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Comparison of Thought-Action Fusion and Dysfunction in Executive Functions of seniors with Anxiety Sensitivity

Abstract

This study aimed to compare thought-action fusion and executive functions of seniors with high and low anxiety sensitivity. For this purpose, a causal-comparative method was used to compare the two variables in two elderly groups. The population included all seniors who were referred to health centers in district one of Tehran in 2019. The participants were sampled by the random method, and 130 samples were assessed using the Taylor-Cox anxiety sensitivity questionnaire, the thought-action fusion instrument of Wells et al., and Barkley deficits in the executive functioning scale. The obtained data were analyzed using the one-way multivariate analysis of variance. The results of the group comparison showed that the total score of thought-action fusion and its components were different among seniors with high and low anxiety sensitivity. Elderly people with high anxiety sensitivity suffered more from thought-action fusion problems. A comparison of the executive dysfunction of seniors with high and low anxiety sensitivity showed a significant difference, and the executive dysfunction of seniors with high anxiety sensitivity was higher than the group with low anxiety sensitivity.

Keywords: *Thought-action fusion, Executive dysfunction, Anxiety sensitivity, Elderly*

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Introduction

Aging is a global phenomenon that shortly will be one of the most important social and welfare challenges in developing countries. At present, the elderly (population 60 years and older) have the highest population growth rate in the world compared to other groups. In Iran, population aging is an inevitable process (Latifi et al., 2019). In old age, a significant reduction in physical and mental strength, leaving active working life, changes in family structure, and feeling marginalized by the family and society, in addition to the transition to retirement, can be fraught with serious concerns and are associated with loss of confidence, anxiety, and physical/mental disorders (Babazadeh et al., 2014). Although worry is a common cognitive process in normal people, extreme worry is one of the main symptoms of anxiety and increased discomfort. In addition to having the main feature of generalized anxiety disorder, worry also plays an important role in other emotional disorders.

Anxiety sensitivity is one of the types of anxiety disorders that has been the focus of researchers in the field of anxiety disorders in recent years (Zalaznik, et al., 2022). Anxiety sensitivity is a stable tendency variable that indicates a desire to catastrophically interpret the physical, psychological, and social consequences of anxious experiences as distressing and dangerous (Vujanovic et al., 2018). Anxiety sensitivity is a type of anxiety that is more related to fear of anxiety and anxiety-related symptoms, and people with anxiety sensitivity believe that these symptoms lead to potentially harmful physical, psychological, and social consequences (Wilmer, et al., 2021).

High anxiety sensitivity in people is usually diagnosed by a strong negative reaction to anxiety symptoms, and also people with low anxiety sensitivity often experience such conditions as unpleasant conditions, but such conditions are not considered threatening by people with high anxiety sensitivity (Thompson and Schmidt, 2021). A person with high anxiety sensitivity considers not only stressful events but also relatively normal events to be catastrophic, while a person with low anxiety sensitivity considers these events adverse but does not catastrophize them. Therefore, it can be concluded that one's evaluation of a stressful situation has a decisive role in its subsequent consequences. Anxiety sensitivity appears to influence how people are evaluated. Accordingly, scientists have concluded that anxiety sensitivity plays a crucial role in the development and persistence of various types of mental disorders, particularly anxiety disorders (Khakpoor, Saed & Shahsavar, 2019).

On the other hand, it has been found that cognitive biases and cognitive problems are very important factors in the development of many mental disorders, particularly anxiety disorders in the elderly. The cognitive bias of thought-action fusion (TAF) has been considered in the last decade. Salkovskis (1985) and Shafran, Thordarson, and Rachman (1996) first explored this concept. The current concept of the cognitive bias of TAF was derived from Rachman (1993), Salkovskis (1985), and clinical observations of obsessive-compulsive patients, in which patients stated, "Thought equals

action." Three types of thought-action fusion are known. This likelihood is about self (I think about getting sick; this way of thinking increases my chances of getting sick); this type of TAF is called "likelihood-self". Sometimes this likelihood is related to others (if I think others are sick, they likely get sick). This TAF is called "likelihood-other." Another type of TAF is called moral TAF. Believing that "having intrusive thoughts is morally equivalent to doing that moral act", for example, if I think about cursing in the church, it is as bad as doing it (Shafran & Rachman, 2004). TAF, therefore, means "the tendency to assume a causal relationship between thoughts and external reality" (Rassin, Merckelbach, Muris, & Spaan, 1999), which is usually of three kinds: Moral thought-action fusion: Interpreting obsessive thoughts, and not performing actions related to these thoughts equal the occurrence of these thoughts (Rachman et al., 1995). Event action-thought fusion: The belief that thinking about an impossible or probable event increases the likelihood of that event occurring, and Object action-thought fusion: for example, some objects evoke bad feelings.

