



Thought–shape fusion in eating disorders

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Objectives. The aims of the present study were (1) to examine the association between a cognitive distortion ('thought–shape fusion') and eating disorder psychopathology and (2) to examine the degree of thought–shape fusion in people with eating disorders and a non-eating-disorder control group.

Design. Associations between thought–shape fusion and eating disorder psychopathology were examined and the degree of thought–shape fusion was compared between people with and without clinical eating disorders.

Method. Forty-two women with clinical eating disorders and a group of 42 age-matched women with no self-reported history of an eating disorder completed self-report questionnaires to assess thought–shape fusion, eating disorder symptoms, body checking and body avoidance, and depression.

Results. Thought–shape fusion was significantly associated with eating disorder psychopathology. The majority of the associations remained significant when controlling for levels of depression. Patients with eating disorders showed significantly more thought–shape fusion than the non-clinical controls.

Conclusions. Thought–shape fusion is a cognitive distortion associated with eating disorders. It may be a direct expression of the overevaluation of eating, shape and weight. It is recommended that thought–shape fusion be tackled directly in cases where it is a barrier to changing the core psychopathology of eating disorders.

Psychiatric disorders are sometimes characterized by a range of specific cognitive distortions. Such cognitive distortions are said to occur if the thinking is consistent, non-veridical and skewed (Rachman & Shafran, 1999) and they are hypothesized to contribute to the maintenance of the disorder. It is therefore important to identify such distortions and, if necessary, to develop ways of tackling them.

Some distortions have been well studied, in particular the catastrophic misinterpre-

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tation of bodily sensations in panic disorder (Clark, 1986), the thinking errors in depression (Beck, 1995), the inflation of responsibility in obsessive-compulsive disorder (OCD; Salkovskis *et al.*, 2000) and distorted cognitions or beliefs regarding shape and weight in people with eating disorders (Bonifazi, Crowther, & Mizes, 2000; Cooper & Fairburn, 1992; Cooper, Cohen-Tovée, Todd, Wells, & Tovée, 1997; Mizes *et al.*, 2000).

A cognitive distortion associated with inflated responsibility in OCD is 'thought-action fusion' (Rachman, 1993; Shafran, Thordarson, & Rachman, 1996). The term thought-action fusion is used to describe the belief that (one's) specific intrusive thoughts can directly influence the relevant external event and/or the belief that having these intrusive thoughts is morally equivalent to carrying out a prohibited action. For example, a patient with OCD may have the intrusive image of a relative being injured in a car crash and believe that having this thought increases the chance of that relative really being involved in such an accident. A series of studies have confirmed the association between thought-action fusion and OCD (Amir, Freshman, Ramsey, Neary, & Brigidi, 2001; Coles, Mennin, & Heimberg, 2001; Rassin, 2001; Rassin, Diepstraten, Merckelbach, & Muris, 2001; Rassin, Merckelbach, Muris, & Spaan, 1999; Rassin, Merckelbach, Muris, & Schmidt, 2001; Shafran & Rachman, 2004) and they suggest that such a cognitive distortion is not specific to OCD but is associated with other anxiety disorders.

A cognitive distortion similar to thought-action fusion was hypothesized to exist in people with eating disorders based on clinical experience and the evidence that cognitive distortions exist in this population (Cooper *et al.*, 1997). This variation of thought-action fusion has been termed 'Thought-shape fusion' (TSF) (Shafran, Teachman, Kerry, & Rachman, 1999). TSF has three components. First, *Likelihood TSF*, which refers to the belief that just thinking about eating a forbidden food makes it likely that the person has gained weight or changed shape. People with this form of TSF know rationally that thinking about eating a forbidden food cannot actually create weight gain or shape change, but they nevertheless also illogically sometimes think this to be the case. Second, *Moral TSF*, in which experiencing the thoughts about eating forbidden food is believed to be morally equivalent to actually eating the prohibited food. Third, *Feeling TSF*, in which experiencing thoughts about eating forbidden food increases the feeling of fatness. Roughly speaking, 'If I think about overeating or eating prohibited foods, then I think that I may have gained weight/I am immoral/I feel myself as fatter'.

