Can Thought-Action Fusion Be Induced and Alleviated?

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SUMMARY

Objective: This study aims to examine the effects of the induction of thought-action fusion (TAF) on appraisal process, by using an enhanced paradigm which integrates the favourable aspects of Sentence Completion Task (SCT) with Obsessive-Compulsive (OC)-like perseverative reasoning (PR) task. The study also aims to evaluate the effect of psychoeducation (PE) on alleviating the level of TAF-Induction experience.

Method: A total of three groups were formed. The first group with high OC traits (47 participants), a second with low OC traits (70 participants) were the two analogue groups; and a third group composed of patients with obsessive compulsive disorder (OCD) (52 participants) were used. For induction of TAF, all participants were asked to construct a causal link between two OC-like feared situations in a perseverative fashion. Later, for alleviation, while half of the participants read psychoeducational information about TAF, the remaining half read information about stress. Appraisal processes regarding TAF-Likelihood and TAF-Morality components were assessed before and after enhanced paradigm, and after PE.

Results: With the current methodology, the likelihood component of TAF could be obtained by the induction of experience. PE about TAF appeared to be effective only on TAF-likelihood component when compared to TAF-morality component. Contrary to the expectations, there was no difference between OCD group and the two analogue groups on TAF-Likelihood scores. In addition, also unexpectedly, participants in the analogue group having high OC traits had significantly higher scores on TAF-Morality compared to OCD group.

Discussion: Clinical implications are discussed in the light of literature.

Keywords: Thought-action fusion, obsessive-compulsive disorder, morality, perseverative reasoning, psychoeducation.

INTRODUCTION

Obsessive Compulsive Disorder (OCD) is characterized by obsessions and compulsions (APA 2013) with an incapacitating effect on patients' global functioning and well-being (Rachman 1997, Salkovskis 1985). Although several etiological models have been suggested for OCD, cognitive behavioral models generated the large body of empirical evidence and led to the development of effective treatments (Frost and Sketee 2002). Whether or not the intrusion escalates into obsession depends on the way of the person's faulty appraisal processes concerning the intrusion. Regarding the appraisal processes, it is proposed that consequences of the catastrophic misinterpretations of the significance of one's intrusive thoughts might affect the intensification and persistence of the obsessive and compulsive symptoms (Rachman 1997, Salkovskis 1985).

Obsessive Compulsive Cognitions Working Group [OCCWG] (1997) offered dysfunctional belief domains such as inflated personal responsibility, the overestimation of the importance of thoughts, the need to control thoughts, and perfectionism. Thought Action Fusion (TAF), one of the prominent forms of overestimation of importance of thoughts, is the tendency of overvaluing the significance and consequences of thoughts (Rachman et al. 1996). TAF beliefs are thought to be involved in the escalation process from *intrusive thoughts* towards *obsessions* (Shafran et al. 1996). TAF is defined as the belief that one's specific intrusive thought can directly influence the relevant external events (i.e. TAF-Likelihood component) and/or the belief that having these intrusive thoughts is morally comparable to carrying out a

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prohibited act (i.e. TAF-Morality component) (Rachman and Shafran 1999).

The present study was particularly focused on the induction and alleviation procedure of TAF. For induction, both Sentence Completion Task (SCT) and perseverative reasoning (PR) paradigm were integrated to surpass the shortcomings of these two paradigms. For alleviation, psychoeducational intervention for TAF was used. Further, appraisal processes of participants during the induction and alleviation procedure were evaluated. There are mainly two types of methods in assessing the construct of TAF: the studies using self-report measures and experimental ones. SCT, one of the experimental methods in TAF research, is developed both to induce the likelihood component of TAF and also to evaluate related appraisal processes. In this paradigm, participants are asked to write the name of a loved one in a distressing sentence such as "I hope _____ is in a car accident" and they are asked to visualize the event. After visualization, they are asked to predict the possibility of the event's occurrence in the next 24 hour (Rachman et al. 1996).

SCT is considered to be in need of revision in terms of mainly two important aspects. Firstly, participants in SCT are not asked about the direct effect of their wish/thought on the event's occurrence. However, questionnaires regarding the assessment of TAF examine the relationship between the desire/wish and the event. For instance, thought action fusion scale uses sentences investigating the direct link between wish and the event (Yorulmaz et al. 2004). Secondly, participants in SCT are asked to predict the possibility of the event's occurrence in limited time period. However, participants are asked to determine the probability of the event without time restriction in other tasks. For example, participants are asked to assess the probability level of the event in the given scenario with the help of the question of what is the probability of the event's occurrence in the future (MacLeod and Byrne 1996). Beyond these aspects, although SCT was developed to induce the likelihood component of TAF, participants' appraisal ratings regarding likelihood component seemed to be low. For instance, participants in both Rachman et al. (1996)'s study and in Marcks and Woods' (2007) study did find the probability of the accident's occurrence (in the following 24-hour-period) very *unlikely.*