Scholars believe that TAF is a kind of cognitive bias that is the basis of the destructive interpretation of obsessive thoughts. This concept is related to two ideas: Intrusive thoughts about destructive actions are equal to performing those actions (moral TAF), and Thinking about a catastrophic event increases the likelihood that it will occur (likelihood TAF) (Shafran, Thordarson & Rachman, 1996). TAF is an overestimation of unwanted thoughts and therefore causes symptoms of obsessive thoughts (Rachman, et al. 1995).

Although the association between TAF and anxiety has been under-reported, this small association may indicate that TAF is a hallmark of anxiety disorders, not just OCD. In a definition of anxiety disorders, Bandelow (2022) described it as "Anxiety disorders are a type of mental illness whose symptoms include nervousness, panic and fear, sweating and increased heart rate" (Bandelow, et al., 2022). Therefore, people with TAF also have problems with cognitive inhibition. Inhibition is generally defined as conscious inhibition of attention or response to an annoying, irrelevant, and aimless stimulus.

In old age, impairment can be seen in a variety of cognitive tasks of seniors - such as attention control, response inhibition, planning, set shift, and verbal flexibility. Memory functions - particularly information storage and manipulation (working memory) and conscious recall of specific events (implicit episodic memory) - are impaired as the aging process begins.

In contrast, nonexecutive skills, such as vocabulary, numerical skills, and event memory, are relatively far removed from the damage associated with aging (Giguère-Rancourt, et al., 2022). In addition to a reduction in working memory capacity and processing speed, inhibitory capacity is also impaired in the elderly, leading to retention errors in the Wisconsin Card Classification Test (Kosky, et al., 2022). Activities that require executive functions include scheduling appointments, understanding medical information, driving, proper use of medication, cooking, dressing, and doing household chores. Executive functions are a cognitive process that coordinates purposeful and complex activities. Various studies have considered several causes for executive dysfunctions of seniors, including dendritic degeneration, chemical malformation in the forehead and hippocampus, and white and gray tissue lesions in the frontal region of the brain (Best, Miller & Jones, 2009).

Theorists (Slater and Shields), who have studied the possibility of a genetic link in the experience of anxiety, have provided evidence to support the role of biological factors in anxiety. Researchers believe that genetics plays a role in individual differences in the feeling of anxiety, and therefore different people have low or high emotional fluctuations, which is called anxiety sensitivity (Thompson, et al., 2021). Accordingly, the present study aims to compare the TAF and executive dysfunction of seniors with high and low anxiety sensitivity.

Materials and Methods

This research was a causal-comparative study to compare two dependent variables between two groups of seniors with high and low anxiety sensitivity. The population included all the seniors who were referred to the health center in district one of Tehran in 2019. The participants were sampled by the random method, and 130 people were assessed using the following three questionnaires.

Thought-Fusion Instrument (TFI): TFI (Wells et al., 2001) is a 14-item self-report scale that measures individuals' beliefs about the meaning of their thoughts, risks, and the consequences of their thoughts according to a metacognitive model. Responses are measured on a scale from zero (I do not believe in this statement at all) to 100 (I strongly believe this statement is true). This scale measures three areas of belief: thought-action fusion (if I have thoughts about hurting myself, I will eventually act on them), thought-event fusion (if I think some things will happen, my thoughts become real), and thought-object fusion (some objects evoke bad feelings). The reliability and validity of this scale were evaluated in Iran by Shirinzadeh Dastgiri (2006); the internal consistency coefficient was 0.89 for the whole scale and 0.84-0.76 for the sub-scales. The correlation of the subscales with each other and with the whole scale was 0.44-0.88, which indicates the acceptable validity and reliability of the scale.

Revised Anxiety Sensitivity Index (ASI-R): The ASI-R (Taylor & Cox, 1998) is a 36-item self-report instrument that measures the fear of anxiety-related symptoms. This instrument is specially designed to evaluate and measure the lower-order factors of anxiety sensitivity (Taylor & Cox, 1998). Based on a factor analysis of 155 outpatients with

different psychiatric diagnoses, Taylor and Cox (1998) concluded that ASI-R would have a four-factor order structure. These factors are: 1) fear of respiratory symptoms, 2) fear of anxiety reactions visible in public, 3) fear of cardiovascular symptoms, and 4) fear of lack of cognitive control. Respondents indicate their agreement with each item on a Likert scale ranging from very low (0) to very high (4). Scores range from 0 to 144, which indicate the lowest and highest scores, respectively. It should be noted that 10 ASI materials with acceptable psychometric capabilities are included in ASI-R. Taylor and Cox (1998) reported the internal consistency coefficient of ASI-R subscales for factors 1-4 as 0.91, 0.86, 0.88, and 0.89, respectively, based on Cronbach's alpha formula. They also reported a coefficient of correlation of 0.94 between ASI-R and ASI as concurrent validity. The correlation of factors ranges from 0.28 to 0.40 with each other and 0.66 to 0.77 with the overall factor (total ASI-R score), which indicates the validity of the construct for ASI-R (Taylor & Cox, 1998). In general, studies show that ASI-R has acceptable validity and reliability (Taylor & Cox, 1998).