Preliminary investigations of TSF were encouraging (Shafran *et al.*, 1999). A self-report questionnaire was developed and found to have good reliability and predictive validity in a sample of 119 students (Shafran *et al.*, 1999). The cognitive distortion was strongly associated with *all* subscales and global scores on the Eating Disorder Examination - Questionnaire (EDE-Q; Fairburn & Beglin, 1994) and the association between TSF and all subscales of the EDE-Q remained significant when partialling out the effects of depression and obsessiveness. In addition, TSF was associated with a range of other cognitive distortions (e.g. the belief that the moral unacceptability of eating forbidden food is greater if the person voluntarily chooses to eat it, as opposed to eating the forbidden food when there is little choice) and associated behaviours (e.g. that thinking about gaining weight can elicit the urge to check that clothes are not fitting more tightly).

Further investigations of TSF have been conducted using an experimental paradigm with students high in TSF (Shafran *et al.*, 1999) and patients with anorexia nervosa (Radomsky, de Silva, Todd, Treasure, & Murphy, 2002). These studies demonstrated

that TSF can be elicited under experimental conditions, it produces emotional reactions and it prompts the urge to engage in ‘corrective’ behaviour such as exercising, vomiting, and checking one’s body shape.

The aim of the present study was to examine the association between TSF and eating disorder psychopathology in a sample of patients with the full range of clinical eating disorders and to compare TSF in patients with clinical eating disorders to TSF in adults from the community with no history of an eating disorder.

Method

Participants

Forty-two women (mean age 28.6 years; *SD* 9.7) meeting DSM-IV criteria (American Psychiatric Association, 1994) for a clinical eating disorder participated in this study (diagnoses were made during semi-structured interviews with trained clinicians). All clinical participants were recruited from Oxford University Department of Psychiatry and The Royal Free Hospital in Hampstead. Participants reported their height and weight for diagnostic purposes. Ten patients met the criteria for anorexia nervosa, 10 met the criteria for bulimia nervosa, and 22 met the criteria for an eating disorder not otherwise specified (EDNOS). The patients with an atypical eating disorder were all significantly impaired by their disorder, according to a clinician’s judgment. In addition, their subscale scores on the measure of eating disorder psychopathology were in the clinical range (see Table 1). Another group of 42 women with no self-reported current or past history of an eating disorder served as controls (mean age 28.3 years; *SD* = 9.1). These participants were recruited through advertisements asking for help with research into eating habits and body image. They were weighed and measured by a research assistant as part of another study. Two of these participants had been treated for a psychiatric disorder in the past (not eating-disorder related). After a complete description of the study had been given to the participants, their written informed consent was obtained.

Measures

Eating Disorder Examination – questionnaire version (EDE-Q; Fairburn & Beglin, 1994)

This is a self-report measure of eating disorder psychopathology based on the Eating Disorder Examination interview (EDE; Cooper & Fairburn, 1987; Fairburn & Cooper, 1993). Like the EDE interview, it focuses on the participant’s state over the preceding 28 days. It comprises 36 items that focus on the main behavioural and attitudinal features of eating disorders and those items needed to generate the EDE subscales of restraint, eating concern, shape concern and weight concern. It uses a 7-point forced-choice rating scheme for these subscales. Frequencies of key eating disorder behaviours are measured in terms of the number of days on which each particular form of behaviour occurs. The questionnaire has good reliability and validity (Carter, Aime, & Mills, 2001; Luce & Crowther, 1999; Wilfley, Schwartz, Spurrell, & Fairburn, 1997, Mond *et al.*, 2004) and takes approximately 15 minutes to complete.

