Comparing jumping to conclusion and personalization biases in schizophrenic patients with and without medication therapy

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(Received 24 Feb, 2013 Accepted 29 Jul, 2013)

Original Article

Abstract

Introduction: Previous studies have reported contradicting results about the effect of medication therapy on attribution bias and jumping to conclusion (JTC) bias in schizophrenic patients. This study aims at analyzing the effect of medication on attribution bias and JTC bias in schizophrenic patients.

Methods: This study is an ex post facto and casual-comparative research. 28 people including 14 schizophrenic patients, who have not used drugs already, and 14 schizophrenic patients, who have used drugs at least for past 4 weeks, were selected and they did not show any significant difference in terms of age, gender and education level. Computer-based similarities task and Internal-Personal-Situational Attributions questionnaire were used for analyzing jumping to conclusion bias and attribution bias, respectively.

Results: The independent T-test was used to analyze data. The results showed that schizophrenic patients, who had used drug at least for 4 weeks, gained higher scores in similarities task in contrast to patients, who did not use drugs; however, they did not show any significant difference in score of personalization subscale in Internal-Personal-Situational Attributions Questionnaires.

Conclusion: Jumping to conclusion bias was reduced after medication therapy, so it is a postural trait whereas personalization bias was not reduced by medication therapy, so it is a character-based trait.

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Key words: Jumping to Conclusion Bias – Patients - Schizophernia

Citation: Saffarian Z, Goodarzi MA, Rasti Kerdar N. Comparing jumping to conclusion and personalization biases in schizophrenic patients with and without medication therapy. Hormozgan Medical Journal 2015;19(3):163-168.

Introduction:

Cognitive perspectives about delusion have connected biological explanations and delusion phenomenology to each other (1). Probabilistic reasoning bias theory or jumping to conclusion bias theory is a cognitive perspective that was offered by Garety et al. (1). Jumping to conclusion bias is defined as people's attribution to make decision based on less information in hand (2). Gold, Bish, Lanon, Hubar, Cowern and Buchnan (2000) (3) argue that jumping to conclusion bias would be the cause of delusion. Hasty collection of information is related to delusion, as it can be considered as the cause of psychosis.

There is no consensus on character-based or postural nature of jumping to conclusion bias; as some theorists have treated jumping to conclusion bias as a character-based trait; hence, this bias is developed before emergence of symptoms (4) and represents a risk factor for development of psychosis; some authors have referred to this bias as a postural trait; hence, it changes with the delusional beliefs levels and may only play a role in the continued delusion (1).

Brume, Jones, Wooley, Bert, Tabraham and Valmegia (2004) (5) suggest that the response pattern of jumping to conclusion (JTC) bias is considered as a risk factor in development of psychosis. Other studies indicated that this response pattern is found in both schizophrenic patients with and without delusion experience (1,6,7). A recent longitudinal study suggests that bias is a sustainable defect and will not be removed after getting rid of symptoms (8). Accordingly, JTC bias is considered as a character-based trait. On the other hand, several studies indicated that patients with delusion may show relative improvement while committing this bias (6,9,10). This finding suggests that patients with delusion in contrast to those who are free from delusion for now show higher levels of JTC bias, which is considered as a postural trait in this condition. Perhaps emergence of such contradiction can be attributed to using imprecise instruments (1,6,11).

Benthall's defensive theory is another cognitive theory which explains about how delusions occur (Benthall, 1994) (12); according to this theory delusion is the damage caused by an exaggerated personalization bias (13). The major question about personalization bias is that whether personalization is a character-based trait or a postural trait and whether is reduced by medication? In answer to this question, Mizrahi, Edington, Remingtono Kapour (2008) (14,15) started to analyze the effect of medication on personalization bias and demonstrated that personalization bias is not reduced by medication. According to their conclusions, personalization bias is not a postural trait and is not reduced with positive symptoms, such as delusion.

Since the most important treatment for schizophrenic patients is medication therapy, this study tries to examine the effect of medication on the cognitive biases in schizophrenic patients.

Methods:

This study is a cross-sectional research which is classified as a casual-comparative research in terms of methodology. The population of the study consisted of all schizophrenic patients who have referred to Razi and Ibn-e Sina Psychiatric Hospitals in Shiraz City.

14 schizophrenic patients who have been admitted recently in the psychiatric ward and did not receive any medication and 14 schizophrenic patients, who have started to use medication at least for 4 weeks, were selected as the control group. The sample size was measured using an equations and Epilnfo software. The inclusion criteria for the sample group were primary education, having sufficient vision and having schizophrenia. The exclusion criteria were having physical diseases, neurological disorders such as epilepsy and sort of brain damages and any other psychological disease, except the main diagnosis (such as drug abuse, mental retardation or schizoaffective). These people initially were selected using convenience sampling, but later the disqualified people in terms of diagnostic interview based on DSM-IV criteria for schizophrenia disorders and also regarding inclusion and exclusion were excluded. Totally, 28 patients in two groups were examined. There was not a significant different in terms of age and gender and education level between the two groups. The subjects' age range varied from 19 to 40 years old.

