

The influence of emotion regulation strategies on intrusive thoughts

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Introduction: Individuals may use suppression to control their intrusive thoughts. Some studies show that thought suppression decreases the intrusive thoughts, but other studies report that thought suppression leads to a significant increase of intrusive thoughts. Additionally, the effects of alternative strategies such as acceptance have not been extensively studied yet. Noteworthy, cross-cultural studies have shown that strategies such as suppression and acceptance are different between eastern and western cultures. Hence, this research aimed at investigating the influences of thought suppression and acceptance on intrusive thoughts in Iranian culture.

Methods: 66 participants were randomly assigned to one of three groups (thought suppression, acceptance, and control group). Participants answered to questionnaires, including White Bear suppression inventory, the Beck depression inventory-II, general health questionnaire, the second version of acceptance and action questionnaire. They were then asked to record the frequency of their thoughts by placing a check mark on a sheet of paper every time they experienced these intrusions. Data were analysed using ANOVA.

Results: Results indicated that there is a significant difference among groups ($F_{2,62} = 3.63$, $p < 0.03$), and the significant difference was between the acceptance group and thought suppression ($p < 0.02$). Acceptance group experienced significantly higher levels of thought suppression.

Conclusion: Suppression in short-term is a useful strategy because it does not lead to intrusive thoughts. Not only does suppression work temporarily, but also it serves as a neutralizational strategy. As a matter of fact, suppression terminates exposure to the intrusive thoughts and prevents the perceived negative consequences of the intrusive thoughts.

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Key words: Thought suppression, Acceptance, intrusive thoughts .

Introduction

Many researches have indicated that the intrusive and unwanted thoughts have been observed in clinical and non-clinical populations (1). Unwanted intrusive thoughts play a significant role across many psychological disorders (2). The control of

cognition is very important in psychological well-being (3) and people use many mechanisms to control their cognition. Suppression is a frequent reaction to intrusive thoughts (4).

Researchers (5) have considered thought suppression as an intentional process that

serves to remove some items intentionally according to an individual's priorities. When intrusive thoughts trigger unpleasant and negative emotions, individuals use thought suppression to control them (4,6). The ironic process theory (7) has been introduced to explain the relationship between thought suppression and intrusive thoughts, and it suggests that engagement in thought suppression can lead to an increase of intrusive thoughts. According to aforementioned theory, thought suppression includes two processes (5). The first process is the operating process, which is an intentional and effortful process and seeks mental content that is consistent with the desired mode. This process operates by seeking other mental materials to keep the mind away. The second process is the monitoring process, which is unconscious and less effortful. The monitoring process seeks mental contents that represent the failure to reach the desired situation. This process is inconsistent with the main purpose of suppression because it stays vigilant for happening of the unwanted items (5).

In line with this, researchers (8) showed that avoiding a thought may lead to an increase of intrusive thoughts. In the next studies, researchers (9) showed participants engaged in suppression had more target thoughts in the next period than did participants engaged in expression. Researchers (10) instructed one group to suppress their thoughts and instructed another group to monitor their thoughts. No difference was observed between groups in the number of intrusions. However, when subjects were instructed to monitor their thoughts without suppressing them, a rebound effect was observed. Subjects who had previously engaged in suppression reported more intrusive thoughts. Similarly, some researches indicated that suppression could lead to more intrusive thoughts (8,11,12). A meta-analysis showed that thought suppression leads to low or

moderate rebound effect (13). On the other hand, a study (14) showed that thought suppression in comparison to emotional inhibition and control group did not lead to different amount of intrusive thoughts. Another study (15) used the mention control instructions ("think of anything you want, you might think of a white bear, but you don't have to"). This study did not report rebound effect. Additionally, some researchers in non-clinical samples (16, 17) and clinical samples (18,19) investigated the effects of thought suppression on intrusive thoughts, but did not find the increased levels of intrusive thoughts after thought suppression. Accordingly, attempted suppression studies have reported inconsistent results and research on the influences of attempted suppression on intrusive thoughts can elucidate the underlying mechanisms of intrusive thoughts. On the other hand, cross-cultural studies show that culture has a significant role in emotional regulation strategies, such as suppression (20). Hence, it is necessary to investigate the effects of thought suppression on intrusive thoughts in Iranian culture.