SCT is also thought to be in need of being revised in terms of investigating the persistent nature of obsessions, which is another key component in OC symptomatology (Giele et al. 2013). Giele and her colleagues (2011) handled this problem by including perseverative OC-like reasoning in an imaginal vignette. They claimed that this kind of perseverative OC-like reasoning had enough power to make an unlikely catastrophe more credible (Giele et al. 2011). Numerous researchers have also shown that imagining the prospective consequences of hypothetical events resulted in a subjective feeling that these events were more likely to occur. This subjective feeling is also thought to be strengthened through repetition of this type of imagination (Szpunar and Schacter 2013). In fact, Giele et al.'s (2011) study strengthened the probability/likelihood of the imaginal event's occurrence by inducing perseverative OC-like reasoning. This study seemed to be successful at resolving the problems regarding the low level of likelihood component and persistent nature of intrusive thoughts. However, this time, Giele et al.'s (2011) study seemed to be absent in terms of TAF-Induction procedure. For instance, one of the imaginal vignettes used in their study included a story in which the participants were asked to visualize the event of falling of their niece's pacifier on the ground. In this story, they were asked to imagine that they wiped it off very carefully and then gave it to his/her niece. After reading the story, the participants were informed that their niece died one day later, which was an OC-like harmful outcome. It was thought that neither in the story nor in OC-like harmful outcome, there were no induced thought, wish, or desire. It is concluded that Giele et al.'s (2011) study seemed not to contain "thought"-action fusion induction procedure. Therefore, the present study tried to integrate SCT with PR paradigms for TAF-Induction to overcome the mentioned difficulties.

For another target, the current study aimed at alleviating the level of TAF. There is a psycho-educational intervention program for the possible amelioration for the level of TAF. It consists of a written message including psychoeducation (PE) about TAF. It basically emphasizes the normality and irrelevance of intrusive thoughts. Zucker and his colleagues (2002) found that participants taken the mentioned PE text about TAF experienced a substantial change in their TAF level, their level of distress and their need for neutralization as compared to participants taken PE regarding stress as a control group. PE about stress included information about the effects of stress.

The first aim of the current study was to integrate SCT and PR paradigms together into one paradigm in order to overcome the drawbacks observed in OCD research. Two appraisal processes (levels of TAF-Likelihood and TAF-Morality) were assessed to test the effects of experimental manipulation. The second aim was to examine the effectiveness of receiving PE about TAF upon these appraisals of participants. Finally, the third aim was to test the effectiveness of this experimental manipulation on appraisal processes amongst three groups, namely, low and high OC symptomatology groups and an OCD-patient group.

Hypothesis 1: We hypothesized for both TAF-Likelihood and TAF-Morality that there would be a significant main effect of time, in that, TAF-Likelihood and TAF-Morality scores after PR (at Time2) would be significantly higher than scores before PR (at Time1).

Hypothesis 2: We also hypothesized that there would be a significant main effect of group, in that; the OCD-patient group would have significantly higher scores on both TAF-Likelihood and TAF-Morality than the high OC group. Moreover, the high OC group would have significantly higher scores on both TAF-Likelihood and TAF-Morality than the low OC group.

Hypothesis 3: We hypothesized for both variables that there would be a significant interaction effect between time and PE. That is, after giving PE, both TAF-Likelihood and TAF-Morality scores of participants would decrease significantly more in TAF-PE condition than stress-PE condition.

METHODS

Participants

Primarily, there were two phases in the present study. One was pre-screening phase and the other was main experiment phase. There were three groups in the experiment phase: Low OC group, High OC group and OCD-Patient group. In the pre-screening study, the two analogue groups, one high in OC traits and the other in low OC traits, were determined to compare with OCD clinical sample (for more detailed information, please see procedure part and also Table 2 including a flowchart for the procedure of the study). Five hundred and seventeen (327 female) university students (mean age= 22.17, SD = 4.64) from Middle East Technical University (METU) participated in the pre-screening study. Participants were given a written informed consent together with a demographic information form and Padua Inventory-Washington State University Revision (PI-WSUR). Eleven participants were excluded due to head injury history and 30 participants were excluded because of current use of psychotropic drugs. Based on remaining 476 students' scores on PI-WSUR, 122 participants who scored half a SD (SD = 10.05) above the mean of PI-WSUR (Mean = 36.08) and 173 participants who scored half a SD below the mean of the PI-WSUR were determined as eligible students for high OC group and low OC group respectively. They were all contacted via e-mail for the second phase. Eventually 117 students agreed to participate in the experiment and formed the low OC group (70 participants) and high OC group (47 participants).

Regarding the *OCD patient group*, 66 patients with OC symptomatology who applied to the outpatient clinic of Psychiatry Department of Hacettepe University Medical Faculty Hospital participated in the study via convenience sampling technique. Patients' diagnoses of OCD were confirmed by a clinical interview made by senior psychiatry residents according to DSM-IV-TR. The exclusion criteria involved having any brain damage, psychosis, substance use disorder, and history of a neurological disorder. Regarding the medication condition of OCD-patient group, six participants had no psychiatric medication. Two participants were using mood stabilizers and forty-four participants were using selective serotonin reuptake inhibitors (SSRIs). Participants were taking medication in a stabile manner. Also, they were not attending psychotherapy sessions. The mean of duration of illness was 55.77 month (standard deviation = 54.50).

