A cognitive distortion associated with eating disorders: Thought-shape fusion

Roz Shafran*, Bethany A. Teachman, Sean Kerry and S. Rachman

Psychology Department, University of British Columbia, Canada

Objectives. The primary objective of this study was to describe and investigate a cognitive distortion associated with eating psychopathology. This distortion, termed ‘thought-shape fusion’, is said to occur when merely thinking about eating a forbidden food increases the person’s estimate of their shape or weight, elicits a perception of moral wrongdoing and makes the person feel fat.

Design. Two studies were conducted. The first was a psychometric study and the second utilized a within-participants experimental design.

Methods. In Study 1, thought-shape fusion was assessed in a sample of 119 undergraduate students using a questionnaire. In Study 2, 30 students with high thought-shape fusion scores participated in an experiment designed to elicit the distortion.

Results. Thought-shape fusion was found to be significantly associated with measures of eating disorder psychopathology. The questionnaire used to measure thought-shape fusion had high internal consistency, a good factor structure accounting for 46.2% of the variance and predictive validity. The results from Study 2 indicated that the distortion can be elicited under experimental conditions, produces negative emotional reactions and prompts the urge to engage in corrective behaviour (e.g. neutralizing/checking). This corrective behaviour promptly reduces the negative reactions.

Conclusion. The results of the two studies indicate that the concept of thought-shape fusion is coherent, unifactorial and measurable. It is associated with eating disturbance and elicits negative emotional and behavioural responses.

Cognitive distortions have been identified in a range of psychopathology, including depression, (Beck, 1976), panic (Clark, 1986), hypochondriasis (Warwick, Clark, Cobb & Salkovskis, 1996), eating disorders (Garner & Bemis, 1982) and obsessive-compulsive disorder (Freeston, Rhéaume & Ladouceur, 1996; Salkovskis, 1985; Shafran, Thordarson & Rachman, 1996). Cognitive distortions are said to occur if the thinking is consistent, non-veridical and skewed (Rachman & Shafran, 1998);

* Requests for reprints should be addressed to Roz Shafran, Oxford University, Department of Psychiatry, Warneford Hospital, Oxford OX3 7JX, UK.
Parts of this paper were presented at the 3rd London Conference on Eating Disorders (1996) and the 31st Annual AABT Convention (1997).
they often serve to maintain dysfunctional behaviour. For example, there is good evidence that episodes of panic are maintained by the patient engaging in the skewed misinterpretation of bodily sensations (Clark et al., 1997). Ultimately, eliminating the cognitive distortion should lead to a reduction in the psychopathology; however, it is first necessary to identify the specific cognitive distortions that are playing a part in the maintenance of psychopathology. A cognitive distortion is assumed to play a role in a disorder if: (1) it is associated with the psychopathology of the disorder; (2) experimental manipulation of the distortion results in the predicted effects on psychopathology; and (3) the reduction/elimination of the distortion is followed by a reduction/elimination of the abnormal behaviour or experience.

Work on cognitive distortions in obsessive-compulsive disorder (OCD) has lead to the identification of a distortion termed ‘thought-action fusion’ (TAF; Rachman, 1993; Rachman, Shafran, Mitchell, Trant & Teachman, 1996; Shafran et al., 1996). This distortion comprises two components: (1) the belief that having a negative thought increases the likelihood that the feared event will occur (likelihood TAF); and (2) the belief that having a negative thought is the moral equivalent to carrying out the negative action (moral TAF). In a series of studies, it has been shown that TAF is (a) related to obsessive-compulsive psychopathology (Shafran et al., 1996), and (b) that eliciting TAF experimentally leads to the predicted effects on psychopathology (Rachman et al., 1996).

There is clinical and psychometric evidence that people with eating disorders have a variety of cognitive distortions (Cooper, Cohen-Tovée, Todd, Wells & Tovée, 1997; Garner & Bemis, 1982; Mizes, 1992). Based on this, we hypothesized that a comparable (but not identical) type of cognitive distortion to TAF may be implicated in eating disorder psychopathology. We assumed that thought-shape fusion (TSF) has at least three components. First, the belief that just thinking about eating a forbidden food makes it likely that the person has gained weight/changed shape (likelihood TSF). Second, the belief that thinking about eating a forbidden food is almost as morally wrong as actually eating a forbidden food (moral TSF) and third, the belief that thinking about eating a forbidden food makes the person feel fat (feeling TSF). Like its counterpart (i.e. TAF), we hypothesized that people with this distortion know rationally that thinking about eating a forbidden food cannot actually create weight gain or shape change, but that they nevertheless feel this to be the case on an emotional level. Moreover, we considered that TSF was likely to be associated with a range of other cognitive distortions (e.g. the belief that 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 behaviour (e.g. that thinking about gaining weight can elicit the urge to check that clothes are not fitting more tightly).