Since suppression is related to a variety of negative outcomes, effects of alternative strategies acceptance have to be investigated. Acceptance focuses on an increased tendency to experience feelings and thoughts without avoidance, challenge or judgment (21). Many researches have shown the effectiveness of acceptance-based approaches (22). Acceptance has a significant correlation with psychological well-being (23) and has a negative correlation with anxiety (24). Noteworthy, acceptance-based techniques consist of metaphors aimed at maintaining the people's observation of the intrusive thoughts (25). Hence, if acceptance results in a significant increase of noticing the intrusive thoughts and a decrease of struggling with it, it is possible that distress happened after intrusive thoughts decreases. As a result, acceptance does not necessarily lead to a

reduction in the intrusive thoughts (26). A research showed the effectiveness of an acceptance-based technique in comparison to suppression in decreasing the distress, but not frequency of intrusive thoughts (27). A researcher (28) suggested in order to understand acceptance, we have to investigate how it works against the subject's tendency to suppress intrusive items. Researchers (29) reported that acceptance had a significant correlation with less distress in comparison to expression suppression- the act of inhibiting the outward expression of emotion in subjects with anxiety and mood disorders. Another study (30) showed that there was no significant difference in terms of intrusive thoughts between acceptance and suppression group. However, the effects of acceptance on intrusive thoughts have not been investigated in Iranian culture.

While most studies have addressed the role of culture in the types of thoughts that become intrusive (31), no research has considered the effects of diverse emotion regulation strategies on intrusive thoughts in Iranian culture. Also, there is inconsistent evidence on the effects of suppression on intrusive thoughts. Therefore, the purpose of this study was to determine the effects of regulatory strategies such as thought suppression and acceptance on intrusive thoughts in non-clinical samples. So, it was hypothesized that thought suppression and acceptance had significantly different effects on intrusive thoughts.

Methods

The study population of the present study consisted of undergraduate students at Shahid University. Participants were selected by cluster sampling. In the first step, several classes were selected from faculties of Humanities, Basic Science and Engineering faculties. Then, the sample was randomly selected from the aforementioned classes and selected participants gave consent to take part

in the process. Subjects were randomly divided in to three groups. In general, 66 individuals participated in the study; 23 individuals were in the thought suppression group, 19 individuals were in the acceptance group, and 24 individuals were in the control group. Initially, subjects answered to various questionnaires, including White Bear suppression inventory, the Beck depression inventory-II, general health questionnaire, the second version of acceptance and action questionnaire. Then, they were asked to rate their own mood on a visual analogue scale and subsequently observed the a video clip of a grizzly bear attack and then rerated their own mood on a visual analogue scale. Each subject then received specific instructions according to literature (32, 14). Participants in the accept condition was instructed to allow themselves to internally experience any emotions it produced: "It is very important for the experiment that you try and accept any emotional responses you are having. Immerse yourself in the film, allowing yourself to internally experience and externally express any emotions it produces. Rather than trying to control your reaction imagine your emotion is like a cloud passing in the sky - a natural phenomena that comes and goes regardless of any attempts you make to influence it. Let the feelings wash over you, being aware of how they make you think, feel and react. Just observe all the different aspects of how you are feeling in response to the film, rather than judging whether the emotion is 'good' or 'bad' or 'wanted' or 'unwanted'. For example, if the film makes you feel afraid, allow yourself to openly feel your fear and show your fear in your face and body. If you do find yourself beginning to evaluate or control your emotional reaction that is fine - just notice you have done it and then gently move your attention back to observing and accepting your feelings in response to the film" (32) Participants in the thought-suppression group

were instructed to “try their hardest to suppress any thought related to the video they had watched until the end of the experiment” (14). Additionally, participants in the control group were instructed to “think and feel normally about the video they had watched”(14). During the 5-min instruction period, participants were asked to perform according to instruction and in the meantime record the frequency at which they experienced thoughts related to the video by placing a tick on a sheet of paper every time they experienced these intrusions. Then, they reported their mood and adherence level to instruction using visual analog scale (VAS). Finally, subjects were presented with a gift as a mark of appreciation for participation in the study. Noteworthy, participants were assessed in terms of depression and general health because psychological disorders, such as depression leads to an increase of intrusive thoughts (14). So, we assessed participants in terms of depression and general health to make sure that there is no difference among groups and the results are not because of individual differences.

