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FATTENING THOUGHTS. “THOUGHT-SHAPE FUSION” AND EATING DISORDERS¹

ABSTRACT

Psychiatric disorders are characterized by a range of specific cognitive distortions. One of the most interesting cognitive phenomena is *Thought-Shape Fusion*, which occurs when thinking about eating certain types of food increases a person's estimate of their shape and/or weight, elicits a perception of moral wrongdoing, and/or makes the person feel fat. TSF can be induced experimentally in healthy volunteers, but it is especially associated with eating pathology. It may be that thought-shape fusion is both a direct expression of the core psychopathology and also serves to maintain it. In patients for whom thought-shape fusion appears to be a barrier to changing the core psychopathology, direct techniques for addressing thought-shape fusion may be very useful.

Keywords: Thought-Shape Fusion, anorexia nervosa, bulimia nervosa

1. INTRODUCTION

Psychiatric disorders are characterized by a range of specific cognitive distortions that are consistent and not subject to spontaneous verification. They may contribute greatly to the persistence of the disorder. Some of these types of distortions have been described in detail in the source literature and scientifically reviewed, in particular the catastrophic misinterpretation of bodily sensations in panic disorder (Clark, 1986), the thinking errors in depression (Beck, 1995), the inflation of responsibility in obsessive-compulsive disorder (Salkovskis et al., 2000) or distorted cognitions or beliefs regarding shape and weight in people with eating disorders (Bonifazi, Crowther, & Mizes, 2000); Cooper, Cohen-Tovée, Todd, Wells, & Tovée, 1997; Cooper & Fairburn, 1992; Williamson, Muller, Reas, & Thaw, 1999; Williamson, White, York-Crowe, & Stewart, 2004).

¹ This article was originally published in Polish as Starzomska, M., Brytek-Matera, A. (2012). Myśli, które tuczą. „Fuzja myśl-kształt” w zaburzeniach jedzenia. *Studia Psychologica*, 12(2), 5-21. The translation of the article into English was financed by the Ministry of Science and Higher Education of the Republic of Poland as part of the activities promoting science - Decision No. 676/P-DUN/2019 of 2 April 2019. Translation made by GROJ Translations.

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2. HISTORY OF ORIGIN AND DEFINITION OF THE TERM “THOUGHT-SHAPE FUSION”

The term *Thought-Shape Fusion* (TSF) first introduced by Roza Shafran, Teachman, Kerry, and Rachman (1999) is a variation of the concept of Thought-Action Fusion (TAF), proposed by Shafran, Thordarson, and Rachman (1996; cf. Berle & Starcevic, 2005; Einstein & Menzies, 2004). The latter term was used by researchers to name a specific cognitive distortion that occurs in people with obsessive-compulsive disorders. This distortion is the belief that the intrusive, negative thoughts that appear in a person may have a driving force, that is, they can directly influence the relevant event and/or the belief that the appearance of those thoughts is morally equivalent to performing actions that would constitute the actual implementation of those thoughts (Shafran & Robinson, 2004). Thus, TAF consists of two components. The first one refers to the belief that experiencing a negative thought increases the probability that the relevant event will actually take place. This component is called *Likelihood Thought-Action Fusion* (Likelihood TAF). The second variant of Thought-Action Fusion, which is referred to as *Moral Thought-Action Fusion* (Moral TAF) describes the belief that the experiencing of a negative thought is morally equivalent to actually carrying out the negative action (Grim, 2009). For instance, if a patient with an obsessive-compulsive disorder has an intrusive thought that their relative has been injured in an accident, they are fully convinced that having this thought increases the chances that such an accident (involving a relative) will happen soon (Shafran & Robinson, 2004).

Shafran and colleagues (1996) created a questionnaire consisting of 19 items to measure the TAF, whereby the participant is asked to assess to what extent he or she agrees with the given statement. This assessment is made possible by a 5-point scale (from “0” – *I don't agree at all* to “5” – *I fully agree*). The questionnaire includes two subscales: the first one entitled Likelihood Thought-Action Fusion (examples of items include: “My thinking that my relative/friend is sick increases the risk of them actually getting sick”) and the second one entitled Moral Thought-Action Fusion (item example: “When I think of my friend, it's almost as disloyal as if I were unfriendly to them”). The study conducted by Shafran and colleagues (1996) showed that in some individuals, TAF can contribute significantly to obsessive-compulsive disorders by making them feel responsible for their thoughts.

