafran & Robinson, 2004). This justifies the use of samples including all types of eating disorder patients. Nevertheless, it could be the case that the TSF shown by patients whose behavior is characterized by loss of control and bingeing is different to that of those who never lose control and who maintain a severely low weight.

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-Shape Fusion Questionnaire (TSF-Q; Shafran et al., 1999). A further objective was to analyze the relationships between the TSF-Q and different instruments so as to analyze the validity of the questionnaire.

## Method

### Participants

Participants were a group of patients and a group of undergraduates, the former comprising 146 participants with a diagnosis, according to DSM IV-RT criteria (APA, 2002), of anorexia ( $n = 82$ ), bulimia ( $n = 33$ ) or unspecified eating disorder ( $n = 31$ ). This clinical group included 18 men (12.32%) and 128 women (87.68%), with a mean age of 23.25 years ( $SD = 8.79$ ). In the anorexia nervosa subgroup the mean Body Mass Index (BMI) was 16.21 ( $SD = 1.22$ ), in the bulimia subgroup it was 22.32 ( $SD = 1.78$ ), and for those with unspecified eating disorder it was 23.12 ( $SD = .79$ ). None of the patients presented severe comorbid psychopathology at the time of the study, and all of them had clinical characteristics which enabled them to be treated as out-patients. Patients received treatment in the Eating Disorders Unit of the Institute of Behavioral Sciences in Seville (Spain). The group of undergraduates comprised 115 participants, none of whom had a history of psychological disorder. This group included 18 men (15.70%) and 97 women (84.30%), with a mean age of 28.69 years ( $SD = 11.19$ ). The undergraduate group was recruited from three Spanish universities: psychology students from the Universidad de Sevilla and the Universidad Nacional de Educación a Distancia (UNED), and students of human nutrition and dietetics from the Universidad Pablo de Olavide in Seville.

Patients were diagnosed by means of a structured interview according to DSM IV-RT 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.

### Measures

Thought-Shape Fusion Questionnaire (TSF-Q; Shafran & Robinson, 2004; Shafran et al., 1999). The TSF-Q measures the fusion between thought and body shape or image. It is a 34-item, self-report questionnaire which is divided into two sections: a conceptual section comprising 17 items (that measures the importance attached to thoughts related to eating and the body) and an interpretative section, also comprising 17 items and which evaluates how these thoughts are interpreted by participants. 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 questionnaire has been shown to have high internal consistency ( $\alpha = .95$  for the conceptual subscale and  $\alpha = .97$  for the interpretative one) and discriminates between clinical and non-clinical samples (Shafran & Robinson, 2004). The Spanish version of the TSF-Q 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 Appendices A (English version) and B (Spanish version).

Thought-Action Fusion (TAF-Q; Shafran et al., 1996). This questionnaire measures the fusion between thought and action in obsessive disorders. It comprises 19 items organized into three subscales: moral TAF (12 items), likelihood TAF—others (4 items), and likelihood TAF—oneself (3 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-Q study obtained three factors (likelihood TAF—oneself, likelihood TAF—others, and moral TAF) in a group of students, whereas in the group of obsessive patients the best solution involved two factors (likelihood TAF and moral TAF). The values of Cronbach's  $\alpha$  for the moral and likelihood subscales (both for others and oneself) ranged from .85 to .96 in all the samples. A Spanish version of the TAF-Q was obtained here by conducting a translation and back translation procedure. The corresponding values of Cronbach's alpha were .85 (likelihood TAF—oneself), .95 (likelihood TAF—others) and .93 (moral TAF). Regarding the validity, the correlations between TAF-Q and the other used instruments (except TSF-Q) ranged from .18 to .42 ( $p < .01$ ).

Eating Disorders Inventory-2 (EDI-2; Garner, 1998). A self-report questionnaire with 11 subscales (drive for thinness, bulimia, body dissatisfaction, ineffectiveness, perfectionism, interpersonal 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 inventory has been used to monitor psychological change during treatment and the *drive for thinness* subscale has been used as a screening test (Mitchell et al., 1990). The internal consistency of the test ranges between .83 and .92 in patient samples, and between .65 and .93 for various non-clinical samples. Test-retest reliability ranges between .41 and .97 depending on the sample. The inventory shows adequate construct validity and correlates, for example, with the 26-item version of the Eating Attitudes Test (Garner & Garfinkel, 1979), weight measures, the BDI and the Hopkins Symptom Checklist (HSCL; Derogatis, Lipman, Rickels, Uhlenhuth, & Covi, 1974), a precursor of the SCL-90.

State-Trait Anxiety Inventory (STAI; Spielberger, Gorsuch, & Lushene, 1970). 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 a good internal consistency (between .90 and .93 for the STAI-S and between .84 and .87 for the STAI-T). The convergent validity with respect to other measures of anxiety ranges from .58 to .79. The present study used the Spanish version of the STAI (Seisdedos, 1982).