A preliminary study of 70 undergraduate students indicated that such distortions do occur and are positively correlated with eating disorder psychopathology. Encouraged by the results of this preliminary study we developed a more detailed questionnaire to assess TSF, and predicted that: (1) TSF is associated with the psychopathology of eating disorders; and (2) that eliciting TSF in an experimental situation would lead to predicted psychological effects. These hypotheses were examined in two separate studies.
STUDY 1

Method

The purpose of Study 1 was to investigate the construct and measurement of TSF and to determine its association with eating disorder psychopathology, obsessional compulsive problems and depression.

Sample

Participants were 119 undergraduate students who took part in exchange for course credit. The mean age of the sample was 20.7 years (SD = 4.3) and 77% were female.

Measures

TSF questionnaire. This questionnaire contained 33 items that covered the three domains (likelihood, moral and feeling components) which we assumed to comprise TSF. Participants were asked to 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’, ‘For me, just thinking about not exercising for a month is almost as wrong as actually not exercising’ and ‘I feel fatter if I just think about “pigging out”’. We also included some items to assess associated cognitions (e.g. ‘If I choose to eat cake it is more unacceptable than if it is served to me at a friend’s house’; ‘If I eat fried food, I will gain far more weight than if a friend eats fried food’) and associated behaviour (e.g. ‘Just thinking about not exercising for a month makes me want to cut down on what I eat’).

The eating disorders examination—questionnaire version (Fairburn & Beglin, 1994). This questionnaire is based on the Eating Disorders Examination (Cooper & Fairburn, 1987) and comprises four subscales: restraint, eating concerns, weight concerns and shape concerns. It rates beliefs and behaviour for the previous 4 weeks, and most questions require either a severity or frequency rating.

TAF scale (Shafran et al., 1996). This 19-item scale comprises a subscale of likelihood TAF (e.g. ‘If I think of a relative/friend falling ill this increases the risk that he/she will fall ill’) and moral TAF (e.g. ‘When I think unkindly about a friend, it is almost as disloyal as doing an unkind act’). Items are rated on a 5-point scale ranging from 0 ‘disagree strongly’ to 4 ‘Agree strongly’. Within the TAF likelihood scale some items relate to TAF for oneself, and others relate to TAF for other people.

Maudsley Obsessional Compulsive Inventory (MOCI; Hodgson & Rachman, 1977; Sternberger & Burns, 1990). This 30-item scale requires a true/false response and assesses obsessive-compulsive checking, cleaning, doubting and slowness.

Beck Depression Inventory (BDI; Beck, Rush, Shaw & Emery, 1979). This 21-item scale assesses symptoms of depression and each item is rated on a scale from 0 to 3.

All participants completed the questionnaires and returned them in exchange for course credit.

Results

Descriptives

The means and standard deviations for the scale are shown in Table 1. The responses are typical of a student population indicating non-clinical scores on all the measures. The precise N varies as some students omitted items.

Factor structure

A principal components analysis with varimax rotation to extract the three putative factors was conducted on the 33-items of the TSF questionnaire, but the analysis
Table 1. Descriptive statistics for the measures used in Studies 1 and 2