Tools:

Similarities Task:

The task materials are forms that very similar to each other. These forms are offered to subjects through 17 groups. The selected images include all areas and classes with which people everyday deal (e.g. home appliances and personal stuff).

In any effort, an image as the template is displayed at the top part of the computer screen. At the same time, three roughly similar images are displayed at the bottom part of the screen; out of which only one image is exactly similar to the template. In any effort, the subject is provided

consecutively with the images through five different speeds (very fast, fast, normal, slow, and very slow). The subject is asked to choose the image that is exactly similar to the template by pushing the relevant key on the keyboard while the three images are rotating. According to the JTC theory's assumptions, when images are displayed very fast (the first round of rotation), it is very possible that people guess the most similar image based on jumping to conclusion bias. In contrast, people who have not JTC bias possibly will guess the most similar image when the images are displayed with slow (fourth or fifth rounds of rotation). The effort will finish in any step (speed) in which the subject chooses the most similar image and slower images are not displayed any more. It is supposed that people with bias in contrast to people without bias can guess the image faster when the images are rotated, it means that they guess the image when they have not sufficient evidences. In this task, for finding the most similar image in different rounds of rotation, the following scores are given: if the subject guess an image (correct or incorrect) in the first round (very fast speed) he/she will take 5; score 4 for the second round (fast speed); score 2 for the third round (normal); score 2 for the fourth round (slow); and score 1 for the fifth round (very slow). Likewise, in each step, when the subject hues the image correctly will take score 1 otherwise his/her score will be 0. The total scores of the subject for guessing the most similar images vary from 0 to 85.

For analyzing the concurrent validity of the task, the correlation coefficient of the received score, in a group consisting of 45 schizophrenic patients, were compared with the scores gained from the pieces task designed by Garety ($P<0.001$, $n=45$, $r=0.75$). Similarly, the similarities task was able to differentiate subjects without delusion experience and those with delusion experience which it implies the discriminant validity of similarities task. Cronbach's alpha and bisection method were used to analyze its reliability ($r=P<0.001$; $r = 0.95$, $P<0.001$) (11).

Internal – Personal - Situational Attributions Questionnaire:

This questionnaire is a self-report survey designed for assessing the locus of casualty. Internal - Personal - Situational Attributions Questionnaire includes 32 social situations (16) situations with positive and 16 situations with negative outcomes. Positive and negative accidents were included in the questionnaire casually. Responses are classified based on three casualties as follows: self-attributional (internal attributions), other-attributional (external-personal attributions) or attributional situation (external-situational attributions). Scores include the sum of self-attributional, other-attributional and attributional situation for both positive and negative incidents.

The externalizing bias subscale's score is measured via dividing number of external-personal attributions by the total personal-external attributions for the negative incidents and by the external-situational attributions for the negative incidents. Higher personalization scores represent more attitudes to employ other-attribution mode in contrast to attributional situation for negative incidents.

The questionnaire's internal reliability coefficient was reported 0.67 using Cronbach's alpha method. The questionnaire's reliability is 085 for positive incidents among clinical groups, and 0.81 for negative incidents. The reliability coefficient in non-clinical groups is 0.68 for positive incidents and 0.74 for negative incidents (16).

For determining the questionnaire's reliability, a total of 100 students of Shiraz University studying in different majors were selected using convenience sampling method and filled the questionnaire. The reported reliability coefficients for the questionnaire, using Cronbach's alpha and bisection methods, were 0.73 and 0.71 for positive incidents in non-clinical group; whereas they were 0.72 and 0.70 for the negative incidents.

Similarly for determining the concurrent reliability of the questionnaire its correlation coefficient was measured. The correlation coefficient measured for the Rotter's Internal-External Locus of Control Scale and externalization bias subscale was 0.70. The correlation coefficient measured for the Rotter's Internal-External Locus of Control Scale and personalization bias subscale was 0.68. The primary reliability coefficients measured using bisection and test-retest methods were 0.65 and 0.72, respectively (17).

In Iran, the reliability coefficient of this scale was reported 0.75 using test- retest method. Its discriminant validity was measured based on correlation of its scores with Marlowe-Crowne Social Desirability Scale scores, which was equal to 0.41. This tool is used for assessing the attributional bias in delusional people (17).

Results:

Generally, the average age of subjects was 28.43 years old and their SD was 4.98.Table 1 summarizes other properties of the sample group split by the research groups. The independent student's T-test method was used to test the hypothesis which says that schizophrenic patients who did not use medication show more JTC bias in contrast to schizophrenic patients who use medication (similarities task score). Table 5 shows the results of this analysis.