Beck Depression Inventory (BDI; Beck, Ward, Mendelson, Mock, & Erbaugh, 1961). This 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 to 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 Beck Depression Inventory shows adequate reliability (.93) and a convergent validity between .62 and .66. The present study used the Spanish version of the BDI (Conde & Franch, 1984).

Symptom Checklist (SCL-90-R; Derogatis, 1983; González de Rivera et al., 1989). 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: a) the GSI or Global Severity Index, which measures the degree of general distress; b) PST or Positive Symptom Total, which refers to the number of symptoms reported by the subject; and c) the PSDI or Positive Symptom Distress Index, which measures the intensity of symptoms and relates general distress to the number of symptoms. The values of Cronbach's alpha range from .81 to .90 and the instrument shows adequate concurrent and predictive validity.

### Procedure

With regards to the instruments, the Thought-Action Fusion Questionnaire (TAF-Q; Shafran et al., 1996) and the obsessive-compulsive subscale of Derogatis' Symptom Checklist (SCL-90-R; Derogatis, 1983; González de Rivera, et al., 1989) were applied in order to analyze the convergent validity. On the other hand, the Eating Disorders Inventory (EDI-2; Garner, 1998) was administered to test the criterion validity. Finally, the relationships between the TSF-Q and the remaining the questionnaires and subscales could be

considered as measures of convergent and discriminant validity, since there are both convergent and differential aspects between these questionnaires. The analyses of both factor structure and validity constitute tests of the construct validity of TSF, which needs to be assessed with respect to all types of validity.

After obtaining informed consent for the study the participants in the clinical group completed the questionnaires in individual sessions with no time limit; this was done in the therapeutic context with the therapist present at the start and finish, as follows. The therapist 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 they 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 undergraduates) volunteered to take part in the study and none of them received any kind of recompense for completing the questionnaires. In the case of the undergraduate group, anonymity was left to the discretion of individual participants and data were collected in group-sessions.

## Results

### *Factor structure, internal consistency and correlations among several subscales and the TSF-Q total*

A separate factor analysis was performed for the two groups (patients with eating disorders and undergraduates) using the principal components 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 ED patients, Bartlett's test of sphericity gave  $\chi^2 = 3614.72$  ( $p < .0001$ ), while the Kaiser-Meyer-Olkin (KMO) index of sample adequacy was .928. In the group of undergraduates, Bartlett's test gave  $\chi^2 = 4747.55$  ( $p < .0001$ ) and a KMO index of .797. The number of factors was determined by considering those with eigenvalues above 1, through examination of the scree plot, and with the parallel analysis (Horn, 1965). 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 (Cota, Longman, Holden, Fekken, & Xinaris, 1993; Glorfeld, 1995; Hayton, Allen, & Scarpello, 2004), two factors were considered to be significant. In both samples the best solution for the principal components analysis of the 34 items of the TSF-Q revealed two factors that corresponded to the two sections identified by its authors: *conceptual* and *interpretative*. These two factors accounted

Table 1

Factor structure (principal components with varimax rotation) and explained variance of the TSF-Q in the patient group and the undergraduate group

Item	Patients with ED		Group of undergraduates	
	Factor 1	Factor 2	Factor 1	Factor 2
TSF1	.589	.238	.742	.225
TSF2	.559	.442	.702	-.021
TSF3	.452	.288	.666	-.015
TSF4	.598	.346	.401	.043
TSF5	.461	.443	.523	.189
TSF6	.682	.216	.770	.242
TSF7	.678	.025	.812	.129
TSF8	.663	.387	.697	.244
TSF9	.629	.314	.693	.136
TSF10	.643	.224	.704	.041
TSF11	.709	.300	.737	.225
TSF12	.607	.287	.769	.184
TSF13	.690	.421	.672	.131
TSF14	.487	.290	.664	.239
TSF15	.737	.385	.681	.285
TSF16	.701	.468	.685	.335
TSF17	.616	.174	.672	.145
TSF18	.411	.599	.045	.765
TSF19	.399	.488	.535	.157
TSF20	.262	.807	.230	.792
TSF21	.337	.504	.459	.506
TSF22	.278	.696	.638	.462
TSF23	.249	.818	.132	.877
TSF24	.322	.796	.222	.927
TSF25	.370	.319	.313	.619
TSF26	.317	.712	-.003	.860
TSF27	.268	.615	-.072	.854
TSF28	.256	.773	.409	.662
TSF29	.266	.833	.495	.790
TSF30	.305	.697	.478	.468
TSF31	.512	.560	.247	.360
TSF32	.263	.704	.129	.759
TSF33	.414	.593	.422	.347
TSF34	.240	.765	.408	.741
Explained variance	46.51	6.68	42.81	13.56
Accumulated variance	46.51	53.18	42.81	56.37

for 53.18% of the variance in the sample of patients and 56.37% in the group of undergraduates. The *conceptual* section or subscale measures the importance attached to thoughts related to eating and the body, while the *interpretative* section or subscale evaluates the way in which participants interpret such thoughts.