White Bear Suppression Inventory (WBSI): This inventory was presented in 1994 (33). It has 15 items that measures tendency for chronic thought suppression. Various researches confirmed its reliability and validity. For example, researchers reported good internal consistency (Cronbach's alpha of 0.89) and test-retest reliability was 0.80. Scores of this questionnaire had positive correlation with other variables such as depression, anxiety and obsessive-compulsive behavior (34). A research investigated the psychometric features of this inventory in Iran. Ranjbar Kohan (35) reported that Concurrent validity of WBSI with BDI was $r=0.51$ and its reliability was confirmed. This questionnaire was used to ensure that there was no difference among groups in terms of this variable.

The Beck Depression Inventory-II (BDI-II): Beck Depression Inventory-II (BDI-II) is the revised version of Beck Depression Inventory developed to assess symptoms of depression. The coefficient alpha of the BDI-II was reported .91 (36). Researchers (37) reported that the BDI-II had positive correlations with self-report measures of depression and anxiety. So, the validity of BDI-II was confirmed. Also, Researchers (38) obtained alpha coefficient of 0.93 and test-retest reliability of 0.93 in Iran. The validity of the inventory was confirmed using brief symptom inventory.

General Health Questionnaire (GHQ): GHQ was developed in 1972 (39). A Cronbach's alpha of .76 was obtained, and validity of the test was confirmed (40). Researchers (41) validated this test among university students in Iran. Cronbach's alpha of this questionnaire was 0.92. Similarly, Construct validity of the questionnaire was confirmed.

The second version of Acceptance and Action Questionnaire (AAQ-II): This questionnaire has 10 questions and measures acceptance, avoidance and lack of psychological flexibility. Two factors were obtained in one study (42). Cronbach's alpha evaluations were 0.55 for the first and 0.88 for the second factor. This questionnaire showed a significant correlation with the general health questionnaire, the Beck Depression Inventory and the Beck Anxiety questionnaire. A study investigated psychometric features of this questionnaire in Iran (43). Cronbach's alpha was 0.82. This questionnaire was used to ensure there is no difference among groups in terms of this variable.

Visual Analogue Scale (VAS): VAS was applied to determine the mood of subjects and their adherence. In one study (14), subjects were asked to determine their mood on the following scale (0: extremely distressed, 100: without any distraction).

Subjects also determined level of adherence to instructions (0: no adherence to, 100: full adherence).

A video clip of a grizzly bear attack (from "Faces of Death"): Using movie has been determined as a reliable method to provoke emotions in the laboratory (44). According to researchers (11) suppression is usually self-initiated in the real world. On the other hand, providing instructions to subjects about suppression may limit generalization of the results. Thus, it is recommended to use a natural paradigm such as death-related thoughts in order to provoke spontaneous suppression (45). A clip of a bear attacking a tourist was taken from a documentary named "*Faces of Death*". This documentary presents videos from real life and traumatic events that were recorded incidentally (46). This clip shows a bear attacking a tourist and ends with vague scenes. The pilot study proved that the clip is emotionally charged and causes negative feelings. The film has been examined in Iranian culture (Salehzadeh Einabad, Shairi, in press). Participants

showed significant mood changes after watching the clip. Results indicated that there are significant differences in evaluation of the clip between male and female participants ($p < 0.05$). This results indicate that women show more responses to emotional stimuli, and they are more likely to express their emotions, while men are more likely to control or hide their emotional displays.

Result

Data were analysed in SPSS-23. First, descriptive results were calculated. Then, 3 groups were compared using ANOVA. Finally, Tukey test was performed.

Table 1 contains sample size, gender, and age of subjects in each of the groups. The observed F for age was 0.63, which is not significant compared with critical values. Also the observed Chi square values for the groups for comparisons in terms of gender and education were 1.95 and 2.79 respectively, which is not significant in comparison with critical values.

Table 1. Descriptive findings

Group	Sample size Frequency (percent)	Gender		Age
		Man	Woman	Mean (SD)
Thought suppression	23 (26.4)	15 (65.2)	8(34.8)	19.82(1.33)
Acceptance	19 (21.8)	9 (4.47)	10(52.6)	20.55 (1.58)
Control	24 (27.6)	24 (27.6)	12 (50)	20.41 (1.08)

Descriptive findings are presented in Table 2. According to table 3, there is no significant difference among groups in variables, including mood, depression, acceptance,

suppression, and mental health. In addition, there is a significant difference in terms of intrusive thoughts among groups.