As mentioned above, studies by Shafran and colleagues (1999) have shown that some people may have a cognitive distortion similar to Thought-Action Fusion, which the researchers described as Thought-Shape Fusion and defined it as a person's belief that just thinking about food makes them gain weight. Whereas, as stated above, the TAF consists of two components, there are three components in TSF (Shafran & Robinson, 2004):

(1) The first component is called *Likelihood Thought-Shape Fusion* (Likelihood TSF). It refers to the belief that the appearance of thoughts about eating “forbidden” food (i.e., food containing large amounts of sugar and/or fat, high-calorie foods) increases the likelihood of weight gain or shape change. A person with this form of TSF knows rationally that thinking about eating a high-calorie food cannot create weight gain or shape change, *however, they still have concerns and start to believe against the laws of logic that this is possible.*

(2) The second component called *Moral Thought-Shape Fusion* (Moral TSF), prevails in people who are convinced that experiencing thoughts about eating “forbidden” food (in their opinion) is as morally unacceptable as actual consumption of that food.

(3) The third component of the TSF – *Feeling Thought-Shape Fusion* (Feeling TSF) occurs in people whose thoughts about eating “forbidden” food intensify their negative feeling of being obese.

Roza Shafran and Paul Robinson (2004) propose to translate the described components into the words of a person with a TSF: “When I think about overeating or eating forbidden foods, then – I think my body weight may increase / I think I am immoral / I feel fatter” (p. 400).

3. FIRST STUDIES ON TSF

Preliminary studies on TSF have produced highly promising results. A self-report questionnaire (Shafran et al., 1999) was developed to study the TSF, which is an extended version of the working draft questionnaire applied to a group of 70 students. This questionnaire includes 33 items concerning the three TSF components described above. The participants were asked to answer to what extent they agree with a given statement (“0” – *not at all* – “4” – *totally*). Examples of items include: “Just picturing myself gaining weight can really make me gain weight” (Likelihood Thought-Shape Fusion); “For me, just thinking about stopping exercising for a month is almost as bad as if I didn’t really exercise” (Moral Thought-Shape Fusion); “I feel fatter just by thinking about overeating” (Feeling Thought-Shape Fusion). The questionnaire also included items on TSF-related cognitive structures (e.g., “When I eat a fried dish, my body weight will increase much more than that of my friend who ate the same dish”) and behaviours (e.g., “Just thinking about giving up exercise for a month makes me want to eat less”). The psychometric properties of the questionnaire were checked by conducting studies on 119 students with an average age of 20.7 years ($SD = 4.3$), 77% of whom were women. Based on the raw results, an analysis of the main components was performed (using the varimax rotation method on 33 items of the questionnaire) in order to identify three factors corresponding to the three TSF components. The analysis showed that only one factor is responsible for 46% of the variation. Thus, three factors corresponding to the three subscales of the questionnaire (Likelihood, Morality and Feeling) could not be identified. For this reason, the authors (Shafran et al., 1999) decided that one overall result of the TSF will be taken into account in further studies. Further analysis of the raw results showed that the scale is characterized by high internal consistency (which means a high degree of similarity of the results obtained by the participant) for its individual items. The results of the correlation analysis showed a statistically significant moderate (within $.51 < r < .61$, $p < .001$) relationship between TSF and all subscales Eating Disorder Examination – Questionnaire (EDE-Q – questionnaire version¹; Fairburn & Beglin, 1994). Furthermore, the analyses

¹ It is a reliable and accurate tool. It applies to the examination of a person’s state within over the preceding 28 days. It comprises 36 items that include behavioural and attitude-related aspects of eating disorders, which are part of the following four subscales: eating restrictions, eating concern, weight concern and body shape concern. The task of the participant is to mark on a 7-point Likert scale the appropriate response (related to the frequency of a given behaviour).

revealed a statistically significant, though weak relationship ($r = .323, p < .01$) between TSF and TAF (Shafran et al., 1996). However, the correlation analyses did not prove a correlation between the results on Maudsley Obsessional Compulsive Inventory (MOCI²; Hodgson & Rachman, 1977). The results of the statistical analysis also showed that the correlations between the results obtained in the subscales of the TSF questionnaire and the EDE-Q remained significant even when variables such as depression (measured with the Beck Depression Inventory test [BDI], which examines characteristic attitudes and symptoms of depression [Beck, Ward, Mendelson, Mock, & Erbaugh, 1961]) and obsessiveness (investigated with the MOCI questionnaire) were controlled.

In the same project, after the strictly psychometric study described above, the authors (Shafran et al., 1999) conducted an experimental investigation to determine the role of TSF in the psychopathology of eating disorders and to answer the following questions:

- (1) Can a cognitive distortion of the TSF type be elicited under laboratory conditions?
- (2) What kind of behaviour may be associated with this distortion?
- (3) Does the questionnaire for TSF investigation have a satisfactory predictive accuracy?