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

The first factor, which explains 46.51% and 42.81% of the total variance (in the patient and undergraduate groups,

respectively), comprises 17 items that refer to the *conceptual* part of the questionnaire. The second factor explains 6.68% and 13.56% of the total variance (in the patient and undergraduate groups, respectively) and consists of a further 17 items that refer to the *interpretative* part of the questionnaire.

The internal consistency of the TSF-Q and its subscales was analyzed by means of Cronbach's alpha coefficient. The *conceptual* factor had ( $\alpha = .933$ ) in the group of patients and ( $\alpha = .931$ ) in the group of undergraduates,

Table 2  
 Descriptive statistics for the measures used and differences between groups

	Patients (N = 146) Median SD	Students (N = 115) Median SD	U	p
TAF				
Moral-TAF	18 (11.72)	12 (11.95)	6.720	< .01
Likelihood TAF—others	0 (3.57)	0 (1.74)	7.510	< .05
Likelihood TAF—oneself	1 (3.44)	0 (2.21)	7.520	< .05
TSF				
Total-TSF	38 (34.02)	2 (14.85)	2.329	< .001
Conceptual-TSF	17 (16.76)	1 (7.68)	2.313	< .001
Interpretative-TSF	22 (19.32)	1 (8.71)	2.070	< .001
STAI				
STAI-S	25 (13.83)	16 (10.69)	4.872	< .001
STAI-T	33.5 (11.68)	17 (10.96)	3.486	< .001
BDI	15.5 (12.88)	4 (5.90)	3.026	< .001
EDI-2				
Drive for thinness	11 (6.67)	1 (3.84)	2.697,5	< .001
Bulimia	1 (3.97)	0 (1.51)	5.670	< .001
Body dissatisfaction	12 (7.82)	3 (5.21)	3.095,5	< .001
Ineffectiveness	7 (7.23)	1 (3.36)	2.882,5	< .001
Perfectionism	5 (3.51)	2 (3.23)	5.467,5	< .001
Interpersonal distrust	4 (3.96)	1 (2.93)	5.142	< .001
Interoceptive awareness	6 (5.80)	1 (2.81)	3.240,5	< .001
Maturity fears	6 (5.23)	3 (3.92)	5.348	< .001
Asceticism	5 (4.27)	2 (2.16)	3.383,5	< .001
Impulse regulation	3 (4.99)	0 (3.30)	4.261	< .001
Social insecurity	6.50 (5.37)	2 (3.89)	4.498,5	< .001
SCL-90				
Somatization	1 (0.93)	0.58 (0.66)	5.605,5	< .001
Obsessive-compulsive	1.5 (0.89)	0.65 (0.63)	4.153	< .001
Interpersonal sensitivity	1.66 (1.02)	0.55 (0.65)	3.549,5	< .001
Depression	1.84 (1.01)	0.61 (0.65)	3.076,5	< .001
Anxiety	1.2 (1.38)	0.40 (0.54)	3.855,5	< .001
Hostility	1.16 (0.97)	0.50 (0.65)	3.966	< .001
Phobic anxiety	0.43 (0.74)	0.14 (0.38)	4.964,5	< .001
Paranoid ideation	1.16 (0.84)	0.50 (0.65)	4.586	< .001
Psychoticism	1.05 (0.77)	0.20 (0.42)	3.142,5	< .001
Global Severity Index	1.43 (2.32)	0.51 (0.48)	3.145	< .001
Positive Symptom Total	60 (19.87)	34.50 (20.14)	3.818,5	< .001
Positive Symptom Distress Index	2.1 (0.69)	1.35 (0.43)	2.998	< .001

while the corresponding values for the *interpretative* factor were ( $\alpha = .949$  and  $\alpha = .936$ ). Overall, the questionnaire (TSF-Q total) yielded ( $\alpha = .964$ ) for patients and ( $\alpha = .954$ ) for undergraduates.

The correlation between TSF-Q total and TSF-conceptual was .934, the correlation between TSF-Q total and TSF-interpretative was .951, and the correlation between TSF-conceptual and TSF-interpretative was .777 in the sample of patients. In the sample of students the correlations were

.893, .918, and .641 respectively. Finally, the means of the inter-item correlations were .44 and .40, for patients and students respectively.