Table 2: Descriptive findings regarding depression, acceptance, thought control, suppression, mental health, Adherence, mood, Intrusive thoughts

Variable		Thought suppression	Acceptance	Control
BDI-II	Mean	9.80	12.68	11.02
	SD	4.98	6.28	8.47
ERQ-suppression	Mean	12.82	12.63	12.83
	SD	5.49	4.69	5.58
AAQ-II	Mean	51.20	49.16	48.70
	SD	8.68	12.48	52
TCQ total	Mean	59.87	62.66	61.69
	SD	8.17	8.68	61.06
TCQ- punishment subscale	Mean	8.56	9.15	9.69
	SD	2.84	2.54	9.50
TCQ-Distracton subscale	Mean	13.63	13.76	14.65
	SD	3.22	3.37	14.50
TCQ-Worry subscale	Mean	8.84	9.26	9.41
	SD	1.90	2.18	9.50
TCQ-Social control subscale	Mean	12.11	12.89	13.17
	SD	2.97	3.10	3.94
TCQ-Reappraisal subscale	Mean	14.62	15.31	12.75
	SD	3.52	3.59	3.11
WBSI	Mean	46.60	47.73	49.03
	SD	8.92	13.52	10.96
GHQ-12	Mean	9.78	11.47	10.54
	SD	3.99	4.91	4.79
Adherence	Mean	78.69	73.42	73.54
	SD	20.46	17.95	20.56
Mood	Mean	32.60	33.05	38.62
	SD	20.66	30.52	21.20
Intrusive thoughts	Mean	26.26	71.89	37.94
	SD	28.46	89.92	39.15

Note. WBSI= White Bear Suppression Inventory, BDI-II= Beck Depression Inventory-II, GHQ= General Health

Table 3 presents the result of comparison of the variables in 3 groups.

Questionnaire, ERQ=Emotion Regulation Questionnaire, AAQ-II The second version of Acceptance and Action Questionnaire

Table 3: Comparison of depression, acceptance, thought control, suppression, mental health, Adherence, mood, Intrusive thoughts among groups

Variable		Sum of squares	df	Mean squares	F	Sig.
BDI-II	Between subject	90.41	2	30.13	.63	.59
	Within subject	3960.29	62	47.71		
	total	4050.70	65			
ERQ-suppression	Between subject	11.95	2	3.98	.14	.93
	Within subject	2253.99	62	27.15		
	total	2265.95	65			
AAQ-II	Between subject	104.07	2	34.69	.32	.80
	Within subject	8910.66	62	107.35		
	total	9014.73	65			
TCQ total	Between subject	250.78	2	83.59	1.04	.37

	Within subject	6613.76	62	79.68		
	total	6864.55	65			
TCQ- punishment subscale	Between subject	41.20	2	13.73	1.86	.14
	Within subject	612.72	62	7.38		
	total	653.92	65			
TCQ-Distractio n subscale	Between subject	23.48	2	7.82	.88	.45
	Within subject	734.95	62	8.85		
	total	758.43	65			
TCQ-Worry subscale	Between subject	5.47	2	1.82	.42	.73
	Within subject	361.12	62	4.35		
	total	366.60	65			
TCQ-Social control subscale	Between subject	14.04	2	4.68	.38	.76
	Within subject	1023.70	62	12.33		
	total	1037.75	65			
TCQ-Reappraisal subscale	Between subject	88.46	2	29.48	2.26	.08
	Within subject	1080.36	62	13.01		
	total	1168.83	65			
WBSI	Between subject	69.45	2	23.15	.19	.89
	Within subject	9783.64	62	117.87		
	total	9853.10	65			
GHQ-12	Between subject	55.21	2	18.40	.81	.48
	Within subject	1873.84	62	22.57		
	total	1929.05	65			
Adherence	Between subject	419.02	2	139.67	.39	.75
	Within subject	29432.69	62	354.61		
	total	29851.72	65			
Mood	Between subject	518.571	2	259.285	.447	.641
	Within subject	36514.051	63	579.588		
	total	37032.621	65			
Intrusive thoughts	Between subject	27800.11	2	9266.70	3.69	.01
	Within subject	208118.99	62	2507.45		
	total	235919.10	65			

Table 4: Multiple Comparisons in terms of Tukey's HSD test

Group (I)	Group (J)	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Thought suppression	acceptance	-45.633*	17.408	.029	-87.41	-3.84
	control	-11.697	16.384	.756	-51.02	27.63
acceptance	Thought suppression	45.633*	17.408	.029	3.84	87.41
	control	33.936	17.243	.129	-7.45	75.32
control	Thought suppression	11.697	16.384	.756	-27.63	51.02
	acceptance	-33.936	17.24	.129	-75.32	7.45

* The mean difference is significant at the 0.05 level

According to table ξ , there is a significant difference between thought suppression and acceptance groups in terms of thought suppression. As can be seen, the mean of acceptance group is higher than thought suppression group.