Based on the paradigm used for obsessive-compulsive disorder in Rachman, Shafran, Mitchell, Trant, and Teachman (1996) studies, it was initially assumed that a cognitive disorder can be elicited under experimental conditions, which was achieved by asking participants experiencing this disorder to write a sentence about eating “forbidden” food and imagining that they are eating it until the aversion occurs. The following three hypotheses have been advanced:

(1) First of all, the experimental procedure described above will cause participants to admit that their weight gain or unfavourable change of body shape may be the result of thinking about eating “forbidden” food. Furthermore, they will admit that they feel they have behaved immorally by thinking about eating the “forbidden” food. Besides, the participants will state that thinking about eating “forbidden” food makes them feel more obese;

(2) Second, the experimental procedure (described above) will evoke: anxiety, guilt and the desire for so-called corrective behaviour (e.g., looking in the mirror or bringing back the “right image” by imagining eating celery or writing about eating a carrot);

(3) Third, as a result of a certain corrective behaviour, the influence of the experimental procedure will be minimized, which will mean that the participants will be less likely to think/write that their body weight will increase as a result of thinking about eating high-calorie food, as well as to experience less feelings about the morally reprehensible act (which is eating) and about being an obese person.

Additionally, it was predicted that the results within the TSF scale will be prognostic for the effects of the experimental procedure, namely experimental manipulation will cause significant changes in the results obtained by the measurement with this tool (it was a hypothesis concerning the prognostic accuracy of the TSF tool).

In order to verify the above-mentioned research hypotheses, 30 students were examined who, after completing a short screening questionnaire, obtained high scores in at

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least one of the three components of TSF (none of the examined students was a participant in a previously conducted psychometric study). The mean age of participants was 21.3 years ($SD = 5.3$), 87% were women. After completing the same questionnaires used in the previous study (TSF, EDE-Q, TAF, MOCI, and BDI questionnaires), persons were asked to indicate what their current body weight is, how obese they feel and what type of food they consider to be extremely fattening. After completing the questionnaires, the participants were relaxing. This lasted until the level of anxiety (measured using the verbal analogue scale, where “0” corresponds to the *not at all* and “100” corresponds to the *totally*) was 30 points or less. The feeling of guilt was also assessed. The participants were asked to think about food (a single food or a combination of foods) that they considered extremely fattening and which in their opinion would probably cause weight gain. Then they were asked to complete the following sentence: “I am eating...” – here they inserted the names of the fattening food. The purpose of this task was to enable the participants to visualize the consumption of “forbidden” food. Next, they were asked to imagine that they were eating huge amounts of this food until it became very unpleasant. Then the participants were asked to focus their attention on this picture until their feelings of anxiety were at least 20 points higher (on the above described verbal analogue scale) compared to the result at the beginning of the experiment. The following persons were not qualified for further studies: three persons whose level of anxiety did not increase; seven persons whose level of cognitive TSF was not found (despite the high result obtained in the questionnaire measuring TSF); the data of these persons could not be used in investigating experimental predictions, and four persons with elevated BDI scores were not admitted for further studies for ethical reasons.

The level of anxiety, feeling of guilt, feeling of being obese and current body weight was measured using verbal analogue scales in people who were qualified for further studies. Then the participants were asked to assess the probability that their body weight increased as a result of the experimental procedure. The participants informed the investigators about how they perceived their own control over eating “forbidden” foods over the last 24 hours, to what extent they consider their participation in the experiment morally unacceptable, and how strong their desire to reduce the psychological consequences of completing the sentence and the need to check whether they have gained weight as a result of participating in the experiment. Before answering the above-mentioned questions, the participants were asked to read the following introduction: “We would like to understand what you think of these questions, even if you find these thoughts meaningless. In other words, we would like to know what you think about it on an emotional level, so we ask you to listen to the irrational voice in your head, and not just the voice of a rationally thinking person”. The participants could then decide whether they would undertake corrective behaviour (similar to neutralisation) within the next two minutes, or whether they would check for possible weight gain. If they chose the second option, the investigator would leave the room to give them privacy. Therefore, the researcher could only be informed about the process of checking the bodyweight when they returned to the room where the study took place. After the check/neutralisation, the level of anxiety and the feeling of being obese was reassessed. It was determined how the participants assessed the probability of weight gain. Additionally, their feelings of guilt and the feeling of having acted immorally were examined, as well as the intensification of their desire to neutralize and check their

weight. In the end, the participants were relaxing until the level of anxiety was lowered to 30 points on the verbal analogue scale (thus the participants were subjected to so-called debriefing³).