#### *Descriptive statistics for the applied measures and differences between groups.*

Table 2 shows the Median and SD obtained from the two samples for the different analyzed variables. Due to the

Table 3

Correlation between the Thought-Shape Fusion Questionnaire (TSF-Q) and the various subscales of the Eating Disorders Inventory (EDI-2)

Subscales of the EDI-2	TSF-Q conceptual		TSF-Q interpretative		TSF-Q total	
	Patients	Students	Patients	Students	Patients	Students
Drive for thinness	.66**	.56**	.70**	.53**	.72**	.58**
Bulimia	.39**	.33**	.48**	.29**	.47**	.34**
Body dissatisfaction	.59**	.51**	.68**	.36**	.68**	.47**
Ineffectiveness	.53**	.40**	.59**	.32**	.59**	.38**
Perfectionism	.33**	.23*	.28**	.14	.32**	.20*
Interpersonal distrust	.36**	.34**	.31**	.31**	.36**	.35**
Interoceptive awareness	.57**	.66**	.62**	.53**	.63**	.63**
Maturity fears	.21*	.29**	.24**	.26**	.24**	.30**
Asceticism	.60**	.26**	.57**	.30**	.67**	.30**
Impulse regulation	.50**	.39**	.50**	.33**	.53**	.39**
Social insecurity	.45**	.25**	.49**	.18	.50**	.23*

Note: \* =  $p < .05$ ; \*\* =  $p < .01$ ; the remainder no significant.

fact that the variables did not fit in normal distribution, the *U* Mann-Whitney test was performed, which revealed significant differences in all cases. The values of the effect size indexes (Cohen's *d*) ranged from .46 to .82, these being medium-large effects.

#### Correlation with related scales

In the sample of patients there was a significant and positive correlation ( $p < .01$ ) between TSF-Q total scores and the following subscales: moral TAF ( $r = .33$ ), likelihood TAF—others ( $r = .33$ ) and likelihood TAF—oneself ( $r = .42$ ). Similarly, there was a positive and significant correlation ( $p < .01$ ) between the conceptual subscale of the TSF-Q and the following subscales: moral TAF ( $r = .32$ ), likelihood TAF—others ( $r = .30$ ) and likelihood TAF—oneself ( $r = .39$ ). Finally, the interpretative subscale of the TSF-Q also showed a positive and significant correlation ( $p < .01$ ) with the subscales: moral TAF ( $r = .23$ ), likelihood TAF—others ( $r = .31$ ) and likelihood TAF—oneself ( $r = .40$ ).

In the sample of students there were significant and positive correlations ( $p < .01$ ) between TSF total score and moral-TAF ( $r = .38$ ), between the conceptual subscale of the TSF-Q ( $r = .34$ ) and moral-TAF, and between the interpretative subscale of the TSF-Q ( $r = .38$ ) and moral-TAF. The remaining correlations were not significant.

In the sample of patients the correlations between the TSF-Q and the obsessive-compulsive subscale of the SCL-90-R were positive and significant ( $p < .01$ ). Specifically, the correlation between the obsessive-compulsive subscale and the conceptual subscale of the TSF-Q was .48, while the corresponding value for the interpretative subscale was .52; the correlation between the obsessive-compulsive subscale and TSF-Q total scores was .51. In the case of the

students the corresponding correlations were .38, .40, and .42, respectively ( $p < .01$ ).

Analysis of the association between TSF-Q 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 eleven subscales that are clinically relevant to eating disorders. As can be seen in Table 3 the correlations were positive and significant ( $p < .01$ ) with all the subscales of the EDI-2.

As regards the relationship with the State-Trait Anxiety Inventory (STAI), in the sample of patients STAI-S scores showed a positive and significant correlation ( $p < .01$ ) with the conceptual subscale of the TSF-Q ( $r = .34$ ), with its interpretative subscale ( $r = .38$ ), and with TSF-Q total scores ( $r = .38$ ). STAI-T scores were even more strongly correlated with the conceptual subscale ( $r = .49$ ), the interpretative subscale ( $r = .53$ ) and TSF-Q total scores ( $r = .54$ ).

In the sample of students STAI-S scores showed a positive and significant correlation ( $p < .01$ ) with the conceptual subscale of the TSF-Q ( $r = .32$ ), with its interpretative subscale ( $r = .33$ ), and with TSF-Q total scores ( $r = .35$ ). STAI-T scores were even more strongly correlated with the conceptual subscale ( $r = .34$ ), the interpretative subscale ( $r = .36$ ) and TSF-Q total scores ( $r = .37$ ).

With respect to the presence of depressive symptomatology, scores on the BDI showed a positive and significant correlation ( $p < .01$ ) with the conceptual subscale of the TSF-Q ( $r = .61$ ), with its interpretative subscale ( $r = .64$ ), and with TSF-Q total scores ( $r = .67$ ). In the case of the students the correlations were lower, but also significant ( $p < .01$ ): .29, .32, and .33, respectively.

The final analysis concerned the relationship with the subscales of Derogatis' Symptom Checklist (SCL-90-R), i.e.