<table>
<thead>
<tr>
<th>Measure</th>
<th>Study 1</th>
<th>Study 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>Mean (SD)</td>
</tr>
<tr>
<td>Thought-shape fusion total</td>
<td>115</td>
<td>16.4 (18.74)</td>
</tr>
<tr>
<td>EDEQ-4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Restraint:</td>
<td>118</td>
<td>1.08 (1.32)</td>
</tr>
<tr>
<td>Eating concerns</td>
<td>109</td>
<td>.84 (1.05)</td>
</tr>
<tr>
<td>Weight concerns</td>
<td>116</td>
<td>1.69 (1.42)</td>
</tr>
<tr>
<td>Shape concerns</td>
<td>116</td>
<td>2.23 (1.62)</td>
</tr>
<tr>
<td>Thought-action fusion total</td>
<td>114</td>
<td>24.56 (13.66)</td>
</tr>
<tr>
<td>TAF moral</td>
<td>119</td>
<td>18.88 (10.4)</td>
</tr>
<tr>
<td>TAF likelihood (others)</td>
<td>118</td>
<td>2.86 (3.14)</td>
</tr>
<tr>
<td>Maudsley Obsessional</td>
<td>118</td>
<td>8.95 (5.52)</td>
</tr>
<tr>
<td>Compulsive Inventory</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beck Depression Inventory</td>
<td>118</td>
<td>10.5 (9.16)</td>
</tr>
</tbody>
</table>

revealed that the best solution was a one-factor solution accounting for 46% of the variance. The three subscales (likelihood, moral, feeling) did not separate into separate factors. (As the analysis yielded one main factor, subsequent analyses were completed by using the total TSF score). The scale had high internal consistency (α = .96) indicating a large degree of overlap amongst the items on the scale.

Correlational analyses

Spearman’s correlations were conducted to investigate the relationships among the different measures. A significant association was found between TSF and all subscales on the EDE-Q (r = .51 with the restraint subscale, r = .58 with the eating concerns subscale, r = .57 with the weight concerns subscale and r = .54 with the shape concerns subscale; r = .61 between total on TSF and EDE-Q total; all p < .001). TSF was also significantly associated with total TAF (r = .323, p < .01) and BDI (r = .252, p < .01) but not with the MOCI (r = .189, p > .01). The correlations amongst TSF and EDE-Q subscales remained significant when partialling out the effects of depression and obsessionality (all r > .47, p < .001).

Discussion of Study 1

This study fulfilled the first criterion in investigating the role of cognitive distortions in psychopathology, namely that TSF is a coherent and measurable construct; moreover there is an association between the TSF distortion and eating disturbance. The strength of the association was remarkably strong (r = .61, p < .001) and it was not mediated by depression or obsessionality. There are several explanations for this association. It is possible that the distortion increases eating disorder
psychopathology, e.g. by increasing preoccupation with food, shape and weight. Alternatively, people with high levels of shape and weight concerns may be more likely to experience this distortion.

The next study was designed to answer three specific questions. First, can the distortion be made explicit in an experimental laboratory setting? Second, what behaviour is associated with the distortion? Third, does the questionnaire have predictive validity?

STUDY 2: AN EXPERIMENTAL INVESTIGATION OF TSF

The aim of this study was to elucidate the role of TSF in eating disorder psychopathology and to answer the questions described above. Based on our previous work on TAF (Rachman et al., 1996), it was hypothesized that the distortion can be made explicit in a laboratory setting by asking people who report this distortion in the questionnaire to write a sentence about eating a forbidden food and then to imagine themselves eating the forbidden food to the point that it is aversive.

Predictions

The following predictions were made:

1. The experimental procedure will elicit the distortion and hence lead to:
   (a) participants estimating that it is likely that they had gained weight or changed shape solely from thinking about eating the forbidden food;
   (b) participants reporting a feeling of moral wrongdoing after thinking about eating the forbidden food;
   (c) participants reporting feeling fatter after thinking about eating the forbidden food.

2. The experimental procedure will elicit (a) anxiety, (b) guilt and (c) the urge to perform some corrective behaviour (e.g. checking in the mirror or having a ‘corrective image’ such as imagining themselves to be eating celery or writing a sentence that they are eating carrots).

3. Following performance of corrective behaviour, the effects of the experimental procedure will diminish (i.e. participants’ estimates of the likelihood that they had gained weight from thinking about eating fattening food/writing the sentence will decrease, as will feelings of moral wrongdoing and feelings of fatness).

In addition, we predicted that questionnaire responses to TSF would predict the effect of the experimental procedure. We also expected that people with TSF will show the same pattern of associations within their questionnaire responses as in the previous study.

Method

Participants

Thirty undergraduate students who endorsed significant levels of at least one of the three components of TSF on a brief screening questionnaire completed this study in exchange for course credit. None of this sample participated in the previous study. The mean age of the sample was 21.3 years (SD = 5.3) and 87% were female.
Measures

The measures used were the same as in Study 1.