Body checking and avoidance questionnaire (Shafran, Fairburn, Robinson, & Lask, 2004)

This 23-item self-report measure assesses the checking and avoidance of body shape

and weight. Like the EDE-Q, it assesses the participant's state over the preceding 28 days. It addresses the frequency of various checking and avoidance behaviours across the body parts, for example, the pinching of the thighs, stomach and bottom, and also frequency of weighing. It uses a 6-point forced-choice rating scheme for 22 items. Scoring is as follows: 0 = 'Not at all - not interested', 1 = 'checked less than once a week', 2 = 'checked 1-6 times a week', 3 = 'checked 1-2 times a day', 4 = 'checked 3 or more times a day' and 5 = 'avoided doing so because of possible distress'. A final open-ended item asks about other ways that the participant has assessed their size. This item was not included in the mean score. The reliability and validity of this questionnaire has been demonstrated in previous research (Shafran *et al.*, 2004), including high discriminant validity and high internal consistency (Cronbach's α of .9 in original study (Shafran *et al.*, 2004) and .9 in the current sample).

Beck Depression Inventory (BDI) (Beck, Ward, Mendelsohn, Mock, & Erlbaugh, 1961)

This is a 21-item self-report measuring characteristic attitudes and symptoms of depression, including pessimism, suicidal ideation and sleeping difficulties. Participants are asked to rate their level/severity of each symptom over the previous week on a 4-point scale. The highest possible total for the test is 63, with the lowest being zero. This measure is one of the most widely used to assess depressive symptomology, and its reliability and validity have been demonstrated in previous research (Beck, Steer, & Garbin, 1988).

*Thought-shape fusion questionnaire (Shafran *et al.*, 1999)*

This 34-item self-report questionnaire was revised on the basis of the findings of a previous study (Shafran *et al.*, 1999) to eliminate items that did not correlate with the total score or load on the main factor. The questionnaire is divided into two sections. The first section ('concept') comprises 17 items that cover the three domains of thought-shape fusion (i.e. likelihood, moral and feeling components). These domains do not form distinct factors and so are analysed together. Participants rate their agreement with each statement on a scale of 0 'not at all' to 4 'totally'. Examples of items include 'Just picturing myself gaining weight can really make me gain weight', 'If I think about breaking my diet, it is almost as unacceptable as really breaking my diet', 'I feel fatter just by thinking about gaining weight'. This section also asks about the impact of thinking on behaviour e.g. 'Picturing myself eating chocolate makes me want to check my body to make sure I haven't gained any weight'. The second section ('interpretation') comprises 17 items regarding the interpretation of thinking about eating 'forbidden' or 'fattening' food. Examples of interpretations are 'I am a pig', 'I'm out of control', 'I'm not perfect', 'I lack self-discipline'. As before, participants rate their agreement with each statement on a scale of 0 'not at all' to 4 'totally'. The mean scores for the two subscales are computed separately. Two additional open-ended items ask about other interpretations; these are not included in the mean score. For the current sample, the internal reliability of the scale was high (Cronbach's α = .95 for 'concept', and .97 for 'interpretation') and discriminated between the clinical and non-clinical samples (see Results section).

Table 1. Mean scores on the questionnaires

	Anorexia nervosa (N = 10)	Bulimia nervosa (N = 10)	Atypical eating disorders (N = 22)	Controls (N = 42)	Significance of group differences (P)
Mean age	22.2 (4.3)	26.8 (4.3)	32.3 (11.6)	28.3 (9.1)	< .05
Mean BMI	16.7 (0.8)	24.2 (6.2)	23.0 (7.3)	23.6 (4.1)	< .005
EDE-Q					
Restraint	4.5 (1.1)	4.0 (1.5)	3.3 (1.8)	1.2 (1.3)	< .001
Weight concern	4.4 (1.4)	4.5 (0.9)	4.1 (1.6)	1.1 (0.9)	< .001
Shape concern	4.6 (1.3)	4.8 (1.1)	4.6 (1.2)	1.6 (1.2)	< .001
Eating concern	4.1 (1.3)	4.4 (0.6)	3.4 (1.5)	0.5 (0.7)	< .001
Global EDE-Q	4.4 (1.2)	4.4 (0.9)	3.8 (1.3)	1.1 (0.9)	< .001
BDI	24.4 (12.1)	23.3 (8.3)	21.4 (11.2)	6.1 (5.9)	< .001
Mean BCAQ	2.1 (1.0)	2.3 (1.0)	2.1 (0.9)	0.9 (0.6)	< .001
TSF concept	1.3 (1.1)	1.0 (1.0)	1.3 (1.0)	0.2 (0.3)	< .001
TSF interpretation	1.7 (0.9)	2.0 (0.6)	2.0 (1.2)	0.3 (0.4)	< .001

Note: Missing values replaced with mean of adjacent values.