Since higher scores in similarities task represent more JTC bias, the Student's T-test results suggested that patients who use medication show less bias in contrast to patients who did not use medication.

Independent student's T-test was used to test the hypothesis which says schizophrenic patients who did not use medication in contrast to patients who use medication do not show any difference in terms of attributional bias (personalization bias) level. Table 6 summarizes the results of this analysis.

According to the results shown in table 3, there is not a significant difference between average scores of personalization bias in a group whose members have used medication at least for 4 weeks and the group whose members did not use medication. These findings show that patients who use medication and patients who do not use medication are similar in terms of personalization bias.

Table 1. Mean Values and SD of studies groups split by age and education level

Groups	Demographic Properties					
	No.	Men/Women	Age		Educational Level	
			Mean Value	SD	Mean Value	SD
Patients without drugs experience	14	5.9	28.67	3.12	10.91	1.32
Patients with drugs experience	14	6.8	28.34	3.11	10.81	2.12

Table 2. Mean Values and SD of using Chlorpromazine (mg) and duration of medication

Groups	Minimum score	Maximum score	Mean value	SD
Dose (mg)	65	115	78.11	2.34
Medication duration	1	70	27.9	23.26

Table 3. Mean value and SD of delusion severity in patients with and without medication experience

Groups	Mean	SD	No.	Degree of freedom	t value	Significance level
Patients with medication experience	2.01	1.42	14	26	3.43	0.02
Patients without medication experience	4.36	0.96	14			

Table 4. Comparing scores of schizophrenic patients in similarities task

Groups	Mean	SD	No.	Degree of freedom	t value	Significance level
Patients with medication experience	0.88	0.16	14	26	0.65	NS
Patients without medication experience	0.84	0.19	14			

Table 5. Comparing scores of schizophrenic patients in Personalization subscale

Groups	Mean	SD	No.	Degree of freedom	t value	Significance level
Patients with medication experience	69.17	1398	14	26	3.78	NS
Patients without medication experience	51.05	12.60	14			

Conclusion:

Previous studies have reported contradicting results on the effect of medication therapy on attributional bias and JTC bias in schizophrenic patients. This study aimed at comparing the attributional bias and JTC bias in patients who did use antipsychotic drugs with patients who used these drugs.

The results showed that the group, whose members have used drugs at least 4 weeks, showed less JTC bias in contrast to the group, whose members have used drugs. This result confirms the first hypothesis and is consistent with the previous studies (6,9,10); however, it is inconsistent with the findings of a study (8).

Since the dopaminergic system in attention deficit/hyperactivity disorder in patients with delusion increases Perceptual salience of the environmental stimulators, it is possible that such patients consider the environmental data more important than they really are (1). Hence, they may do not feel any need to analyze more precisely such stimulators for the final conclusion.

Since anti-psychotic drugs reduce dopamine release, as the result of this reduction, this mechanism would be effective in reduction of JTC bias. Since four weeks time is needed to reducing dopamine level in patients with delusion (14): thus, it is possible that subjects, who did not use drugs, show more JTC bias in contrast to those patients who have used drugs for 4 weeks. However, since this study is a cross-sectional study and control condition was not applied completely, it is impossible to conclude that improvement of schizophrenic patients who use drugs necessarily is due to using drug.

On the other hand, more studies on schizophrenic patients who use or do not use anti-psychotic drugs did not reveal any difference in terms of the personalization bias. The results were consistent with Mizrahi, Edington, Remington and Kapour (13), who demonstrated that personalization bias does not reduce with using drug and they confirm the second hypothesis of our study. As mentioned in introduction section of this paper, personalization bias is considered as a character-based trait which does not change by antipsychotic drugs (13).

In a nutshell, the results of our study showed that using antipsychotic drugs is effective on reducing JTC bias, but it has no effect on attributional bias. Therefore, making inexperienced patients familiar with the role of antipsychotic drugs role, as a moderator of JTC bias, will help them to improve their conclusion. Since personalization bias is a character-based trait and they are moderated with cognitive therapy, it is possible to help patients in diagnosing personal and situational attributions in order to decrease the gap between social conjectures and social realities and to adjust people's cognitive rigidity (18). Regarding this study's constraints in developing precise control and lab condition, it is suggested the future studies deal with studies with experimental method and applying more precise control on disturbing variables in order to achieve a more decisive conclusion.

Acknowledgement:

This article is the result of a thesis which has been completed with cooperation of Razi and Ibn-e Sina Psychiatric Hospitals in Shiraz City. It is necessary to appreciate all authorities and employees of the mentioned hospitals for their assistance in collecting data.

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