It is suggested that incorporating low and high OC groups in the studies has an advantage for understanding OCD phenomenon (Burns et al. 1995, Gibbs 1996). Therefore, low OC group (70 participants), high OC group (47 participants) and OCD patient group (52 participants) participated in the experiment part (See Table 2 for sample characteristics). Ten participants were excluded from the main analysis since they did not comply with the instructions. Additional four participants were detected as being univariate outliers and they were excluded from the further analysis.

Table 1. The Number of Participants Given Four Types of Experiment Material Across Three Groups

	Total	HA/ Stress-PE	CA/ TAF-PE	CA/ Stress-PE	HA/ TAF-PE
Low OC Group	70	18	18	17	17
High OC Group	47	12	12	12	11
OCD-Patient	52	13	13	14	12
Total	169	43	43	43	40

HA: Heart attack, CA: Car accident.

Table 2. Sample Characteristics

		OCD (n=52)	HOCD (n=47)	LOCD (n=70)	Significance Test
Gender (n (%))					
Female		33 (63.46)	28(59.57)	44(62.86)	
Male		19 (36.54)	19(40.43)	26(37.14)	
Age	X (SD)	31.35 (9.63)	20.96 (1.37)	20.69 (1.46)	F(2,166)=67.12***
Education (Year)	X (SD)	12.44 (3.46)	12.87 (0.88)	12.96 (1.12)	F(2,165)=0.96
PI-WSUR	X (SD)	54.11 (30.62)	65.80 (19.37)	17.67 (5.87)	F(2,163)=94.88***

Note: OCD : OCD-Patient group, HOCD: High OC group, LOCD: Low OCD Group, X: Mean Value, SD: Standard Deviation *** p < .001

Table 3. A Flowchart for the Procedure of the Study

A. Pre-screening phase
1. Signing the informed consent and filling out the questionnaires for pre-screening phase
2. Exclusion due to the head injury and psychotropic medication
3. Calling participants via e-mail for the experiment phase
B. Experiment Phase
1. Reading the main vignette
2. Visualization part
3. First Assessment of DVs (Time 1)
4. A. Example PR (Regarding the food vignette)
B. Example PR (Regarding the friend vignette)
5. Reading the main vignette again
6. Visualization part
7. Actual PR
8. Second Assessment of DVs (Time 2)
9. Reading about PE about TAF or the effects of stress
10. Third Assessment of DVs (Time 3)

DV: Dependent Variable.

Table 4. Summary for the Results of Main Effect of Time

DVs	Time Conditions	Mean Scores at Time 1&2 (Standard Error of the Mean)
TAF-Likelihood*	Time 1 (before PR)	M = 2.45 (0.10)
	Time 2 (after PR)	M = 2.64 (0.10)
TAF-Morality	Time 1 (before PR)	M = 3.51 (0.10)
	Time 2 (after PR)	M = 3.48 (0.10)

Note: TAF = Thought-action Fusion, PR = Perseverative Reasoning, * = DV obtained significantly different scores between Time 1 and Time 2

Table 5. Summary for the Results of Interaction Effect of Time and PE

DVs	PE Condition After PE	Mean Scores Obtained After PE (Standard Error of the Mean)
TAF-Likelihood *	Stress-PE	M = 2.57 (0.14)
	TAF-PE	M = 2.04 (0.14)
TAF-Morality	Stress-PE	M = 3.42 (0.15)
	TAF-PE	M = 3.13 (0.16)

Note: PE = Psychoeducation, TAF = Thought-action Fusion, * = DV obtained significantly different scores between Stress-PE and TAF-PE conditions

MATERIALS

Demographic Information Form (DIF): Demographic information form was administered to obtain information about age, gender, education level of the participants and use of psychotropic medication and/or receiving psychological intervention.

Padua Inventory-Washington State University Revision: The PI-WSUR is an abbreviated version of the Padua Inventory (Sanavio 1988). It is a self-report questionnaire evaluating the frequency and severity of obsessions and compulsions (Burns et al. 1996). Scores for each item range from 0 (not at all) to 4 (very much). The PI-WSUR is thought to have acceptable reliability (α = .92) (Burns et al. 1996) and test–retest reliability (α= .72) (Jacobi et al. 2006). The scale was adapted to Turkish by Yorulmaz and his colleagues (2006). The internal consistency of this inventory in OCD patient group and in student population was found to be .94. The Cronbach Alpha score of PI-WSUR in the present study was .93.

Vignettes: There were four types of vignettes; two of them were training vignettes used for teaching the task (namely, food vignette and friend vignette). They were used in example PR. Other two vignettes were main vignettes (about either a car accident or a heart attack). They were used in the actual PR. Vignettes include self-relevant, interpersonal, and emotional events. In all vignettes, there were two sequential events. In the first event, participants hoped for the occurrence of an event. In the second event, they were informed that their wish came true. Participants were asked to imagine experiencing the situation given in the vignette. For instance, the vignette about the car accident, which was the one of the main vignettes, was as follows: "First Event: Imagine that you are spending time with an acquaintance. After a while, you have a quarrel with this person. You start to blame each other. Then, you leave the place and move away. The thought of "I hope that s/he has a car accident" pops into your mind. Second Event: Soon afterwards, you learn that this person had a car accident and you feel guilty."