The results of statistical analyses supported the first hypothesis: it turned out that 26 out of 30 participants (87%) admitted that they were convinced that the experiment caused an increase in their body weight or an adverse change in body shape. The average assessment of the probability that the experimental procedure will cause weight gain was 27.83% ($SD = 19.8$). Twenty four (80%) of the 30 participants admitted to feeling that it is morally unacceptable for them to think or write about eating “forbidden” food. The mean assessment of this behaviour as morally unacceptable was 34.2% ($SD = 28.04$). The answers to the question “How obese do you feel?” indicated that all participants felt obese, with a mean score of 51.04% ($SD = 21.8$, $N = 24$ — participants after excluding six persons who changed words in the sentence) showed that the participants felt about 50% more obese following thoughts about eating the “forbidden” food/ writing a sentence with the name(s) of the “forbidden” food than before the experimental manipulation.

The results of statistical analyses also supported the second hypothesis: the level of anxiety significantly increased from 17 ($SD = 10.39$) to 60 ($SD = 20.68$) after the experimental procedure ($t(29) = 11.13$, $p < .001$). The feeling of guilt also increased significantly from 17.67 ($SD = 22.77$) to 57.33 ($SD = 24.06$, $t(29) = 7.25$, $p < .001$). The experimental procedure also caused 24% of participants ($SD = 23.4$) to desire to check body weight and shape, and 41.67% of participants ($SD = 32.12$) to experience corrective behaviour.

The results of statistical analyses also confirmed the third hypothesis: two thirds of the participants chose to minimize the effects of the experiment by engaging in neutralizing behaviour. It included crossing out a sentence, imagining oneself at the moment of physical exercise, or eating celery, etc. One third of the participants chose to check their appearance in the mirror. All participants had two minutes for these activities. It showed that these activities significantly reduced the increased (in the results of the experiment) values of all variables ($p < .01$) except for the feeling of moral wrong-doing. No significant differences were observed in terms of neutralization effects in comparison to checking, except that performing the neutralizing activity was surprisingly more effective in reducing the desire for neutralization than the checking ($t(28) = 2.4$, $p < .05$).

What is more, the prognostic accuracy of the TSF tool has been proven. The result obtained by the participants in the TSF scale proved to be predictive for behavioural and subjective emotional changes after the implementation of the experimental procedure.

4. RESEARCH ON TSF IN EATING DISORDERS

Several years later, Shafran and Robinson (2004) conducted important studies on the prevalence of TSF in people with eating disorders. The authors investigated 42 women whose mean age was 28.6 years ($SD = 9.7$): 10 met the diagnostic criteria for anorexia nervosa, 20 met the criteria for bulimia nervosa and 22 were diagnosed with an atypical eating disorder. The control group also included 42 women with no history of eating disorders, with a mean age of 28.3 years ($SD = 9.1$). All women were measured

³ A method that allows reducing the effects of post-traumatic stress relatively quickly (Taralowska, Florkowski, Wachowska, & Gałecki, 2011).

and weighed. It has been found that two persons from the second group had mental disorders in the past, however, these were not eating disorders. The following tools were used: EDE-Q (Fairburn & Beglin, 1994); Body Checking and Avoidance Questionnaire (BCAQ⁴; Shafran, Fairburn, Robinson, & Lask, 2004); BDI (Beck et al., 1961). Besides, a 34-item TSF questionnaire was used, which was a revised version of the 33-item tool used in the Shafran and colleagues study in 1999. The modification included eliminating items that did not correlate with the overall result or were not part of the main factor. The new version of the questionnaire comprised two sections: the first section (referred to as Concept) comprised 17 items that covered the three domains of the TSF (likelihood, moral and feeling components). These components do not form distinct factors and are analysed together. The participants were to rate their agreement with each statement on a scale from “0” – *not at all* to “4” – *totally*. Example of items includes: “Just picturing myself gaining weight can really make me gain weight”. The second section of the questionnaire (referred to as Interpretation) comprises 17 items regarding the interpretation of thinking about forbidden or fattening (in the opinion of the participants) foods. Example of interpretations includes: “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 were computed separately. Statistical analyses have shown that this revised tool provides high reliability and differentiates well between clinical and non-clinical groups.