Procedure

Participants completed the battery of questionnaires and were also asked to report their current weight, how fat they currently felt, and the type of food they consider to be extremely fattening to eat. After completing the questionnaires, the participants were given some relaxation training until their anxiety was 30 points or less on a verbal analogue scale (where ‘0’ corresponds to ‘not at all’ and ‘100’ corresponds to extremely high). Their baseline rating of current feelings guilt were also assessed. The participants were asked to think of a food that they considered to be extremely fattening, and that would be likely to make them gain weight if they ate it. After they had thought of such a food (or combination of foods), they were asked to complete the following sentence: ‘I am eating ______’, filling in the name of the fattening food(s) in the blank. The purpose of this was to help the participant conjure up an image of themselves eating the forbidden food. They were asked to think about eating the food and to think about eating large quantities of it so that it was unpleasant for them. They were asked to keep on thinking about this image until their feelings of anxiety were at least 20 points higher than baseline. Three participants whose anxiety did not increase by 20 points were excluded as were seven participants who did not experience the TSF distortion (despite high scores on the TSF questionnaires) because their data could not be used to test the experimental predictions. Four participants had elevated scores on the BDI and were excluded from the study for ethical reasons.

Using verbal analogue scales, ratings were then taken of current anxiety, guilt, feelings of fatness and estimates of actual weight. They were asked to estimate the likelihood that they had gained weight/changed shape solely from the experimental procedure (i.e. thinking about eating the forbidden food and writing the sentence), and how much fatter they felt solely from the experimental procedure. They were also asked how much control they thought they had over whether they ate their forbidden food in the next 24 hours, how morally unacceptable they thought it was to have engaged in the experimental procedure, the strength of the urge to reduce or cancel the effects of writing the sentence, and the strength of the urge to check that they hadn’t actually gained weight. The ratings were prefaced with the statement that ‘I want to understand what you think about these questions, even though your thoughts may seem senseless to you. In other words, I want to know what you think on an emotional level, so please listen to the irrational voice in the back of your head, and not just the rational voice’.

The participants could then choose whether to engage in 2 minutes of either ‘corrective behaviour’ (akin to neutralizing) or checking whether they had gained weight. The experimenter left the room if participants chose to check in order to allow privacy; the precise nature of the checking was then determined when the experimenter re-entered. All the TSF ratings of anxiety etc. were again taken after the checking/neutralizing behaviour. At the end of the experiment, participants were given relaxation training until their anxiety was less than 30/100 on a verbal analogue scale and they were then debriefed.

Results

This sample was selected for high scores on the TSF. Compared to the unselected sample of students in Study 1, the TSF group recorded elevated levels of obsessive compulsive problems and depression, which were both in the clinically significant range. The means and standard deviations of the questionnaire scores are shown in Table 1. Many of the specific predictions for the experiment were confirmed.

Prediction 1. (a) Participants will report that it is likely that they had gained weight or changed shape solely from thinking about eating the forbidden food; (b) they will report a feeling of moral wrongdoing and (c) report feeling fatter after thinking about eating the forbidden food. Twenty-
six of the 30 participants (87%) reported that they believed the procedure had caused some weight gain or shape change; the mean estimate of the likelihood that the experimental procedure had caused weight gain or shape change was 27.83% (SD = 19.8). Of the 30 participants, 24 (80%) reported feeling that it was morally unacceptable to have thought about eating the forbidden food or to have written the sentence; the mean estimate of the moral unacceptability of the experimental procedure was 34.2% (SD = 28.04). In response to the question ‘how much fatter do you feel’, all participants reported feeling fatter, and the mean score was 51.04% (SD = 21.82; N = 24) indicating that the participants felt approximately 50% fatter than before they had thought about eating the forbidden food/written the sentence. In summary, predictions 1(a), 1(b) and 1(c) were fulfilled.

Prediction 2. The experimental procedure will elicit (a) anxiety, (b) guilt and (c) the urge to perform some corrective behaviour. Anxiety increased significantly from 17.00 (SD = 10.39) to 60.00 (SD = 20.68) following the experimental procedure (paired t-test: t(29) = 11.13, p < .001). Feelings of guilt increased significantly from 17.67 (SD = 22.77) to 57.33 (SD = 24.06) (t(29) = 7.25, p < .001). The experimental procedure elicited an urge to check weight and shape of 24% (SD = 23.4) and an urge to perform a corrective behaviour of 41.67% (SD = 32.12).