In all assessment phases, for TAF-Likelihood, participants were asked to indicate the statement of "I think that my wish for my aquaintance having the car accident/heart attack increases the risk of the actual occurrence of the car accident/heart attack" via 5-point Likert Type scales (1 = I totally disagree with the statement and 5 = I totally agree with the statement). For TAF-Morality, participants were asked to indicate the statement of "I think that wishing for my aquaintance having the car accident/heart attack is as bad as causing the car accident/heart attack" via 5-point Likert Type scales (1 = I totally disagree with the statement and 5 = I totally agree with the statement).

Psychoeducation (PE) Material: There were two types of PE, namely TAF-PE and Stress-PE. The PE texts were taken from Zucker et al. (2002)'s study. Whereas TAF-PE contains information about the "normality" of intrusive thoughts and their "irrelevance" to the occurrence of outside events, Stress-PE includes information about the effects of stress.

The study in the end had four versions of experiment material across three groups by combining vignette types with PE types. They were counterbalanced before the assignment of the participants (See Table 1).

PROCEDURE

The vignettes were developed by subject matter experts via pilot study. The final version of the material and the experimental procedure were approved by METU Ethics

Committee and the Head of Hacettepe University Faculty of Medicine, Psychiatry Department. Low and high OC groups were tested in psychology laboratory and OCD-Patient group was tested in Psychiatry Clinic at Hacettepe University Faculty of Medicine, Psychiatry Department. Each participant was tested individually. Table 3 displays the flowchart for the procedure of the study.

In the experiment phase, after signing the consent form, participants first read the main vignette that was followed by the first assessment (at Time1). There were two types of main vignettes (vignette about car accident or vignette about heart attack) given to the participants in a counterbalanced manner. Afterwards, participants were asked to answer the questions about the details of these consecutive events for a few seconds in order to facilitate the visualization of the vignette. Visualization part was set to equate the procedure with the one in original SCT. That is, participants were asked to imagine as if they were experiencing these two events involved in the vignette. During the visualization period, participants were first asked to indicate and write down the time and the place of the second event. Secondly, they were asked to report where they were when they learned the second event. Lastly, they were asked to rate how close they felt towards the person in the imaginal vignette on a visual analogue scale (VAS), ranging between 0 (moderately close) and 100 (intimate). The continuum started with being moderately close so that participants were not allowed to indicate a person who was distant to them. After visualization, participants went through the first assessment phase.

Participants were then trained in step-wise PR via training vignettes. There were two steps in example PR. In the first step, food vignette was given to participants. In the second step, friend vignette was given to participants. In food vignette, they were *only* asked to read the PR example which included three constructed explanations between the events of *wishing for* and *getting* food to learn the general principles of PR. These given explanations were already fabricated according to the question of "in what way(s) does your thought/wish *solely and exclusively* result in getting food?". These explanations aimed to inform participants about the proper criteria.

The food vignette was as follows: "The first event: Imagine that you in an instant start to crave a kind of food which you have not eaten for a long time. You start to think that "I wish I got the food". The second event: Soon, your friend serves this food and you become very happy."

The first constructed explanation included two steps between the events. In the first step, it was written in the text that "Because I desire it so much, it becomes like a pray." In the second step, it was written in the text that "Then, the God made my pray come true." The second explanation included three steps between the events. In the first step, it was written in the text that "By this thought, I sent positive energy to the universe." In the second step, it was written in the text that "Probably, this energy affected the other events in one way or another." In the third step, it was written in the text that "In the last, my friend must be affected by the positive energy." The third explanation included one step between the events. In this step, it was written in the text that "Because I am a person having pure in heart, I am not disappointed."

While participants were asked to only read the explanations in food vignette, in all other vignettes (in the friend vignette and in one of the main vignettes), participants were asked to construct and write down three explanations including at least one step and at most three steps between the events as in the prepared example in food vignette. The original material consisted of explanations including 5 or 6 steps in the Giele et al. (2011)'s study. However, it was reduced to 1-3 steps via the experience obtained during the pilot study.

Afterwards, they were given the friend vignette as a second training vignette. This vignette was as follows: "The first event: Imagine that you go out in the weekend. In an instant, your beloved friend came to your mind. You start to think that "I wish I came across him/her". The second event: Soon, you came across with him/her and you become very happy."

This time, they were required to construct and *write down* three explanations in the expected way between events of wishing for and coming across a friend by themselves. In other words, they were asked to construct and write down a causal link between two events in the vignette according to already specified criteria in the food vignette: their thought/wish should be the *only determinant* for this second event and no other explanations including coincidence were allowed. Regarding this proper criteria, participants were asked to fabricate these three explanations even if they found it funny, irrational and/or nonsense. Also, these explanations could be alike to or different from each other. For them, not being literally the same was enough for the generation process for these explanations.