The results of Pearson’s correlation analysis revealed that in the clinical group, there is a significant statistical relationship between the results of the two TSF subscales and all subscales on the EDE-Q, and these results remained significant when controlling the level of depression (BDI scores), except for the correlation between the results of the TSF Concept subscale and the results of the EDE-Q Weight concern subscale and the correlation between the results of the TSF Interpretation subscale and the results of the EDE-Q Restraint subscale. Furthermore, the results obtained in both TSF subscales correlated significantly with the results obtained from BCAQ and BDI tools, however, the correlation between the BCAQ and TSF was no longer significant when controlling for *Body Mass Index* (BMI). The correlation analyses did not reveal the association between the TSF Concept and BMI; they revealed a small, yet statistically significant correlation between the TSF Interpretation and BMI, however, it lost its statistical significance when the level of depression was controlled (with the use of the BDI scale). The pattern of intercorrelations for the control group was similar to that of the clinical group, however, in the first group the correlation between the results obtained in the TSF Concept subscale and the results obtained in the BCAQ scale lost its significance when depression was controlled. The associations between the

⁴ This 22-item tool, similarly to EDE-Q, assesses the state of the participant over the preceding 28 days and the frequency of different behaviours related to checking and avoiding confrontation with the body shape, e.g. related to checking and avoiding certain behaviours (e.g. the frequency of weighing). The tool uses a 6-point scales (“0” – *not at all applicable*, “1” – *check less than once a week*, “2” – *check 1–6 times a week*, “3” – *check 1–2 times a day*, “4” – *check 3 or more times a day*, and “5” – *avoid doing so because of possible distress*). The reliability and validity of this questionnaire have been demonstrated in previous research (Shafran, Fairburn, Robinson, & Lask, 2004), including high discriminatory relevance and high internal consistency.

results of TSF Interpretation subscale and those obtained in the Restraint and Shape concern subscales have also lost their significance. It should be added that the results obtained in the two TSF subscale were characterised by high intercorelation both in the clinical group and in the group of mentally healthy people.

Comparisons between the clinical group and the control group indicated that the participants with eating disorders achieve significantly higher results in both subscales of the TSF measurement questionnaire than those in the control group. This result shows that TSF is a cognitive distortion associated with eating disorders. Moreover, in the clinical group, there was a stronger relationship, in comparison with the control group, between the severity of symptoms in the course of eating disorders and the degree of TSF. It is worth noting the interpretation of the authors (Shafran & Robinson, 2004) regarding the lack of statistical significance of the association between the results obtained by participants in both TSF and BCAQ subscales during BDI control and the lack of statistical significance of the association between the results obtained in the Interpretation subscale of the TSF tool and BMI when controlling for depression. In interpreting the first result, the researchers claim that perhaps the urge to check one's own body that arises from TSF is harder to overcome in a state of low mood. While interpreting the second result, the authors believe that a lowered mood can lead to both negative interpretations and breaking the diet. Both of these results indicate a strong association between eating disorder psychopathology and depression. Strong intercorrelation between the results obtained by the participants in both subscales of the TSF tool indicate that they measure a single, more general concept of the importance of thoughts about food, weight and body shape in people with eating disorders. Furthermore, they confirm the important role that these thoughts play for these people. Undoubtedly, there is a similarity between eating disorders and obsessive-compulsive disorders.

Shafran and Robinson (2004) argue that in eating disorders, over the importance of thoughts about food can be considered a direct expression of overvaluation of the importance of food, shape and weight and their control, which is one of the most symptomatic features of the psychopathology of eating disorders. Moreover, the authors emphasize that if TSF is a direct expression of overvaluation of these three aspects of self-assessment and control, a treatment that would successfully address such abnormal evaluation should also reduce the TSF. On the other hand, they underline that TSF can be a direct expression of the psychopathology of eating disorders, but can also be a factor that maintains it, e.g. a person feels obese from just imagining not exercising for a month, then the focus on shape is likely to persist, as this factor is the most important for their self-assessment. Such thoughts and interpretations can lead to a low mood, repeated monitoring of one's body, self-criticism and unsuccessful attempts at suppressing the thoughts, all of which may serve to maintain the psychopathology. Naturally, one cannot exclude the possibility that TSF is at the core of eating disorders, however, according to the knowledge of the authors of the paper, such a hypothesis was not verified and the sources of this phenomenon were not considered. In patients for whom TSF constitutes a barrier to changing the psychopathological picture, direct techniques for mitigating TSF may be highly beneficial. Such techniques should be incorporated into evidence-based interventions. These interventions should also include the possibility of using the TSF phenomenon during therapy sessions to signal/say to

patients that thoughts and feelings do not necessarily reflect reality. It is worth noting that TSF patients are not delusional, they are fully aware that their thoughts cannot influence their weight, however, they admit that their belief still guides their behaviour.