Prediction 3. Following the performance of corrective behaviour, the effects of the experimental procedure will diminish. Two-thirds of the participants chose to ‘neutralize’ the effects of the experiment by engaging in a ‘corrective’ behaviour. Such behaviour included crossing out the sentence, imagining themselves exercising, having an image of eating celery etc. The other third chose to check in the mirror. All participants were given a maximum of 2 minutes to perform their corrective behaviour. The corrective behaviour significantly reduced all the experimental variables (p < .01) except for the feeling of moral wrongdoing (t = 2.28, p = .03). There were no significant differences in the effects of neutralizing compared to checking, except that performing the neutralizing behaviour was (unsurprisingly) significantly more effective in reducing the urge to neutralize than checking (t(28) = 2.4, p < .05). There was a trend for neutralizing to be better than checking at reducing anxiety, guilt and feelings of fatness but these differences did not reach significance (p > .05) (Table 2). In order to rule out the effects of a spontaneous decline in these feelings, future experiments should include a placebo attention control.

In addition, we predicted that questionnaire responses to TSF would be associated with estimates of the likelihood of weight gain/shape change from thinking about eating forbidden food/writing the sentence, and also with the feelings of moral unacceptability and fatness elicited by the procedure. We also expected that people with TSF would show the same pattern of associations within their questionnaire responses as in Study 1.

Significant positive Spearman’s correlations were found between the total score on the TSF scale and (a) estimates of likelihood that the experimental task had caused weight gain/shape change (r = .44, p < .05) and (b) the urge to neutralize (r = .375,

1 Data from the first six participants were excluded after the wording of this item changed.
Table 2. Percentage change after neutralization or checking

<table>
<thead>
<tr>
<th></th>
<th>Post-experiment (before neutralization/checking)</th>
<th>Immediately after neutralization/checking</th>
<th>t (d.f.)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Likelihood of weight gain/shape change</td>
<td>27.83</td>
<td>18.17</td>
<td>3.24 (29)</td>
</tr>
<tr>
<td>Moral wrongdoing</td>
<td>34.17</td>
<td>26.17</td>
<td>2.28 (29)*</td>
</tr>
<tr>
<td>Reported increase in feelings of fatness</td>
<td>51.04</td>
<td>26.88</td>
<td>3.98 (23)</td>
</tr>
<tr>
<td>Anxiety</td>
<td>60.00</td>
<td>25.67</td>
<td>8.57 (29)</td>
</tr>
<tr>
<td>Guilt</td>
<td>57.33</td>
<td>24.67</td>
<td>6.15 (29)</td>
</tr>
<tr>
<td>Urge to neutralize</td>
<td>41.67</td>
<td>16.83</td>
<td>4.40 (29)</td>
</tr>
<tr>
<td>Urge to check</td>
<td>24.00</td>
<td>13.20</td>
<td>2.92 (29)</td>
</tr>
</tbody>
</table>

*All p < .01 unless otherwise stated.

*p = .031.

Scores on the TSF scale were not significantly associated with the other variables assessed in the experimental task (all p > .05). Spearman’s correlations were calculated to investigate the relationships among the different measures, as in Study 1. The findings with respect to the relationship with subscales of the EDE-Q were replicated. A significant association was found between TSF and all subscales on the EDE-Q (r = .46, p < .05 with the restraint subscale; r = .45, p < .05 with the eating concerns subscale; r = .37, p = .05 with the weight concerns subscale and r = .42, p < .05 with the shape concerns subscale). Although TSF was significantly associated neither with total TAF (r = .20, p > .05) nor BDI (r = .185, p > .05), the mean scores of the BDI and TAF were elevated in this sample compared to Study 1 and there was a non-significant association between TSF and MOCI (r = .302, p > .05). The correlations among TSF and EDE-Q of restraint, eating concerns and shape concerns remained significant when partialling out the effects of depression and obsessionality (all r > .41, p < .05), but the correlation between the TSF and weight concerns subscale of the EDE-Q failed to meet significance (r = .33, p > .05).