In the actual PR stage, participants were first asked to read the main vignette (either vignette about car accident or heart attack) and to imagine as if they were experiencing two events involved in each vignette. Their previous written answers for the details of these events were again provided to participants so to refresh their memories. It was thought that refreshment of memories could facilitate the visualization part. Then, they were asked to make a step-by-step PR. Afterwards, they took the second assessment (at Time2), which was identical to the first assessment. In this actual PR stage, they were instructed to link two events in the vignette by constructing three different

explanations with the *same* procedure in training phase. Later, half of the participants were given the stress-PE, and the other half was given the TAF-PE. Lastly, all participants took the third assessment (at Time3).

Lastly, all participants were debriefed at the end of the procedure about the nature of the experiment. Also, they were all provided with the information about TAF. Each participant was checked for their level of distress and was offered to discuss any concerns about the study. The experimenter also provided his contact details in case of any future distress caused by the experiment protocol. Participants who were university students were given bonus credit for their participation in the study. Participants from psychiatry clinic participated in study voluntarily.

RESULTS

The study had a 3 (Group: Low OC Group, High OC Group, OCD-Patient Group) X 2 (PE: TAF-PE, Stress-PE) X 2 (Vignette Type: Car accident, Heart Attack) X 3 (Time: Before PR, After PR, After PE) mixed design; group, PE and vignette type (VT) were between-subjects factors, time was a within-subjects factor. Dependent variables (DVs) were TAF-Likelihood and TAF-Morality. They were both related to the causal link in the vignettes.

First, a 4-way 3 (Group: Low OC group, High OC Group, OCD-patient Group) X 2 (PE: TAF-PE, Stress-PE) X 2 (VT: Car accident, Heart Attack) X 3 (Time: Before PR, After PR, After PE) mixed design ANOVA was run for each dependent variable separately. If the main effect of vignette type was not significant, the variable was pooled and a 3-way 3 (Group: Low OC group, High OC Group, OCD-Patient Group) X 2 (PE: TAF-PE, Stress-PE) X 3 (Time: Before PR, After PR, After PE) ANOVA was run in turn. The main effect of vignette type for neither TAF-Likelihood nor TAF-Morality was significant; therefore, two 3-way ANOVA were run for each DV. The whole data were analyzed via SPSS 17.0 version. Bonferroni comparisons were used for pair-wise comparisons.

It was predicted for TAF-Likelihood that there would be a significant main effect of time, in that, TAF-Likelihood scores after PR (at Time2) would be significantly higher than scores before PR (at Time1). It was also predicted that there would be a significant main effect of group, in that; the OCD-Patient group would have significantly higher scores on TAF-Likelihood than the high OC group. Moreover, the high OC group would have significantly higher scores on TAF-Likelihood than the low OC group. Also, it was predicted that there would be a significant interaction effect between time and PE. That is, after giving PE, TAF-Likelihood scores of participants would decrease significantly more in TAF-PE condition than stress-PE condition.

For TAF-Likelihood, a 3-way 3(Group: Low OC group, High OC Group, OCD-Patient Group) X 2(PE: TAF-PE, Stress-PE) X 3(Time: Before PR, After PR, After PE) mixed ANOVA with repeated measures on the last factor was conducted. Mauchly's test indicated that the assumption of sphericity had been violated (χ^2 (2) = 23.585, p < .001), therefore degrees of freedom were corrected using Greenhouse-Geisser estimates of sphericity (ε = 0.881).

According to the results, there was a main effect of time, (F(1.761, 287.102) = 10.734, MSE = 0.496, p< .001, η_p^2 = .062). TAF-Likelihood scores were significantly higher after PR (M = 2.64) than before PR (M = 2.45) and those scores were significantly higher after PR (M = 2.64) than after PE (M = 2.31). The results also revealed that the main effect of group was significant, F(2, 163) = 7.435, MSE = 4.021, p< .001, η_p^2 = .084: Participants in high OC group had significantly higher TAF-Likelihood ratings (M = 2.91) than participants in low OC group (M = 2.07). Time and PE interaction was also significant, F(1.761, 287.102) = 9.565, MSE = 0.496, p< .001, η_p^2 = .055. In TAF-PE, participants' scores before PR (M = 2.492) were significantly higher on TAF-Likelihood ratings than the scores after PE (M = 2.04). Also, for participants in TAF-PE condition, scores after PR (M = 2.62) were significantly higher than the scores after PE (M = 2.04). Furthermore, after PE, participants' scores in stress-PE (M = 2.57) were significantly higher than participants' scores in TAF-PE (M = 2.04). In addition, for participants in Stress-PE condition, participants' scores after PR (M = 2.68) were significantly higher on TAF-Likelihood ratings than the scores before PR (M = 2.41).

As a summary, for TAF-Likelihood, hypotheses for main effect of time and interaction effect between time and PE were (fully) confirmed. However, the hypothesis for main effect of group was partially confirmed.

It was predicted for TAF-Morality that there would be a significant main effect of time, in that, TAF- Morality scores after PR (at Time2) would be significantly higher than scores before PR (at Time1). It was also predicted that there would be a significant main effect of group, in that; the OCD-Patient group would have significantly higher scores on TAF- Morality than the high OC group. Moreover, the high OC group would have significantly higher scores on TAF-Morality than the low OC group. Besides, it was predicted that there would be a significant interaction effect between time and PE. That is, after giving PE, TAF-Morality scores of participants would decrease significantly more in TAF-PE condition than stress-PE condition.