Results

Descriptive statistics

Table 1 shows the mean age, BMI and scores on the questionnaires for the different groups. A series of one-way ANOVAs and *post hoc* tests indicated that there were group differences on all indices shown. Patients with anorexia nervosa were significantly younger than those with atypical eating disorders, but no other groups differed from each other ($F(3, 80) = 3.08, p < .05$). Patients with anorexia nervosa had a significantly lower BMI than any other group and no other groups differed from each other ($F(3, 80) = 5.12, p < .005$). All three clinical groups had significantly higher restraint scores than the control group, but did not differ from each other ($F(3, 80) = 23.56, p < .001$). This pattern was also found with regard to weight concern ($F(3, 80) = 49.11, p < .001$), shape concern ($F(3, 80) = 46.53, p < .001$), eating concern ($F(3, 80) = 70.44, p < .001$), global EDE-Q scores ($F(3, 80) = 59.81, p < .001$) and depression scores ($F(3, 80) = 25.46, p < .001$).

Associations between TSF, eating disorder psychopathology, BMI and depression

Pearson's product moment correlation coefficients were calculated to investigate the relationships among the different measures within the two samples. These associations are shown in Table 2 (clinical sample) and Table 3 (non-clinical control sample).

For the clinical group, a significant association was found between the two TSF subscales and all subscales on the EDE-Q (Table 2). These remained significant when controlling for BDI scores, with the exceptions of the correlation between TSF concept and weight concern ($r = .31, p = .052$) and the correlation between TSF interpretation and restraint ($r = .24, p > .05$).

TSF was significantly associated with scores on the BCAQ and BDI. However, the correlation between BCAQ and TSF was no longer significant when controlling for BDI scores ($r = .26$ and $.21$ for TSF concept and TSF interpretation respectively; $p > .05$).

Table 2. Correlations between TSF and eating disorder psychopathology, body mass index and depression for the clinical group ($N = 42$)

	TSF concept	TSF interpretation
EDE-Q		
Restraint	.44**	.36*
Shape concern	.51**	.67**
Weight concern	.47**	.53**
Eating concern	.48**	.53**
Global EDE-Q	.55**	.59**
BCAQ	.42**	.38*
BDI	.40**	.40**
BMI	.07 (<i>ns</i>)	.31*

** $p < .01$, * $p < .05$.

Table 3. Correlations between TSF and eating disorder psychopathology, body mass index and depression for the control group

	TSF concept	TSF interpretation
EDE-Q		
Restraint	.40**	.35*
Shape concern	.51**	.51**
Weight concern	.44**	.58**
Eating concern	.69**	.57**
Global EDE-Q	.57**	.57**
BCAQ	.39*	.41**
BDI	.38*	.63**
BMI	-.00 (<i>ns</i>)	-.01 (<i>ns</i>)

** $p < .01$, * $p < .05$.

There was no significant association between TSF concept and BMI; the small but significant correlation between TSF interpretation and BMI ($r = .31$, $p < .05$) was no longer significant when controlling for the effects of depression ($r = .22$, $p > .05$).

The pattern of intercorrelations for the non-clinical group was similar to that of the patient sample (Table 3). After controlling for the effects of depression, the correlations between TSF concept and scores on the BCAQ were no longer significant ($r = .27$, $p > .05$). In addition, the associations between TSF interpretation and restraint, shape concern and BCAQ scores were no longer significant (all r s $< .3$).

The two TSF subscales were highly intercorrelated for both the clinical and non-clinical groups ($r = .74$ and $r = .62$, respectively, $p < .05$).

