

# Evaluation of Positive and Negative Symptoms and Perception of Time in Patients with Chronic Schizophrenia

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## Abstract

**Introduction:** The purpose of this study was to evaluate the positive and negative symptoms and the perception of time in patients with chronic schizophrenia in Isar Psychiatric Hospital and the rehabilitation centers of Ardabil in 2014. The research design was descriptive and correlational.

**Method:** One hundred patients were selected through a convenience sampling method. Positive and Negative Symptom Scale and Time Perception Scale have been applied for data collection. Data analysis was achieved through Pearson correlation coefficient and multiple regression analysis.

**Results:** Findings reveal that there was no significant correlation between positive symptoms and agitation with perception of time in patients with schizophrenia ( $p > 0.05$ ). In other words, positive symptoms and agitation do not affect the perception of time in these patients. But, there was a significant correlation between negative symptoms and disorganization with perception of time ( $p > 0.05$ ). Thus, by increasing the severity of negative symptoms and disorganization, the perception of time was reduced. Also, there was no significant negative correlation between anxiety and depression with visual stimuli. This is while there was no significant relationship between these components and auditory stimuli ( $p > 0.05$ ). In the other words, with increasing levels of anxiety and depression the perception of time was reduced (estimated time to visual stimuli). This is while increased rates of anxiety and depression have no effect on the perception of time (estimated auditory stimuli). The positive and negative symptoms have the ability to predict visual stimuli and auditory stimuli in 25% and 16%, respectively.

**Conclusion:** As a result, according to the positive and negative symptoms in patients with schizophrenia, the response time to the audio and visual stimulus is different.

**Keywords:** Positive Symptoms, Negative Symptoms, Perception of Time, Schizophrenia.

## Introduction

Schizophrenia is reported as the most devastating mental illness. It affects about one percent of the population over the lifespan (1). Schizophrenia is not a single disorder; it is a set of psychosis (2), which is characterized by a different set of symptoms such as severe disabilities in thought, action, self-concept and communication skills. This debilitating disorder usually appears in late adolescence or early adulthood, disrupts the process of socialization and life skills development and increases social isolation and failure in social roles (1). Because of the early prevalence of the disease and its lifetime disruption with the need for continuous and sustained care, this disorder imposes enormous costs on the mental health system. Half of the psychiatric hospital beds are always allocated for patients with schizophrenia (3). Actually, Schizophrenia affects 1% of the world's population annually (4).

Some of the classification methods classify schizophrenia based on positive and negative symptoms. Negative symptoms include slow or shallow emotions, poverty of speech,

thought blocking, inappropriate make-up and appearance, lack of motivation, lack of pleasure, social isolation, and lack of attention and cognitive deficits. Positive symptoms are also fragmented associations, hallucinations, bizarre behavior and speech enhancement. Patients with positive symptoms usually have a better prognosis compared to patients with negative symptoms (5). The results of a study by Kay and Sui (6) reported that the positive and negative symptoms explained 0.36 of the variances of schizophrenia. In a research on fundamental psychosis aspects, Serti and Olgati concluded that there are five main factors that make the original psychosis. These five factors include mania, positive symptoms, disorganization, depression and negative symptoms. So far several models have been proposed for Schizophrenia including the three factors of positive and negative symptoms, and disorganization for schizophrenia disorder.

The perception of time is another variable that is associated with positive and negative symptoms in these patients. According to Ernst Popal, time is not an experimental concept but is a vital idea as all human perceptions are considered to be (7). Despite the ubiquity of time in the empirical world, the feeling of time is special. Intangibility, the lack of a special sensory organ to perceive time, and inconsistency between perception of time and physical time has caused many factors to be taken into account as the potential modulators of time perception, such as attention, memory, emotional arousal and mood (8).

Perception of time on the adaptive process on one hand facilitates prediction of events, and on the other hand, makes the organization and design of possible future behavior (9). Research on the perception of time is often directed by internal clock models, the models which take an inherent source of time information for granted (10). A time processor, is also called the timer, reliance on four inter locking means: 1) a clock: it is composed of a pulse generator that generates pulses at a given degree. According to Treisman (11), the pulse generator arousal level may change under the influence of external inputs, increased levels of arousal adds on pulses beats; 2) working memory reserve: in addition to storage capacity of events in the mind, this memory refers to the ability to change them as well; 3) semantic memory reserve: this memory is considered equal to the long-term memory ; 4) comparative: Its main function is to compare current values with the values from the previous experiments stored in semantic memory and finally determine the time response based on the comparison (12).

Subjective time is directly associated with the amount of attentional resources allocated to the processing of time. This means if less attention is devoted to the passage of time, the estimated time will be shorter (13). Nikpoor & Homayoni (14) showed that the people with schizophrenia cannot give an on time response to light and sound stimuli and spend more time compared to the control group. The results of Pinkham et al. (15) showed that the deficiency in attention and concentration abilities (the signs of disorganization) leads to difficulty in time reaction in patients with schizophrenia. Finally, due to the destructive nature of schizophrenia and its diagnostic

significance and since comprehensive studies have not been conducted in this field in our country, this study sought to assess the positive and negative symptoms and perception of time in patients with chronic schizophrenia.