For TAF-Morality, a 3-way 3(Group: Low OC group, High OC Group, OCD-Patient Group) X 2(PE: TAF-PE, Stress-PE) X 3(Time: Before PR, After PR, After PE) mixed ANOVA with repeated measures on the last factor was conducted. Mauchly's test indicated that the assumption of sphericity had

been violated ($\chi 2$ (2) = 9.514, p < .05), therefore degrees of freedom were corrected using Greenhouse-Geisser estimates of sphericity (ε = 0.946).

According to the results, there was a main effect of time, $F(1.892, 308.409) = 4.627$, $MSE = 0.626$, $p < .05$, $\eta_p^2 = .028$. TAF-Morality scores were significantly higher before PR (M = 3.51) than after PE (M = 3.27) and those scores were significantly higher after PR (M = 3.48) than after PE (M = 3.27). The results also revealed that the main effect of group was significant, $F(2, 163) = 11.872$, $MSE = 4.326$, $p < .001$, $\eta_p^2 = .127$): Participants with high OC group had significantly higher TAF-Morality ratings (M = 3.99) than participants with low OC group (M = 2.89) and also OCD-patient group (M = 3.38).

As a summary, for TAF-Morality, hypotheses for the main effect of time and the interaction effect between time and PE were not confirmed. However, the hypothesis for main effect of group was partially confirmed.

DISCUSSION

The present study essentially aimed to induce the experience of TAF and subsequently alleviate it. It first aimed to integrate the powerful aspects of SCT and PR together into one paradigm in order to simulate TAF experience and test the effects of the manipulation on participants' appraisal processes. The second aim of the current study was particularly to test the effects of the manipulation on appraisal processes of three groups, namely, low and high OC symptomatology groups and an OCD-patient group. The third aim was to examine the effectiveness of receiving PE about TAF or the effects of stress upon appraisals.

As a summary, hypotheses for main effect of time and interaction effect between time and PE were fully confirmed for TAF-Likelihood component. However, the hypothesis for main effect of group on TAF-Likelihood component was partially confirmed. For TAF-Morality, hypotheses for the main effect of time and the interaction effect between time and PE were not confirmed. However, the hypothesis for main effect of group was partially confirmed.

For the main effect of time, participants started to find the causal link between the given two events in the imaginal vignettes much more *likely* after PR when compared to their scores before PR. However, participants appeared not to equate unacceptable wish for someone having accident/heart attack with causing this event after PR. That is, experimental manipulation seemed to increase the level of TAF-likelihood; however, it seemed no effect upon TAF-Morality level of participants.

TAF-Induction procedure actually produces four different possibilities: In the first possibility, TAF-Likelihood and TAF-Morality components are simultaneously induced. In fact, the majority of studies consistently found a moderate correlation between likelihood and moral components of TAF (Shafran and Rachman, 2004). In the second possibility, neither of them is induced. The other two possibilities are as follows: While TAF-Likelihood is induced; TAF-Morality is not and vice versa. Even though it seemed superficially that the third possibility was emerged in the current study, further examination seems to point more complex relationship between these components of TAF. Regarding this relationship, it is thought that although the levels of TAF-morality component before and after enhanced paradigm are not statistically significant, TAF-morality is thought to be stimulated like the component of TAF-likelihood. Overall, participants seemed to credit the possibility of the effect of their wish on occurrence of the event and simultaneously they seemed to be way from the (possible) fearful moral consequences of this occurrence of this event. When examined Rachman et al. (1996)'s study, some of their participants' rejected to attend to their study due to the moral reasons. Also, some other participants were unwilling to comply with the instructions. They visualized much more trivial car accident instead of the accident in the instruction. Even though there was no direct assessment for participants' feelings regarding the content of the experiment in the current study, these kinds of rejection instances are quite common in the literature. Thus, participants' wish about the occurrence of the heart attack or car accident is also thought to be appraised as being fearful for the current study. The experiences during the pilot study of the current study were consistent with these instances. Most of the participants appeared to be reluctant to comply with instructions that they had difficulty to visualize their acquaintances for fearful events in the vignettes. However, this is only an observational data that it is suggested this would be examined qualitatively.

The results of the current study are also thought to be consistent with the mentioned rejection examples in the literature. It would be proposed that participants firstly credited the feared possibility generated by their wish and they soon after tried to neutralize this possibility by stating that there were no causation and consequently moral equity between their wish and the occurrence of the event. That is, increment in the scores of TAF-Likelihood from Time1 (scores obtained before PR) to Time2 (scores obtained after PR) is thought to imply that participants credited the fearful possibility regarding the occurrence of the event in the vignette. Also, the stability in the scores of TAF-Morality from Time1 (scores obtained before PR) to Time2 (scores obtained after PR) is thought to imply that participants rejected this possibility's consequences. Regarding this, Shafran and Rachman (2004) offered that these two components of TAF usually triggered simultaneously. As their offer, it is accepted to be plausible that two components emerged at the same time.