Group comparisons: TSF concept and interpretation

Comparison of the clinical and control groups indicated that participants with an eating disorder had significantly higher levels of 'concept' TSF and interpretation TSF than

participants without an eating disorder ($t(82) = 6.53$, $p < .001$, and $t(82) = 9.67$, $p < .001$, respectively).

Discussion

This study confirmed that thought–shape fusion is a cognitive distortion associated with eating disorders. Patients with eating disorders had significantly more thought–shape fusion than non-clinical controls, and overall there was a strong association between the severity of eating disorder psychopathology and the degree of thought–shape fusion.

In the clinical sample, the association between eating disorder psychopathology and thought–shape fusion remained when controlling for depression, with two notable exceptions. First, the association between thought–shape fusion and body checking/avoidance was no longer significant when depression levels were taken into account. It may be the case that the urge to check one's shape that arises from thought–shape fusion is harder to resist under conditions of low mood. Second, the moderate correlation between the interpretation subscale of TSF and BMI was no longer significant when controlling for depression. This finding may be explained by a low mood leading to both a negative interpretation of thoughts and a breakdown in dietary restraint (Fairburn, 1997). Together, these findings highlight the close relationship between depression and eating disorder psychopathology.

The two subscales of TSF were highly intercorrelated. It may be the case that although conceptually distinct, the different components of TSF and the interpretation of thoughts reflect the more general construct of placing undue importance on thoughts about eating, shape and weight and interpreting such thoughts as personally significant. This process is likely to be similar to the overimportance of thoughts that characterizes obsessive-compulsive disorder (OCCWG, 1997, 2001; Rachman, 1997).

In eating disorders, this overimportance of thoughts about eating is almost certainly a direct expression of the overevaluation of eating, shape, weight and their control, which is suggested to be the core psychopathology of eating disorders (Fairburn, Cooper, & Shafran, 2003). If thought–shape fusion is a direct expression of the overevaluation of eating, shape, weight and their control, a treatment that successfully addresses such overevaluation should reduce thought–shape fusion. On the other hand, it may be that thought–shape fusion is both a direct expression of the core psychopathology and also serves to maintain it. For example, if someone feels huge simply from imagining not exercising for a month, then the focus on shape for self-evaluation is likely to persist. Such thoughts and interpretations may lead to low mood and repeated shape checking (Shafran *et al.*, 2004), self-criticism or unsuccessful attempts at thought suppression, all of which may also serve to maintain the core psychopathology.

In patients for whom thought–shape fusion appears to be a barrier to changing the core psychopathology, direct techniques for addressing thought–shape fusion directly may be warranted. Such techniques should be incorporated within standard evidence-based interventions (see Wilson & Fairburn, 2002) and would include a personalized in-session demonstration of the phenomenon to show that thoughts and feelings do not necessarily reflect reality. Methods to address other cognitive distortions in eating disorders (such as those identified by Cooper *et al.*, 1997) could also be adapted to address thought–shape fusion.

It is worth re-stating that patients with thought–shape fusion are not delusional.

They are fully aware that their thoughts cannot actually influence their weight; however, they then go on to describe an irrational belief that this does occur.

This study is limited by its reliance on self-report measures of eating disorder psychopathology. It also fails to distinguish between thought-shape fusion in people with anorexia nervosa, bulimia nervosa and atypical eating disorders. This deliberate grouping together of patients with all forms of severe clinical eating disorder is a result of recent 'transdiagnostic' theoretical developments arguing that the different eating disorders share a common psychopathology (Fairburn *et al.*, 2003); therefore, no differential predictions are made for the different diagnostic subgroups. Nevertheless, it may be the case that thought-shape fusion in people who do lose control and experience episodes of binge eating differs from thought-shape fusion in people who never experience such episodes and who are severely underweight.

The clinical significance of thought-shape fusion and other cognitive distortions in eating disorders has yet to be established. It is possible that identifying such distortions can be helpful for the relatively large proportion of patients who fail to respond to current therapies (Wilson & Fairburn, 2002). It is suggested that experimental investigation of the role of thought-shape fusion and other cognitive distortions in the maintenance and treatment of eating disorders is a promising avenue to explore in future work.

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