Another study (Jáuregui Lobera et al., 2011), which was based on the assumption that TSF cognitive distortion can be induced using experimentation, aimed to answer the following research questions:

- (1) Can a Thought–Shape Fusion be induced by anxiety?
- (2) If it has a specific relationship with thoughts related to eating fattening foods, can it also be induced in non-clinical groups (analogous to clinical groups)?
- (3) Whether the participants with more adequate strategies for coping with stress will experience a less intense Thought–Shape Fusion than those who showed inadequate coping strategies?
- (4) Can Thought–Shape Fusion influence emotional behaviour (e.g., neutralize feelings that thoughts influence the shape of the body or food)?

Based on these questions, the following research hypotheses have been formulated:

- (1) It was assumed that the effect of inducing TSF would be greater than the effect of inducing anxiety.
- (2) Although patients with eating disorders should have higher levels of TSF than the control group, it is possible to induce TSF also in non-clinical groups.
- (3) It was assumed that participants from both groups with more adequate stress management strategies would experience weaker TSF compared to those with less adequate stress management strategies.
- (4) Hypothesis has been advanced that the participants from both groups, among whom the Thought–Shape Fusion will be induced, will neutralize negative feelings to a greater extent and will eat less than those who were not manipulated by the experiment.

To verify these hypotheses, two 45-person groups were studied: patients with eating disorders and healthy students – volunteers with no history of mental disorders aged 18 to 25 years. Respectively, 92.5% and 86.7% of participants were women. The examined from both groups underwent one of three experimental conditions (15 persons from each group to each condition), namely:

- experimental induction of TSF, in which the participants were asked to think about the food (or foods) they considered to be extremely fattening and to imagine, as clearly as possible, in detail, that they were eating a great amount of that food until the aversion appeared. At that time, they should write one sentence: “I’m eating ...”, inserting the name of the food (foods) they imagined eating. Researchers predicted that such experimental manipulation could cause a TSF distortion leading the participants to estimate as very likely: weight gain or an unfavourable change in body shape solely from thinking about eating fattening food. Moreover, they will feel that they have done something highly immoral solely as a result of thinking about eating “forbidden” food and will feel more obese as a result of just thinking about eating forbidden (in their opinion) food. Researchers also anticipated that this manipulation would cause anxiety, guilt and the urge for corrective behaviours (e.g., checking in the mirror whether they look slim, or imagining themselves to be eating celery or writing a sentence that they are eating carrots);

- experimental induction of anxiety, where the participants were asked to think about a book or film they had recently read/seen. They were then asked to imagine in

detail that they were giving a speech about this book/film to their own therapists or other patients (in the case of students to teachers or other students). The manipulation was to make the participants imagine that they are being evaluated on the quality of their speech. At that time, they should write a sentence: "I'm giving a speech about ...", inserting the name of the book or film;

– control conditions where participants were asked to think about a book or film they read/watch recently. They were then asked to imagine in detail that they were talking about the book or film with a friend. They should then write a sentence: "I'm talking about ...", inserting the name of the book or film.

Then the emotional and behavioural reactions of the participants were measured. Stress management strategies were also evaluated, with mean scores (high vs. low) for concentration on a stress management problem and mean scores (high vs. low) for concentration on emotions, using Coping Strategies Inventory (CSI; Endler & Parker, 1999; as cited in Jáuregui Lobera et al., 2011)⁵. As part of the study, the Visual Analogue Scale (VAS; 100 points) was also used to measure the mood (where "0" means negative mood and "100" means positive mood). The TSF State Questionnaire was also used to measure anxiety, guilt, the likelihood of weight gain, feeling of fatness, and moral wrong-doing as well as the TSF (Shafran & Robinson, 2004). In addition, the researchers used State Trait Anxiety Inventory (STAI), which measures state anxiety (STAI-S) and trait anxiety (STAI-T; Steisdodos, 1982, as cited in Jáuregui Lobera et al., 2011) and BDI (Conde & Franch, 1984, as cited in Jáuregui Lobera et al., 2011). Furthermore, to assess the behavioural effects of TSF induction, the presence or absence of a neutralising TSF effect was estimated by displaying participants a picture of a cake in real size and asking them to evaluate the amount of cake they would like to eat.