Table 4

Correlations between the Thought-Shape Fusion Questionnaire (TSF-Q) and the various subscales of Derogatis' Symptom Checklist (SCL-90-R)

Subscales of the SCL-90-R	TSF-Q conceptual		TSF-Q interpretative		TSF-Q total	
	Patients	Students	Patients	Students	Patients	Students
Somatization	.47**	.03	.57**	.03	.55**	.06
Interpersonal sensitivity	.57**	.32**	.61**	.32**	.63**	.34**
Depression	.51**	.28**	.56**	.26**	.57**	.29**
Anxiety	.11	.14	-.05	.13	.02	.15
Hostility	.40**	.28**	.48**	.25**	.47**	.29**
Phobic anxiety	.46**	.05	.54**	-.05	.53**	.02
Paranoid ideation	.46**	.26**	.50**	.32**	.51**	.31**
Psychoticism	.53**	.29**	.61**	.30**	.61**	.32**
Global Severity Index	.13	.29**	.13	.30**	.14	.32**
Positive Symptom Total	.53**	.20*	.61**	.21*	.61**	.22*
Positive Symptom Distress Index	.46**	.37**	.56**	.35**	.55**	.39**

Note: \* =  $p < .05$ ; \*\* =  $p < .01$ ; the remainder no significant.

Table 5

Partial correlations between the Thought-Shape Fusion Questionnaire (TSF-Q) and the eating disorder-related subscales of the Eating Disorders Inventory (EDI-2), after controlling the rest of psychopathological variables

Subscales of the EDI-2	TSF-Q conceptual		TSF-Q interpretative		TSF-Q total	
	Patients	Students	Patients	Students	Patients	Students
Drive for thinness	.39**	.26*	.44**	.14	.47**	.23*
Bulimia	.16	.03	.30**	.09	.26**	.07
Body dissatisfaction	.24**	.25*	.35**	.12	.33**	.24*

Note: \* =  $p < .05$ ; \*\* =  $p < .001$ ; after controlling STAI, BDI, other subscales of EDI-2, and SCL-90-R.

somatization, obsessive-compulsive, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation and psychoticism. In this case there were positive and significant correlations ( $p < .01$ ) between the TSF-Q and all the subscales of the SCL-90-R, except for anxiety and the GSI. Table 4 shows the various correlations obtained.

#### Partial correlations between TSF and specific eating pathology, controlling the remaining variables

In order to analyze whether TSF continued to show a relationship with specific eating pathology variables, the correlations were calculated again after controlling for the influence of other psychopathology variables. In the sample of patients the partial correlations analyzed showed, after controlling the remaining set of psychopathology variables studied (STAI, BDI, general psychopathology subscale of the EDI-2 and SCL-90-R), that the correlations between the TSF-Q (total and subscales) and the specific subscales of the EDI-2 (drive for thinness, bulimia, and body dissatisfaction) were still highly significant ( $p < .001$ ). After controlling for this same set of variables in the sample of

students the analysis revealed that the correlations between the interpretative subscale of the TSF-Q and the subscales of the EDI-2 were not significant ( $p > .05$ ), while the degree of significance fell ( $p < .05$ ) for the correlation between the conceptual subscale of the TSF-Q and the EDI-2 subscales *drive for thinness* and *body dissatisfaction*; the correlation with the bulimia subscale ceased to be significant ( $p > .05$ ). Finally, the correlations between the TSF-Q total score and the subscales *drive for thinness* and *body dissatisfaction* were weaker ( $p < .05$ ), while the correlation with the bulimia subscale ceased to be significant ( $p > .05$ ). These results are shown in Table 5.

#### Differences between diagnostic subgroups

A one-factor analysis of variance (ANOVA) revealed no significant differences between the TSF scores of the three patient groups (anorexia nervosa, bulimia nervosa, and unspecified eating disorders). The means obtained for TSF-conceptual were 19.10 ( $SD = 17.72$ ), 22.35 ( $SD = 13.86$ ) and 19.55 ( $SD = 16.65$ ) in the anorexia, bulimia and unspecified eating disorder groups, respectively; as regards TSF-interpretative the corresponding means were 21.19



( $SD = 20.33$ ), 28.42 ( $SD = 17.29$ ) and 24.38 ( $SD = 17.23$ ); and for TSF-total they were 40.29 ( $SD = 36.86$ ), 50.78 ( $SD = 27.88$ ) and 43.94 ( $SD = 31.13$ ), respectively. The values obtained in the ANOVA were: TSF-conceptual:  $F(2, 104) = .38, p = .68$ ; TSF-interpretative:  $F(2, 104) = 1.39, p = .25$ ; and TSF-total:  $F(2, 104) = .92, p = .40$ .

### Appealing features

Regarding to the appealing features the TSF-Q was easily administered and scored, and it required only a few minutes to be completed ( $M = 2.72$  minutes) with a range between 1.03 and 4.67 minutes.