## Method

A descriptive and correlation method was used in this study. The study sample included all the patients with schizophrenia who had admitted to the Isar Psychiatric Hospital and the rehabilitation centers of Ardabil in 2014. This sample consisted of 140 members. In this study, 100 patients (52 males and 48 females) were selected based on Cochran sampling formula using convenience sampling method.

Based on initial diagnostic interviews that were conducted by a psychiatrist, patients were selected for this research. All patients were treated with antipsychotic drugs and were in partial remission for at least 3 months. Patients with obvious physical disorders were removed from the study in case of damaged performances, childhood mental retardation, serious head blow, and substance abuse. During this study, a multimedia file with a specific time was shown to patients. They were then asked to carefully pay attention to these files. After its completion, patients were asked to tell the duration of the implementation of the files. The data were analyzed using Pearson correlation and multiple regression methods. The tools used in this study are as follows:

*Positive and Negative Symptoms Scale (PANSS):* This scale was developed by Kay et al. (16) and is a self-rating scale. The scale includes 30 five-point likert-type items. It consists of five sub-scales: Negative Symptoms (8 questions), Disorganization (7 questions), Positive (6 questions), Agitation (4 questions), Anxiety and Depression (5 questions). This questionnaire was designed by Kay et al. (1989) for a comprehensive assessment of the symptoms of schizophrenia. Many research has been carried out in regards to this questionnaire. In 1990, Kay and Sui (6) carried out this questionnaire on 240 patients with schizophrenia and identified two factors of positive and negative syndromes in order to determine the reliability factor of PANSS. Their special values were of 74.08 and 3.7, respectively. This can justify 36.01 percent of the total variance of schizophrenia. In a study, Qamari et al. (17) calculated a Cronbach's alpha of 0.77 for this scale.

*Perception of Time Study:* two visual and auditory variables were measured to assess the perception of time. In this case, a video (a one-minute video) and an audio file (50 seconds) with a time constant for all patients were used to measure the variable.

## Results

The results showed that among participants 52% were male and 48% were women, and the mean age was calculated to be 40/41. Also, 56% of participants were single, 24% married, and 20% were divorced. Furthermore, 28% of this sample were paranoid, 33% were disorganized, and 39% were undifferentiated Schizophrenia.

Also, 28% of participants were paranoid, 33% were agitated and 39% had been diagnosed undifferentiated.

**Table 1.** Mean and standard deviation of the positive and negative symptoms and perception of time

Statistics	Positive symptoms	Negative symptoms	Agitation	Anxiety and Depression	Signs of disorganization	Auditory stimuli	Visual stimuli
Mean	16.9300	24.1000	10.3400	12.8600	19.5000	3.5966	3.1292
Standard deviation	5.13112	5.65060	3.02600	3.44075	4.92469	5.13038	3.62873

**Table 2.** Correlation matrix of variables with time perception (visual stimuli, auditory stimuli) in schizophrenic patients

The independent variable	Statistics	Visual stimuli	Auditory stimuli
Positive symptoms	Correlation	.157	.169
	Significant level	.118	.092
Negative symptoms	Correlation	** .376	** .372
	Significant level	.001	.001
Agitation	Correlation	.125	.120
	Significant level	.215	.233
Anxiety and Depression	Correlation	** -.239	-.169
	Significant level	.017	.108
Signs of disorganization	Correlation	** .424	** .329
	Significant level	.001	.001

P<0/01\*\*      P<0/05\*

As shown in Table 2, the presence of positive symptoms and agitation do not effect on time perception (visual and auditory stimuli) in patients with schizophrenia. The perception of time becomes weaker with an increase in the severity of symptoms and disorganization (estimated

auditory and visual time). Perception of time becomes weaker with the increasing levels of anxiety and depression (estimated time to visual stimuli). This is while increased rates of anxiety and depression have no effect on the perception of time (estimated auditory stimuli).