The research was conducted individually (for patients, these sessions were conducted during the hours of therapy sessions and for students, private meetings were arranged). Before the experiment, the participants completed the VAS by assessing the mood and CSI. They were then subjected to experimental manipulation under one of the three conditions described above. After the manipulation, the participants completed the TSF State Questionnaire. Then they were presented with a picture of the cake in real size (in the Coelho, Carter, McFarlane, & Polivy paradigm, 2008). The participants chose the amount of cake they would like to eat at that time, and they could determine

⁵ The first part of the test serves to examine eight basic strategies for coping with stress (problem-solving, cognitive restructuring, social support, problem avoidance, wishful thinking, emotional expression, social withdrawal, self-criticism); four secondary ones, constituting appropriate combinations of primary strategies (involvement in concentration on the problem; Avoidance of involvement in concentrating on the problem; involvement in concentrating on emotions, avoidance of involvement in concentrating on emotions) and two tertiary strategies, which constitute appropriate combinations of secondary strategies (involvement or non-involvement in solving the problem) of coping with stress. To measure such aspects of coping with stress, participants are asked to describe in detail the stressful situation. Then, they fill in a 40-item test, which uses a 5-point Likert scale. The task of the participants is to indicate on the scale how often they behave in a specific way in a given situation. The test ends with an item that deals with the participant's perception of their own effectiveness in coping with stress (the question: "To what extent have you handled the situation adequately?" – *not at all, to a small extent, good, very good, great*).

the amount of this cake in grams. At that time, participants had the opportunity to neutralize or negate the effects of the sentence they had written previously by crossing it out or writing another word in the place they had previously completed. Depending on whether or not they did or did not do this, they were qualified to one of two groups: neutralizers or non-neutralizers. At the end, the participants completed the following questionnaires: TSF-Q, STAI, BDI.

The results of the study showed that the participants of TSF induction talked about a greater sense of guilt, a more intense feeling of being fat, a higher probability of gaining weight and a higher sense of moral wrong-doing, compared to those who were not subjected to this kind of manipulation (who participated in one of the other two experimental conditions). Thus, the hypothesis of TSF induction was confirmed, and since these differences occurred in both groups, the second hypothesis was also confirmed. The third hypothesis on the influence of stress coping on the decrease of TSF strength was also confirmed for both groups. The last hypothesis concerning the behavioural effects of TSF induction was also confirmed: the percentage of neutralizers was significantly higher in the group of persons with eating disorders compared to the non-clinical group. As for the size of the cookie that was chosen by the participants, patients with eating disorders chose the smallest portions, especially those subjected to the first type of manipulation. In conclusion, research has shown that TSF induction causes both emotional and behavioural changes, which appear to be specific to thinking about eating fattening foods. It is worth to add that in this study, patients with eating disorders subjected to experimental manipulation of the first type compared to non-clinical patients, not only showed a higher degree of TSF state (guilt, more feelings of fatness, more likelihood of weight gain, and a higher degree of moral wrong-doing), but also showed higher scores in terms of TSF characteristics measured with the TSF questionnaire, therefore eating disorder patients seem to be more susceptible to the TSF induction than mentally healthy persons. In the group of patients with anorexia nervosa and bulimia nervosa, only one TSF state degree, namely, the degree of anxiety was higher under the conditions of anxiety induction in both studied groups.

Research carried out by Ignacio Jáuregui Lobera and colleagues (2011) has also shown that perceived self-efficacy in coping with stress, commitment to focus on the problem and commitment to focus on emotions – play a major role in reducing TSF state – particularly in patients with eating disorders. It would therefore be worth examining the role of negative strategies for coping with stress in the persistence of TSF distortion. The authors emphasize the need to analyze the results in particular subgroups of eating disorders. Concluding the results of the research, Jáuregui Lobera and colleagues emphasize that TSF may be involved in developing and maintaining psychopathology of eating disorders. Research on TAF has shown that these cognitive distortions can play a causal role in the development of disturbing intrusive thoughts. It has been proven that educational interventions on cognitive distortions may significantly reduce anxiety resulting from the induction of TAF (as opposed to persons undergoing a controlled intervention). However, the intensity of TSF may decrease during treatment. To learn what is the cause and effect here, it would be necessary to conduct longitudinal studies to assess changes in the TSF experience during the treatment of patients with eating disorders. Besides, a positive change in the strategies used to manage stress could contribute to reducing the importance of TSF distortions in sustaining these disorders.

The cognitive distortion such as TSF fits in with eating pathology, however, the specificity of this distortion for eating disorders has not yet been fully investigated. This attempt was made by Coelho, Baeyens, Purdon, Pitet, and Bouvard (2012). The study aimed to determine the effects of TSF induction on TSF susceptibility in three groups of women: with eating disorders (33 women), with obsessive-compulsive disorders (24 women) and in the group of people without a diagnosis of both eating disorders and obsessive-compulsive disorders (26 women). As expected by the authors, the results showed that individuals with eating disorders are more susceptible to TSF than women with obsessive-compulsive disorders and healthy women. They are also characterized by a higher degree of TSF, more negative emotional states and more intense behaviour neutralisation. Moreover, studies have shown that women with obsessive-compulsive disorders were not particularly susceptible to TSF. In fact, healthy women (the control group) have demonstrated increased susceptibility to TSF compared to women with obsessive-compulsive disorders, as evidenced by their higher level of trait TSF, as well as increased prolonged stress (distress) and difficulty in imagining a situation related to food.