## Discussion

As in the original study of the TSF-Q (Shafran et al., 1999) the present research obtained two factors that correspond to the conceptual and interpretative subscales, each of which comprises 17 items. The factor structure shows that items from the conceptual subscale, which refer to likelihood, morality and feelings, do not represent different factors. As stated earlier the interpretative subscale concerns how an individual interprets the fact of eating certain foods. The likelihood that body shape changes merely through thinking about certain foods, the idea that such thoughts are immoral, the feelings associated with these thoughts and the interpretation made of them appear to represent a more general construct: attaching undue importance to thoughts about eating, body shape (figure) and weight, and interpreting them in a way that has personal significance. To a certain extent this is similar to the overemphasis placed on thoughts in obsessive pathology.

In the proposed factor structure, items 1-17 have well-differentiated factor loadings in both the clinical and undergraduate samples. In the case of items 18-34 (interpretative subscale), item 25 (*The fact that I think about eating "forbidden" or "fattening" food means... I am NOT going to eat the food*) has similar loadings on both factors. There may be a degree of confusion between the conceptual and interpretative aspects here, in that thinking about eating forbidden foods could be taken to mean *I'm not going to eat them* or be regarded as being *as immoral or bad as actually eating them*. However, on theoretical grounds this item can just as easily be assigned to the interpretative subscale, i.e. to the second factor.

In the sample of undergraduates the loadings of items 19, 22, 30 and 33 would seem to indicate that they belong to the conceptual subscale. Thus, as occurs in the patient group, *thinking about forbidden foods* could mean *gaining weight, losing control, not being perfect or getting fat*, or alternatively, *eating forbidden foods* could be regarded as being *as immoral or bad as actually gaining weight, losing control, not being perfect or getting fat*. However, the fact

that both the conceptual and interpretative subscales might belong to the same general construct could also give rise to these loadings. Thus, as before there are good theoretical grounds for assigning these items to the second factor.

In general, the validation study of the Spanish version of the TSF-Q meets the requirements for measuring the construct of 'thought-shape fusion'. The analysis of reliability showed that the Spanish version has adequate internal consistency, both as regards the total questionnaire and for each one of the subscales and factors. This is confirmed by the fact that the means of the inter-item correlations are not indicating a highly redundant content (Boyle, 1991; John & Soto, 2007). In the future it would be advisable to conduct a test-retest analysis, and to examine how thought-shape fusion changes with successful treatment of the eating disorder.

The present data indicate that TSF is a cognitive distortion associated with eating disorders. The ED patients showed much greater TSF than did the students in the control sample, thus confirming previous findings in this regard (Shafran & Robinson, 2004).

With respect to the correlations between the TSF-Q and other instruments, which provide a measure of the different types of validity, the results show a relationship between the TSF-Q and the TAF-Q. This association has previously been reported, especially in patients who were more likely to neutralize the TSF effect (Radomsky et al., 2002). The relationship between TSF and TAF confirms the link between eating disorders and obsessive-compulsive pathology, insofar as both kinds of patients tend to fuse 'bad thoughts' with 'bad consequences'. The correlation coefficients obtained here indicate a shared variance of between 5% and 18%. The observed relationship between the TSF-Q and the obsessive-compulsive subscale of the SCL-90-R supports the association between the symptoms of eating and obsessive disorders. In this case the shared variance ranged from 23-27%.

All the subscales of the EDI-2 showed a positive and significant correlation with the total score of the TSF-Q and its two subscales. The lowest correlations were observed for 'maturity fears' and 'perfectionism', whereas the highest corresponded to 'drive for thinness' and 'body dissatisfaction', the most relevant aspects as regards body image. In these cases the correlation coefficients indicate a shared variance of 43-52% between TSF and the drive for thinness, and of 27-46% between TSF and body dissatisfaction. These data appear to confirm previous reports (Shafran & Robinson, 2004) of the undue importance that eating disorder patients attach to thoughts about food, their body (figure and shape) and weight. This would constitute the psychopathological core of these disorders and, in turn, thought-shape fusion could be involved in problem maintenance for some patients due to the persistent attention to body image and the repeated checking of it (Shafran & Robinson, 2004).