In fact, there are some other findings concerning the rejection of the moral consequences of the possibility of the occurrence of the event in the vignette. As Rachman and Shafran (1999) offered, an increase in TAF-Morality appraisals may be induced by an increase in TAF-Likelihood appraisals. Probably, the increment in the likelihood component might stimulate (subtle) increase in morality component. Then, participants seemed to suppress this increment and reject this possibility. However, the question related to the need for rejection is still left unanswered. What could be the possible mechanism for rejection of this possibility?

New advancements in cognitive model of OCD are thought to be useful for answering this question. As mentioned elsewhere in this text, it is already proposed that the significance that the individual attaches to the intrusion is more important than the intrusion itself. This attached significance includes interpretations regarding the content of intrusion (Salkovskis 1985). These interpretations are believed to involve the beliefs about excessive responsibility for harming other people (Salkovskis 1985, cited in Ferrier and Brewin 2002), beliefs about consequences of certain thoughts (Rachman 1997, cited in Ferrier and Brewin 2002) and beliefs about the characteristics of the self (Rachman 1997, cited in Ferrier and Brewin 2002). Regarding the third group of mentioned beliefs, Rachman (1997) reported that patients see themselves as evil, dangerous, or insane. For instance, it is argued that these interpretations might led patients fear of being rejected or being sent to Hell (Ferrier and Brewin 2002). Similarly, Doron and Kyrios (2005) suggested that the way that the individual appraise himself/herself might lead to dysfunctional reactions to particular intrusive thoughts. Clark and Purdon also pointed out that appraisal of the thought as being inconsistent with the person's sense of self, beliefs and values contributes to the exacerbation of obsessions (Doron et al. 2007).

Researches showed that people have a tendency for rejecting information that threatens self to protect their sense of self-worth (Sherman and Cohen 2002, cited in Perera-Delcourt et al. 2014). People dismiss or distort this information to maintain their feelings of self-integrity (Ferrier and Brewin 2007, cited in Bhar and Kryios, 2007). Probably, participants in this current study tried to preserve their feelings of integrity and reject this feared possibility in the vignette due to its threatening nature. Recently, researchers began to address the escalation of intrusion to obsession by stating that whether mental intrusions contradict and threaten the valued aspects of the self or not. This was crucial to the escalation of certain intrusive thoughts into obsessions (Rowa and Purdon 2003, Rowa et al. 2005). In this line of reasoning, it was found that the most upsetting obsessions of participants with OCD contradicted important aspects of their self (Rowa et al. 2005, cited in Perera-Delcourt et al. 2014).

Guidano and Liotti (1983) thought that moral virtue and lovability were important aspects in terms of beliefs about the self-worth. When someone has contradictory beliefs about the self, such as "I am a good person" and "I am a bad person", this results in uncertainty about one's self-worth. In the end, this person is thought to ascertain the truth about himself/herself (Guidano and Liotti 1983, cited in Perera-Delcourt et al. 2014). In the same vein, Rachman (1997) offered that repugnant intrusive thoughts have a potential in revealing important but usually hidden elements in individual's character such as being evil, dangerous, potentially uncontrollable, evil or fundamentally immoral.

Overall, participants in the study might also experience TAF-Induction procedure as being threatening. That is, wishing someone familiar having a car accident or heart attack might have been contradictory with their valued aspects of their self. Also, they might have thought that TAF-Induction procedure could reveal important and hidden elements of their self. Therefore, they might experience self-ambivalence that they tried to dismiss or distort the feelings caused by the very procedure. That is, on the one hand, participants believed the possibility of the direct link between their wish and the occurrence of the event in the vignette; and, on the other hand, they tried to maintain their integrity by reject this possibility and by implying that there is no moral equity with wishing and occurrence of this event.

For the interaction effect between time and PE, participants in the TAF-PE condition seemed to regard the causal link in the vignette *less* likely than participants in stress-PE condition. Therefore, TAF-PE seemed to be effective for TAF-Likelihood. However, participants in both conditions seem to have similar scores in TAF-Morality dimension about the causal link in the vignette. Therefore, TAF-PE seemed to be insufficient for the alleviation of TAF-Morality scores of participants. Thus, the TAF-PE may need to be revised to target more specifically TAF-Morality.

Why did TAF-Morality component behave differently as compared to TAF-Likelihood component? It was suggested that the morality dimension of TAF had a central role in OCD symptoms in the Turkish culture (Yorulmaz et al. 2004). Besides, an important cross-cultural study of Yorulmaz et al. (2009) revealed that the morality component was accepted to be more prevalent belief domain for Muslim groups when compared to the likelihood component and this morality domain showed a stronger association with OCD symptoms. Moreover, even low religious Muslims had higher scores on TAF-Morality than low religious Christians. Further, morality dimension is closely related to social approval, which is accepted to be a critical domain for traditionally collectivistic cultures (Kağıtçıbaşı 1983, cited in Yorulmaz et al. 2004). Therefore, Turkish people might be quite sensitive to their immoral thoughts that PE about TAF did not have

enough power to alleviate the morality domain as compared to likelihood domain.