The lack of research on the TSF and its neutralisation in individuals belonging to subgroups with eating disorders was complemented by two more studies. Several years after Shafran and colleagues (1999), Adam S. Radomsky, de Silva, Todd, Treasure, and Murphy (2002) conducted a similar study, though not only in the group of mentally healthy subjects but also in the group of *anorexia nervosa*. Twenty patients with the disorder were asked to think about the food they consider to be extremely fattening. Then they were asked to finish the sentence: "I am eating ..."; by writing the name of the "forbidden" food in a space. Then the participants were asked to determine the level of anxiety, guilt, the estimation of body weight, and perception of moral wrong-doing. Participants could neutralise the sentences they had formed. Similarly to the Shafran and colleagues study (1999), most of the participants applied neutralisation in accordance with cognitive-behavioural assumptions about eating disorders and in accordance with the findings on the influence of cognitive errors and distortions on the processing of food, shape and weight information in *anorexia nervosa*. It is worth mentioning one more study, conducted by Kostopoulou, Varsou, and Stalikas (2011). The study aimed to experimentally verify the TSF phenomenon in persons with *bulimia nervosa*. Twenty patients with this diagnosis participated in an experiment involving the eliciting of TSF and investigating the effects of corrective behaviour (checking and mental neutralisation). Verbal analogue scales constituted the main outcome measures of the TSF state. The results showed that TSF increases the feeling of moral wrong-doing, body dissatisfaction, anxiety and guilt, it also strengthens the urge to engage in corrective behaviours such as checking and mental neutralisation. The corrective behaviour reduced most effects of the experimental procedure.

In conclusion, it should be noted that TSF components are also present in *bulimia nervosa* and probably play an intermediary role in the persistence of the disease.

At the end of the overview of the TSF studies, it is worth mentioning a study conducted by Coelho, Carter, McFarlane, and Polivy (2008) to compare the effects of TSF induction on women with eating disorders and mentally healthy women – while on a diet and not on a diet. The hypothesis was advanced that this induction will lead to anxiety, guilt, an increased feeling of obesity, perceived weight gain and perception of moral wrong-doing. Another hypothesis was that individuals with eating disorders and

those on a diet would react more strongly to TSF induction compared to those who are not on a diet. The results of the research showed that TSF may be induced in persons with eating disorders as well as in mentally healthy persons. However, individuals with eating disorders reveal higher levels of TSF after induction compared to mentally healthy people (whether or not on a diet). Contrary to expectations, women on a diet had higher levels of perceived weight gain and perception of moral wrong-doing after triggering anxiety, and not after triggering TSF.

The authors of the paper state that there are no research papers on the methods of TSF treatment. However, it should be assumed that, as in the case of TAF, psychoeducation, consisting in making the patient aware of the existence of cognitive distortions (in this case TSF) and their importance in sustaining the vicious circle of thoughts–emotion–behaviour–thoughts, may prove promising. When a patient learns how to find and name the distortions present in their functioning, it will also be possible to modify them. Psychoeducation aims to correct incorrect beliefs, which reduces stress and minimizes neutralising behaviours (Zucker, Craske, Barrios, & Holguin, 2002). It should be remembered that all techniques used in cognitive-behavioural psychotherapy, such as Socratic dialogue, writing down automatic thoughts, searching for evidence of the truthfulness of judgment, or using paradoxes, may also be highly useful in mitigating the TSF.

5. CONCLUSIONS

In individuals with eating disorders, it is not only monitoring of food that affects body shape and weight. In the patients’ perception, just thinking about fattening food leads to weight gain. Although after a series of studies, it has been proven that TSF can be induced experimentally in both persons with eating disorders and mentally healthy people, the results of the studies unambiguously indicate that this phenomenon is particularly highly associated with the psychopathology of eating disorders. Eating disorders patients undergoing experimental manipulation, involving TSF induction, scored higher with regard to this variable compared to mentally healthy people. Therefore, these persons were more susceptible to TSF induction compared to healthy persons. It cannot be disregarded that TSF may be a direct manifestation of the fundamental psychopathology of eating disorders, which consists in overestimating the importance of food, body shape and weight and control over them. In patients for whom TSF constitutes a barrier to changing the psychological picture, direct techniques aimed at reducing TSF may prove extremely promising.

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