The results also show positive and significant correlations between the TSF-Q (total score and the two subscales) and anxiety — as measured by the STAI — and depression, as measured by the BDI. In the former case the shared variance ranged from 11-29%, while the corresponding figure for depression was 37-45%. The relationship between TSF and depression has been reported by other authors (Radomsky et al., 2002), especially in patients who are more likely to neutralize the effect of experimentally-induced TSF. As regards the relationship with anxiety symptoms this can be understood in terms of models of mediation (Baron & Kenny, 1996; Holmbeck, 1997), in which one variable (a) is said to influence another (c) via a third variable (b). In the present context, anxiety (b) could mediate in the relationship between TSF (a) and the specific symptoms of eating disorders (c). Similarly, in the case of depressive symptoms, negative affect (b) could mediate between TSF (a) and eating disorder symptoms (c) in the same way as has been reported for TAF (Abramowitz, Whiteside, Lynam, & Kalsy, 2003). However, the present study is unable to shed light on this potential relationship. The lack of a significant correlation between the TSF-Q and the anxiety subscale of the SCL-90-R, in contrast to what was found for the STAI (for both state and trait anxiety), suggests that the two instruments (STAI and SCL-90-R) are measuring different aspects of the variable 'anxiety'. Indeed, the obsessive component as measured by the TAF-Q or the TSF-Q could be related to fear, avoidance, catastrophic interpretations of body sensations or of the importance of things, and to feelings of shame (Clark, 1999), a core feature of trait anxiety that is specifically measured by the STAI. The present results showed a shared variance between the TSF-Q and the STAI-T that ranged from 24-29%. Another point to consider is that the fact that TSF, like TAF, is associated with various psychopathological variables (as shown by the correlations between the TSF-Q and the SCL-90-R) could indicate the presence of a general cognitive bias which mediates in the observed relationship between TSF and eating disorder symptoms. As has been proposed for TAF it could be that any relationship between TSF and eating disorders is due, at least in part, to the fact that patients with such disorders also present a wide range of psychopathology (Abramowitz et al., 2003; Clark, 1999), hence the various correlations found. One finding that appears to be inconsistent with the correlations found is that the global severity of other symptoms does not seem to play a role in the relationship between TSF and eating disorder symptoms, since the subscale of the SCL-90-R which measures this aspect (GSI) is the only one, along with anxiety, that is not significantly correlated with the TSF-Q. This lack of correlation should be investigated further. Nevertheless, due to the fact that SCL-90-R is a screening tool, which measures variable states more than stable traits, any interpretation of the different correlations must be given carefully.

As regards the correlations between TSF and the specific variables of the EDI-2, these remained highly significant in the sample of patients even after controlling the different psychopathology variables analyzed. However, in the sample of students these correlations were considerably weaker, or ceased to be significant, after controlling for these variables. This finding is consistent with the results reported by Shafran and Robinson (2004).

The study of TSF in the three diagnostic subgroups revealed no significant differences, thus supporting the notion of a common psychopathology (Garner & Bemis, 1982; Shafran & Robinson, 2004) in which TSF could be present. These results suggest that TSF does not vary between patients with different degrees of control over food intake, and as such the presence or absence of bingeing might not in itself be a key factor in this regard.

The present study has a number of limitations. As already pointed out it would be advisable in the future to perform a test-retest analysis, and to examine whether thought-shape fusion changes with treatment.

With regards to the instruments, the TAF-Q needs to be validated for Spanish population. With respect to the samples, due to the fact that most of the participants were women, the results could not be generalized because of the gender.

Another aspect to consider is the specific study of different eating disorders. Published research in the field of TSF that has made such a distinction has been based on very small samples that range between 10 and 23 for patients with anorexia, 7 and 10 for bulimia, and 4 and 10 for unspecified eating disorders (Coelho et al., 2008; Shafran & Robinson, 2004). The samples in the present study are larger in all three patient groups and the comparison between subgroups revealed no differences. Nevertheless, the importance of this issue merits further study, perhaps by analyzing differences between purging and non-purging types of each eating disorder.

The mediating role, which the various psychopathological variables considered here may play in the relationship between TSF and specific symptoms of eating disorders should be studied in detail. There would be two objectives to such research: firstly, to analyze the role of possible comorbid disorders, which are so often associated with eating disorders, in the expression and — perhaps — the maintenance of specific eating pathology; and secondly, to explore the possibility of modifying the cognitive bias referred to as thought-shape fusion, not only through direct intervention but also by improving the associated symptomatology.

Finally, it is worth considering whether the phenomenon of thought-shape fusion might have prognostic value. It may be that treatment of the eating disorder is sufficient to change the distortion for some patients but for others it might interfere with treatment progress. For those patients, a specific additional intervention focusing on the distortion may be warranted.

## Conclusions

This validation study of the Spanish version of the TSF-Q meets the requirements for measuring the construct of ‘thought-shape fusion’.

The data appear to confirm previous reports of the undue importance that eating disorder patients attach to thoughts about food, their body (figure and shape) and weight. This would constitute the psychopathological core of these disorders.

The study of TSF in the three diagnostic subgroups revealed no significant differences, thus supporting the notion of a common psychopathology in which TSF could be present.

The mediating role which the various psychopathological variables considered here may play in the relationship between TSF and specific symptoms of eating disorders should be studied in detail.

Finally, it is worth considering whether the phenomenon of thought-shape fusion might have prognostic value. It may be that treatment of eating disorders is sufficient to change the distortion for some patients, whereas for others it might interfere with treatment progress.