Discussion of Study 2

In summary, the main results showed that TSF can be made explicit in a laboratory setting. After writing a sentence about eating forbidden food and imagining themselves eating it, people who reported the TSF distortion on a screening questionnaire perceived that it was likely that they had gained weight/changed shape and they had feelings of moral wrongdoing and feelings of fatness; their anxiety and their feelings of guilt also increased. The procedure elicited the urge to check and to neutralize, and performance of such behaviour reduced anxiety. The questionnaire had limited predictive validity in that there was a significant associ-
Thought-shape fusion distortion

The main purpose of this research was to explore the TSF hypotheses, and the results of the specially constructed questionnaire lend support to the occurrence of the phenomenon. The TSF scale did not confirm the existence of the three postulated factors, and the TSF total score was found to have some concurrent and predictive validity, plus the power to identify people who are prone to the TSF distortion. Moreover the TSF scale was, as predicted, significantly associated with eating disorder psychopathology which is consistent with the proposal that the cognitive distortion of TSF may play a role in eating disorders.

The evidence of concurrent validity is seen in the significant correlation with the associated cognitive bias known as TAF in the large initial sample. Moreover, the 30 participants in Study 2 selected for the TSF distortion had a total TAF score of 43.13 which is significantly larger than the TAF mean of 24.6 in the unselected participants in Study 1. The evidence for predictive validity is seen in the successful selection of TSF responders in the experiment of Study 2 and specifically, the successes in using TSF to predict behavioural and subjective experimental changes.

The concepts of TSF and TAF are related but separable. TSF includes a perceptual distortion whereas TAF is a conceptual bias but there is overlap between them; their exact relationship remains to be determined. In Study 1 they were significantly correlated and in Study 2 the questionnaire designed to identify TSF participants also picked up a highly elevated TAF. Both TSF and TAF are readily evoked in experimental conditions, give rise to comparable negative emotional reactions, and to similar corrective urges and neutralization. However, there are at least two important differences between the TAF and TSF. The first difference is that TAF consists of two components, whereas the new concept of TSF has a coherent, unifactorial structure. On reflection it is not surprising that TSF is unifactorial. It is to be expected that someone who fears weight gain and who considers her thoughts about food to have some effect in the real world, is also likely to feel fatter after experiencing thoughts about eating forbidden foods and to find such thoughts unacceptable. Similarly, the feeling of fatness and thoughts about weight gain/shape change are closely aligned. All three putative factors are psychologically interconnected and it is possible that the questionnaire is also picking up the broader concepts of shape concern and fear of fatness. The second difference between TAF and TSF is their real world effects. There is no realistic connection between the thought and the action in the TAF bias. In TSF, the connection between the thought and its effects on perceived shape, feelings of fatness and wrongdoing are realistically connected if the person responds to their thoughts by actually eating the forbidden food. Eating the food will evoke feelings of fatness and concerns about weight gain, shape and change. If thinking about the forbidden food and eating the forbidden food regularly co-occur, then just thinking about eating a forbidden food will be
associated with the feelings of fatness. Indeed, one participant stated that the sensations she experienced when thinking about eating the forbidden food were similar to those she had when actually eating it; she felt that thinking about eating the forbidden food and actually eating the forbidden food had similar consequences and required similar compensatory behaviour (i.e. prolonging her workout).

TSF may be only one example of a general tendency to interpret thoughts (about eating) as carrying excessive personal significance (Rachman, 1997; Salkovskis, 1985). For example, people who overvalue the importance of shape and weight may interpret thinking about eating forbidden foods as meaning ‘I’m not perfect/I’m out of control/I lack self-discipline/I’m a pig’. Such interpretations may lower mood and contribute to the breaking of dietary restraint with its associated behaviour (e.g. checking the body for signs of weight gain). Some participants reported an urge to exercise after the study.

The role of checking behaviour/neutralizing in the maintenance of TSF is interesting. The sample size was too small to determine differences between these methods but it is not surprising that the majority of the sample (two-thirds) chose a cognitive method (neutralizing) to deal with a cognitive distortion (TSF) as opposed to a behavioural method (checking). Examples of neutralizing behaviour include crossing out the original sentence and writing: ‘I am eating a well-balanced diet’, ‘I am not eating chocolate; I am drinking water’, ‘I am eating veggies’, ‘I am eating my normal lunch’, ‘I am eating low-fat pizza with low-fat cheese and no meat’. One participant chose to imagine herself exercising and another chose to imagine that she was vomiting. The potential implications of neutralizing remain to be investigated. It could be argued that engaging in neutralizing serves to maintain the distortion because participants never learn that their thoughts are meaningless; they continue to notice them and therefore feel fatter etc., when they occur. Alternatively, if participants feel less anxious after engaging in such mental neutralizing, perhaps it could be utilized in a therapeutic capacity. For example, imagining oneself exercising could be used as an interim measure to enable patients to reduce their actual exercise. For patients who are at low weight, this may enable weight restoration to advance and reduce the effects of starvation which are suggested to maintain dysfunctional beliefs and behaviour (Vitousek & Ewald, 1993).