Conclusion

This study showed that intrusive thoughts are different in 3 groups, and the significant differences are between acceptance and thought suppression groups. Thought suppression in comparison to control group did not lead to a significant decrease or increase of intrusive thoughts. It should be mentioned that there was a non-significant decrease in comparison to control group. This result is consistent with some researches (14, 15, 16, 17) and is inconsistent with some findings (11, 12, 47). While some researches indicated that suppression can lead to more intrusive thoughts (i.e. rebound effect) (11, 8, 12), others did not support this finding. In order to explain this inconsistency, we should mention two explanations. First, the instructions used in these researches were different. In fact, The instructions presented to control group vary in different researches. A study (8) used an expression control ("try to think of a white bear") and reported a rebound effect, but another study (15) used the mention control instructions ("think of anything you want, you might think of a white bear, but you don't have to") and did not find rebound effect. These results suggest that using different control instructions can be associated with different findings. Secondly, it should be noted that cultural issues may explain the results. Cross-cultural literature shows that emotion regulation strategies are highly affected by collectivism and individualism (20). In fact, Eastern participants in comparison to European and American participants are more inclined to use suppression. Not only is suppression widespread among Asian participants, but also it is used as a strategy to regulate negative emotions (48). Some studies indicate that Asian participants

often express lower emotional reactions to emotion provoking tasks in comparison to other cultural groups. Suppression in short-term is a useful strategy (49, 50) because it does not lead to intrusive thoughts. Not only does suppression work temporarily, but also it serves as a neutralizational strategy. As a matter of fact, suppression terminates exposure to the intrusive thoughts and prevents the perceived negative consequences of the intrusive thoughts (51). Additionally, acceptance led to a significant increase of intrusive thoughts. A study showed that participants who tended to accept intrusive thoughts experienced lower levels of depression, anxiety, obsession and intrusive thoughts (52). Another study revealed that acceptance may reduce anxiety by reducing the negative thought intrusions (47). Our finding challenges the idea that acceptance can be an effective alternative to deal with unwanted thoughts. This result makes sense because when participants are given the instruction to accept their experiences, they find themselves thinking about their feelings and experiencing their inner world without any effort to change, suppress, or evaluate them.

However, it is possible that the beneficial effects of acceptance on intrusive thoughts appear in long-term. On the other hand, there are cultural differences in non-judgmental acceptance. For example, a study (52) showed that the Taiwanese participants scored higher than the American participants in self-judgment. The researchers found that the Taiwanese parents explicitly or implicitly use shame-based strategies to socialize their children. From an early age, when children are seen to misbehave, parents regularly provoke feelings of shame to discipline them. They also frequently judge and criticize their children as a mean to correct their behavior (53). The researchers concluded that the Eastern societies emphasize shame, judgment, and threatened isolation as means of self-improvement. So, it is possible that Eastern participants, including

Iranian subjects are less familiar with non-judgemental acceptance of their experiences.

Thought suppression may have significant implications for the understanding of psychological disorders and designing interventions for them. Researchers indicated the implications of the paradoxical effects of thought suppression in many disorders, including specific phobias (54), generalized anxiety disorder (55), obsessive-compulsive disorder (56). Hence, these results have significant implications for psychological interventions in Iranian culture. Although acceptance has beneficial consequences, it should be noted that suppression is more effective in short term in terms of intrusive thoughts. However, it should be examined which of these strategies are more effective in long-term. Future studies should compare the short and long term consequences of thought suppression and acceptance on intrusive thoughts.

Noteworthy, there are some limitations in this study. Firstly, the research sample in each group was limited. Especially both genders participated in the research. Secondly, the sample consisted of non-clinical subjects with specific education and specific demographic characteristics. So, we cannot generalize findings. Thirdly, the length of instructions was not equal. So it is recommended that a larger sample with educational, occupational, age and gender diversity be examined. Secondly, a research on various clinical samples according to the literature is recommended, including PTSD (57), and OCD (58). Thirdly, different visual and verbal stimuli should be presented to create emotional conditions. Fourthly, effects of other strategies such as attention training technique (59), and mindfulness (58) on intrusive thoughts in Eastern cultures should be investigated. Fifthly, the short and long term consequences of thought suppression and acceptance on intrusive thoughts are compared.

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