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## APPENDIX A

### English version of the Thought-Shape 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 = **Not at all**; 1 = **Some**; 2 = **Much**; 3 = **Very much**; 4 = **Totally**

1. Thinking about eating chocolate is almost as unacceptable to me as actually eating chocolate
2. I feel fatter after thinking about eating chocolate.
3. If I think about gaining weight, I want to check that my clothes aren't fitting more tightly.
4. Thinking about gaining weight is almost as immoral to me as actually gaining weight.
5. Just picturing myself gaining weight can really make me gain weight.
6. I feel huge if I just imagine not exercising for a month.
7. Just thinking about "pigging-out" makes me want to weigh myself.
8. Just imagining myself "pigging-out" can actually make me look fatter.
9. Thinking about breaking my diet makes me want to check in the mirror that I don't look any fatter.
10. Just thinking about not exercising can change the way I really look.
11. I feel fatter if I just think about "pigging-out".
12. Just thinking about not exercising for a month makes me want to cut down on what I eat.
13. If I think about breaking my diet, it is almost as unacceptable as really breaking my diet.
14. My shape can actually change, just by me planning to eat fattening food.
15. My body feels enormous when I just picture myself breaking my diet.
16. I feel fatter just by thinking about gaining weight.
17. Picturing myself eating chocolate makes me want to check my body to make sure I haven't gained any weight.

The fact that I think about eating 'forbidden' or 'fattening' food means...

18. ... I am a pig
19. ...That I'm going to gain weight
20. ... I'm out of control
21. ... I'm a greedy person
22. ... I'm going to lose control and eat the food
23. ... I'm a loser
24. ...I'm worthless
25. ... I am not going to eat the food
26. ... I can't control my mind
27. ... I'm a bad person
28. ... I'm weak willed
29. ...That I've lost control of myself
30. ... I'm not perfect
31. ...That I need to restrict my eating more
32. ...I'm stupid
33. ...That I'm going to get fat
34. ... I lack self-discipline
35. Other (please specify)
36. Other (please specify)

## APPENDIX A

### Spanish version of the Thought-Shape 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. El pensamiento de comer chocolate/ Pensar en comer chocolate es casi tan inaceptable para mi como realmente comer chocolate.
2. Me siento más gordo/a después de haber pensado en comer chocolate.
3. Si pienso en ganar peso, quiero comprobar que mi ropa no me está más ajustada, apretada.
4. Pensar en ganar peso, es casi tan inmoral como ganarlo verdaderamente.
5. Sólo imaginarme a mí mismo/a ganando peso, puede hacerme que gane peso.
6. Me siento enorme si simplemente me imagino sin hacer ejercicio durante un mes.
7. Sólo pensar en darme un atracón, hace que quiera pesarme.
8. Sólo imaginarme a mí mismo/a dándome un atracón puede realmente hacerme parecer más gordo/a.
9. Pensar en romper mi dieta, hace que quiera comprobar en el espejo que no parezco más gordo/a.
10. Sólo pensar que no hago ejercicio/ sólo el pensamiento de no hacer ejercicio puede cambiar realmente la manera en que miro/ mi manera de verme.
11. Me siento más gordo/a si simplemente pienso en (darme) un atracón.
12. Sólo pensar en no hacer ejercicio durante un mes, hace que desee reducir lo que como.
13. Si pienso en romper mi dieta, es casi tan inaceptable como si la rompiera verdaderamente.
14. Mi forma (corporal) puede cambiar realmente, tan sólo planeando comer “comida que engorda”.
15. Mi cuerpo se siente enorme cuando simplemente me imagino/ represento a mí mismo/a rompiendo mi dieta.
16. Me siento más gordo/a solamente pensando en ganar peso.
17. Representarme/ Imaginarme a mí mismo/a comiendo chocolate hace que quiera comprobar si realmente mi cuerpo no ha ganado nada de peso.

El hecho de que piense en comer “alimentos prohibidos” o “comida que engorda” significa que...

18. ...soy un/a cerdo/a
19. ...voy a ganar peso.
20. ...estoy fuera de control.
21. ...soy una persona codiciosa.
22. ...voy a perder el control y voy a comer “alimentos prohibidos”.
23. ...soy un/a perdedor/a.
24. ...soy el/ la peor.
25. ...No voy a comer esos “alimentos prohibidos”.
26. ...no puedo controlar mi mente.
27. ...soy una mala persona.
28. ...soy débil de voluntad.
29. ...he perdido el control sobre mí mismo.
30. ...no soy perfecto/a.
31. ...necesito restringir más mi comida.
32. ...soy estúpido/a.
33. ...voy a ponerme gordo/a.
34. ...carezco de autodisciplina.
35. Otro (por favor especificar)
36. Otro (por favor especificar)