Barkley Deficits in the Executive Functioning Scale (BDEFS): This 39-item scale was designed by Barkley (2011) for representing executive dysfunctions in non-clinical and clinical populations, particularly adults. It is applicable for the age range of 18-81 years and the response is based on a four-point Likert scale (never to always). The scale consists of five subscales, which measure five executive functions: time self-management (21 items), self-organization/problem solving (24 items), self-control/inhibition (19 items), self-motivation (12 items), and emotional self-regulation (13 items). In general, high scores on each subscale indicate further failure in that executive function. For this scale and its subscales, a norm table has been set by age and gender. Cronbach's alpha coefficients are 0.918 for the whole scale and 0.95, 0.96, 0.93, 0.91, and 0.94 for time self-management, self-organization/problem solving, self-control/inhibition, self-motivation and emotional self-regulation, respectively. Retest validity coefficients are equal to 0.84 for the whole scale and 0.83, 0.90, 0.78, 0.62, and 0.78 for time self-management, self-organization/problem solving, self-control/inhibition, self-motivation, and emotional self-regulation, respectively (Barkley, 2011).

Results

Demographic characteristics of the participants in this study showed this study was performed on 93 elderly women and 37 elderly men. The age range of the sample members was 60 to 93 years. The mean age of the sample members was 64.71 years (7.21). Most participants were in the age group of 60 to 65 years (54.31%). Also, in terms of education level, 61.23% were educated below high school, 23.85% had a high school diploma and 14.92% of the participants had an academic degree.

Table 1 shows the descriptive parameters of thought-action fusion and executive functions of both groups.

Table 1: Descriptive parameters of thought-action fusion and executive functions of both groups

Variable	Group	N	Mean	SD
Thought fusion	low anxiety	86	29.98	18.62
	high anxiety	44	73.63	29.64
	sum	130	44.76	30.84
Thought-moral fusion	low anxiety	86	18.08	10.81
	high anxiety	44	22.52	11.61
Though-object fusion	low anxiety	86	19.30	23.74
	high anxiety	44	29.40	16.10
Thought-event fusion	low anxiety	86	13.17	17.32
	high anxiety	44	23.11	25.50
Executive dysfunction	low anxiety	76	117.97	33.10
	high anxiety	42	138.97	23.80
	sum	118	125.44	31.67
Self-organization	low anxiety	83	11.92	3.16
	high anxiety	39	13.84	2.46
	sum	122	12.5410	3.08
Self-control	low anxiety	86	18.9	5.05
	high anxiety	44	23.6	5.75
	sum	130	20.5	5.73

Self-motivation	low anxiety	86	15.7	4.54
	high anxiety	44	12.4	4.64
	sum	130	14.6	4.82
Emotional self-regulation	low anxiety	81	15.2	4.52
	high anxiety	42	18.5	6.44
	sum	123	16.3	5.46
Time self-management	low anxiety	78	15.2	3.05
	high anxiety	42	15.4	3.81
	sum	120	15.2	3.32

As shown in Table 1, there are differences in the means and standard deviations of seniors with low and high anxiety sensitivity. These differences were compared using the multivariate analysis of variance (ANOVA).

Table 2 shows the comparison of thought-action fusion in seniors with high and low anxiety sensitivity.

Table 2: Multivariate ANOVA results for the comparison of thought-action fusion in seniors with high and low anxiety sensitivity

Dependent variable	Group	Sum of squares	SD	Mean of squares	F	Sig.
Thought-action fusion	Intergroup	55454.438	1	55454.438	105.47	.000
	Intragroup	67297.170	128	525.759		
	Sum	122751.608	129			
Thought-moral fusion	Intergroup	574.162	1	574.162	4.669	.033
	Intragroup	15739.408	128	122.964		
	Sum	16313.569	129			
Thought-object fusion	Intergroup	2973.255	1	2973.255	6.440	.012
	Intragroup	59092.776	128	461.662		
	Sum	62066.031	129			
Thought-action fusion	Intergroup	2875.492	1	2875.492	6.884	.010
	Intragroup	53462.816	128	417.678		
	Sum	56338.308	129			

Based on the results obtained from multivariate ANOVA to compare the total score of TAF and its components between two groups of elderly with high and low anxiety sensitivity, there is a significant difference between the two groups in terms of the total score ($p > 0.001$) and thought-moral fusion ($p > 0.033$), thought-object fusion ($p > 0.012$), and thought-action ($p > 0.01$).