It has been hypothesized that checking behaviour serves to maintain body image distortions and may be important in the maintenance of anorexia nervosa (Fairburn, Shafran & Cooper, 1999; Rosen, 1996) and identifying a cognitive distortion that elicits the checking behaviour is of clinical utility. Challenging the distortion using traditional cognitive methods may reduce the checking behaviour, which in turn will decrease the distortion in body image. It remains open to empirical investigation whether neutralizing behaviour serves the same (dys)function as checking behaviour.

In addition to maladaptive checking behaviour, we suggest that the distortion of TSF will lead to certain maladaptive cognitive strategies. In particular, the person who believes that thoughts have an influence on weight/shape is likely to engage in avoidance of such thoughts. It is possible that such thought-suppression leads to a rebound of such thoughts, based on the work of Wegner, Schneider, Carter & White (1987), although a recent study using dieters failed to show this predicted effect (Harnen, McNally & Jimerson, 1997).
Identifying TSF in clients with eating disorders has clinical implications. First, TSF may add to distress and to negative self-evaluations. Second, it may elicit checking behaviour which maintains body image distortion, and hence challenging TSF may serve to reduce checking behaviour. Third, if people with TSF are engaging in thought suppression, then strategies such as exposure to thoughts would need to be introduced. Fourth, if it is hypothesized that TSF is a cue associated with the breaking of dietary restraint, then there are likely to be other internally generated cues to breaking of dietary restraint such as ‘feeling fat’ related to menstrual stage, feelings of fullness associated with delayed gastric emptying, etc.

These studies have a number of limitations. First, participants were selected on the basis that they believed in at least one of the three postulated components of TSF. It remains possible that participants who do not report the distortion would respond similarly in the experiment. Some evidence against this is students (N = 10) who endorsed TSF on the screening form but actually had low scores on the TSF questionnaire. These participants did not respond to the experimental procedure with anxiety or an urge to perform corrective or checking behaviour; they were therefore excluded from continuing because the experimental predictions do not apply to people who are free of the distortion. Second, we did not assess body image distortion specifically. The inclusion for such a measure would address the question of the association between TSF and body image distortion. Third, we are unsure which part of the experimental procedure is primarily responsible for activating the TSF distortion—it could be that writing the sentence is critical, thinking about image is the key element or else thinking about bingeing/losing control is fundamental to eliciting the distortion; refinement of the methodology is needed. Fourth, we did not include a placebo attention control when testing the validity of Prediction 3, pertaining to the effects of corrective behaviour. Such a control is needed to rule out the effects of a spontaneous decline in these feelings and experiments may be along the lines of previous studies of neutralization of TAF (Rachman et al., 1996). Fifth, we were not able to diagnose participants with an eating disorder because we were assessing eating disorder psychopathology using a questionnaire. Inclusion of a standardized assessment measure such as the Eating Disorders Examination (interview version; Fairburn & Cooper, 1993) would facilitate a comparison between women with a clinical eating disorder vs. subclinical population.

We are not suggesting that everyone with weight and shape concerns will experience this cognitive distortion and our data indicate that there are far more people with weight/shape concerns than with TSF: not everyone with an eating disorder will show this distortion. However, the prevalence of this distortion in a student population and the strength of its association with eating disorder psychopathology in two separate studies indicates that it is worthy of further investigation in a clinical population and that awareness of this cognitive distortion may have therapeutic implications. It is possible that patients with bulimia nervosa binge in response to the triggering of this cognitive distortion whereas patients with anorexia nervosa increase dietary restraint in response to the effects of TSF.

In summary, we believe that we have identified a cognitive distortion that may play some part in the maintenance of eating disorder psychopathology. The precise
nature of that role and the clinical implications of the distortion warrant further investigation.

Acknowledgements

The authors are grateful to Dave Hammond for his help in preparing the manuscript for publication.

References


Received 22 June 1998; revised version received 12 January 1999