There emerged a difference between high OC group and low OC group for both DVs regarding the main effect of group. Contrary to the expectations, there was no differentiation between OCD patient group and the analogue groups in terms of TAF-Likelihood and TAF-Morality scores. Even, for TAF-Morality, scores of participants of high OCD group were significantly higher than the scores of participants of OCD-patient group. Similarly, PI-WSUR scores of high OC group are significantly greater than the PI- WSUR scores of OCD-patient group (See Table 2).

This finding could be interpreted by applying to Yorulmaz et al (2004)'s findings of Turkish society's sensitivity towards TAF-Morality component. Moreover, high OC group seemed to be more disadvantageous than OCD-patient group that high OC group had no psychiatric medication and no psychological treatment. Therefore, high OC group might have significantly greater scores on TAF-morality than OCD-patient group. However, additional data concerning treatment history of OCD-patient group and subtyping of OC symptoms of OCD-patient group would help researchers making more consolidated interpretations about these findings. Overall, high OC group was thought to be more susceptible to the effects of current manipulation on the scores of TAF-Morality than OCD-Patient group.

Limitations and Future Suggestions

Regarding the quality of the assessment of the current study, it is proposed that more ecologically valid instruments could be used other than current experimental material because PR section include "forced" procedure. Also, Giele et al. (2011)'s study proposed that participants' credibility level for the scenario in the vignette in the PR condition were significantly greater than the participants' credibility level for the scenario in the control condition. In the current study, however, there is no control condition for enhanced paradigm. Adding this control condition to the experimental manipulation would strengthen the quality of study. Besides, TAF-Morality and TAF-Likelihood components were given in the same order to participants that further studies would counterbalance this sequence to increase the quality of the current research. Also, based upon the literature arguing that intrusive ideas are person-specific (O'Connor 2002) it would be suggested that participants might not find the vignettes as self-relevant and consequently genuine.

The other cluster of limitations is related to the specification of the groups that non-clinical groups were determined according to their scores of PI-WSUR and clinical group was determined according to their clinical diagnosis. That is, non-clinical and clinical groups were not matched according to their characteristics such as age, gender and education. These factors could affect the group effect in the data analysis. Moreover, duration of illness is thought to be an adequate predictor for response to treatment in OCD research (Jakubovski et al. 2013). However, current study had no homogenous clinical group in terms of duration of illness that further studies would use this experimental manipulation with a homogenous clinical group. Furthermore, adding the information regarding participants' symptom and treatment history, content of their symptoms, and comorbid disorders for OCD patients are thought to strengthen the quality of the study. Further studies could use other scales and/or other cutoff points for identification of the groups that main effect of group could be obtained in the expected way.

Regarding attitudes of participants during experimental manipulation, it is thought that researchers for further studies would add the assessment tools for participants' thought control strategies and their affect during experimental manipulation. Moreover, one would argue that this specific methodology could also be used in other clinical diagnoses/ populations based upon the idea that TAF is seen in psychopathologies other than OCD (Berle and Starcevic 2005). Since this experimental procedure focuses mostly TAF-Likelihood, it would also target distinctively the assessment of TAF-Morality component. Addressing these methodological shortcomings may allow for broader inferences and enhance the quality of this research.

From a different viewpoint, a recent systematic review argued that 10 to 37% of patients with do not respond to CBT for OCD (Podea et al. 2009, Schruers et al. 2005, cited in Thiel et al. 2016). It is known that 25 to 30 % of the patients refuse to comply with Exposure and Response Prevention (ERP) and drop-out rates were about 28 % (Emmelkamp and Foa 1983, Kozak et al. 2000, cited in Thiel et al. 2016). It is found that more than one third of the treatment completers are thought to remain symptomatic (Alonso et al. 2001, Eddy Dutra Bradley Westen 2004, cited in Thiel et al. 2016). Another study claimed that 59 % of treatment-seeking OCD patients had experience relapse after an adequate treatment (Eisen et al. 2013, cited in Thiel et al. 2016). These kinds of drawbacks of current treatment of OCD might lead some researchers to improve cognitive-behavioral model of OCD. From this perspective, theoreticians in the cognitive behavioral realm suggest that morality domain is thought to be one of the important areas in determining the self-worth (Doron and Moulding 2009). It is believed that focusing on morality domain would improve the outcomes regarding understanding and treatment of OCD. It is suggested that assessments containing morality realm of patients would increase the quality of the conceptualizations of patients with OCD. Patients with OCD are thought to have a rigid perception of morality. Therefore, thoughts or urges challenging their moral standards could result in increment in their level of self-criticism, rumination and compulsive

behaviors. It is argued that if the relationship between self-worth and morality domain is explored, then this would help the clinician in understanding why specific mental intrusions heightened emotional reactions and avoidance behavior (Doron et al. 2012). Therefore, if this procedure of the current study is improved, then this manipulation would become a tool for the mentioned assessment protocol. In this way, as a clinical application, findings of the current study would shed light on mentioned important points in assessment of OCD.

In conclusion, this study attempted at constructing an enhanced methodology for induction of TAF experience. Simulation of this experience seemed to be obtained for TAF-Morality component within the very procedure of the current study. Moreover, receiving PE about TAF appeared to be effective only in terms of TAF-Likelihood component when compared to TAF-Morality component.

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