Table 3 shows the comparison of executive dysfunctions of seniors with low and high anxiety sensitivity.

Table 3: Multivariate ANOVA results for the comparison of executive dysfunctions of seniors with low and high anxiety sensitivity

Executive function	Group	Sum of squares	Sd	Mean of squares	F	Sig.
Executive functions	Intergroup	11932.271	1	11932.271	13.125	.000
	Intragroup	105456.924	116	909.111		
	Sum	117389.195	117			
Self-organization	Intergroup	97.652	1	97.652	11.111	.001
	Intragroup	1054.643	120	8.789		
	Sum	1152.295	121			
Self-control	Intergroup	644.812	1	644.812	22.980	.000
	Intragroup	3591.688	128	28.060		
	Sum	4236.500	129			
Self-motivation	Intergroup	317.227	1	317.227	15.124	.000
	Intragroup	2684.781	128	20.975		

	Sum	3002.008	129			
Emotional self-regulation	Intergroup	299.401	1	299.401	10.847	.001
	Intragroup	3339.932	121	27.603		
	Sum	3639.333	122			
Time self-management	Intergroup	125.397	1	125.397	7.354	.008
	Intragroup	2182.634	128	17.052		
	Sum	2308.031	129			

The mean of the studied groups was compared in the total score and five executive dysfunctions using multivariate ANOVA. The results showed that there was a statistically significant difference between the two groups of seniors with high and low anxiety sensitivity in all subscales of executive dysfunctions. According to the results in Table 1, executive dysfunctions of seniors with high anxiety sensitivity are more than people with low anxiety sensitivity, confirming the hypotheses about the difference between executive functions of seniors with high and low anxiety sensitivity.

Discussion

This study aimed to compare the seniors with high and low anxiety sensitivity in the dimensions of thought-action fusion and executive functions. The results showed that in all dimensions of thought-action fusion, the mean scores of seniors with high anxiety sensitivity were higher than the scores of seniors with low anxiety sensitivity.

In other words, based on the results of this study, seniors with high anxiety sensitivity had higher scores in all aspects of thought-action fusion, as well as in the failure of executive actions. In other words, seniors with higher anxiety sensitivity were more vulnerable to thought-action fusion as well as to executive failure. The results of other studies also indicate the fact that thought-action fusion is higher in people with mental disorders than in normal people. For example, the results of a study by Hezel et al. (2019) showed that people with OCD consider their thoughts to be more dangerous than others' thoughts. Also, the results of Malehmir et al. (2021) study showed that the average thought-action fusion in people with obsessive-compulsive disorder and bipolar is higher than in normal people. This study also showed that the structure of moral thought-action fusion was higher in patients with bipolar disorder than in other groups. Therefore, it can be concluded that TAF-L is related to many other psychiatric pathologies, including anxiety disorders. On the other hand, TAF-M is a way of thinking in which most of the thoughts in the person have negative consequences (Demirdogen, et a., 2021). Since thought-action fusion is a form of cognitive distortion, it is expected that this cognitive distortion is more prevalent in people with mental health problems than in normal, healthy individuals. Studies also show that anxiety is rooted in metacognitive beliefs, which these people believe that worry makes negative events less likely to happen. Metacognitive mechanisms may be a possible underlying mechanism of TAF in the development of anxiety symptoms (Starcevic & Berle, 2006).

A comparison of executive dysfunctions of seniors with high and low anxiety sensitivity showed that executive dysfunctions of seniors with high anxiety sensitivity were higher than those with low anxiety sensitivity. This finding is consistent with the results of other studies such as Otto et al. (2016) and Inamura et al. (2015), who considered high anxiety sensitivity as a risk factor for psychological and mental health problems and showed a significant relationship between high anxiety sensitivity and working memory capacity.

Based on the results, future scholars are recommended to use clinical samples to investigate the relationship between anxiety sensitivity and mental health. Shorter questionnaires can be used to evaluate the dimensions of mental pathology. It is also suggested to examine the validity and reliability of other forms of this questionnaire. On the other hand, this study can be done on other ages and social strata. It is recommended to consider the predictive validity of the sensitivity and specificity of this questionnaire with different groups of patients in future studies. Investigating the relationship between anxiety sensitivity and healthy personality traits can also be one of the areas of research in the future.

Conclusion

In this study, a significant difference was found between the TAF of seniors with high and low anxiety sensitivity; in the future, anxiety sensitivity can be studied in other dimensions. The present study also shows that anxiety sensitivity is a very important anxiety construct associated with executive dysfunctions. Therefore, it seems that psychologists providing services to the elderly in research and psychological therapies, particularly cognitive-behavioral therapies, should pay special attention to this construct.

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