**Table 3.** Correlation between the perception of time and positive and negative symptoms (visual stimuli, auditory stimuli) in disorganized patients

Components	Statistics	Agitated patients		Undifferentiated patients		Paranoid patients	
		Visual stimuli	Auditory stimuli	Visual stimuli	Auditory stimuli	Visual stimuli	Auditory stimuli
Positive symptoms	Correlation	.324	.281	* -.342	-.262	.166	.192
	Significant level	.066	.114	.033	.108	.399	.327
negative symptoms	Correlation	** .369	** .382	.267	.262	** .409	** .428
	Significant level	.001	.001	.100	.106	.001	.001
Agitation	Correlation	.073	.031	-.193	-.267	.229	.334
	Significant level	.688	.865	.240	.101	.241	.082
Anxiety and Depression	Correlation	** -.482	* .371-	* -.333	-.257	-.048	-.006
	Significant level	.005	.034	.038	.114	.810	.974
Signs of disorganization	Correlation	.340	.279	* .341	.187	** .475	** .395
	Significant level	.053	.116	.033	.254	.001	.001

P<0/01\*\*      P<0/05\*

**Table 4.** Co-linearity test results among the independent variables

The independent variable	Tolerance	VIF
Positive symptoms	0/912	1/05
Negative symptoms	0/899	1/02
Agitation	0/921	1/03
Anxiety and Depression	0/956	1/09
Signs of disorganization	0/937	1/08

According to the obtained value for the predictor variables existing in the regression model, the state has established a good co-linearity and regression analysis allowed.

The Durbin-Watson statistic is 1.91, thus the assumption of independence of error is established. Also, the regression analysis can be used.

To determine the effects of positive and negative symptoms as predictor variables, visual stimuli were analyzed in undifferentiated patients as the criterion variable in the regression equation. As shown in Table 4, the observed F is significant (p <0.01) and positive and negative symptoms can predict visual stimuli in undifferentiated patients with 25%. Due to the beta values

negative symptoms ( $\beta=0.36$ ), anxiety and depression ( $\beta=-0.30$ ) and signs of disorganization ( $\beta=0.32$ ) can predict changes to visual stimuli in undifferentiated patients.

To determine the effects of positive and negative symptoms as predictor variables, auditory stimuli were analyzed in undifferentiated patients as the criterion variable in the regression equation. As Table 4- shows, the

observed F is significant ( $p < 0.01$ ), and positive and negative symptoms can predict auditory stimuli in undifferentiated patients with 16%. Due to the beta values negative symptoms ( $\beta=0.35$ ), anxiety and depression ( $\beta=-0.22$ ) can predict changes to auditory stimuli in undifferentiated patients.

**Table 5.** Results of positive and negative symptoms multiple regression analysis predicting visual stimuli in undifferentiated patients

Predictor variables	R	R2	Non-standardized coefficients		standardized coefficients	T	P
			B	SE	BETA		
Constant	-	-	-1.333	1.875		-.711	.479
Positive symptoms	.025	.015	.111	.071	.157	1.576	.118
Negative symptoms	.142	.124	.236	.065	.368	3.641	.000
Agitation	.142	.115	.008	.136	.007	.062	.951
Anxiety and Depression	.225	.192	-.322	.101	-.305	-3.186	.002
Signs of disorganization	.291	.253	.237	.080	.322	2.959	.004

**Table 6.** Results of positive and negative symptoms multiple regression analysis predicting auditory stimuli in undifferentiated patients

Predictor variables	R	R2	Non-standardized coefficients		standardized coefficients	T	P
			B	SE	BETA		
Constant	-	-	-2.934	2.810		-1.044	.299
Positive symptoms	.029	.019	.169	.100	.169	1.702	.092
Negative symptoms	.139	.122	.325	.092	.357	3.534	.001
Agitation	.140	.113	-.013	.192	-.008	-.069	.945
Anxiety and Depression	.183	.148	-.328	.147	-.220	-2.236	.028
Signs of disorganization	.203	.160	.186	.120	.178	1.545	.126

## Discussion and Conclusion

This study aimed to assess the positive and negative symptoms and perception of time in patients with chronic schizophrenia. The results showed that there was no significant correlation between positive symptoms and agitation and perception of time (visual and auditory stimuli) in patients with schizophrenia ( $p > 0.05$ ). In other words, the presence of positive symptoms and agitation do not affect perception of time (visual and auditory stimuli) in patients with schizophrenia. The results were inconsistent with that of Nikpoor & Homayoni (14) and Wolweret et al. (18). Positive and emotional symptoms such as delusions, hallucinatory behaviors, and anxiety lead to an inability to focus on patients. Therefore, these patients may face problems in providing appropriate and on time responses to light and sound stimulus. The results showed the association between the positive symptoms and agitation with the perception of time (visual and auditory stimuli) in patients with schizophrenia.

To explain the findings it can be noted that the type of drug and the patient's condition at the time of the test can over shadow the results. Results showed that there was a significant correlation between negative symptoms and the perception of time (visual and auditory stimuli) in patients with schizophrenia ( $p > 0.05$ ). By increasing the severity of symptoms, the perception of time (estimated time auditory and visual) of these patients is weakened. The result is consistent with the findings of several studies. Nikpoor & Homayoni (14) and Wolweret al. (18) showed that people with schizophrenia cannot give a timely response to light and sound stimuli and spend more time compared to controls. Also, the results indicated that

there is a correlation between negative symptoms with the perception of time (auditory and visual stimuli) in patients with schizophrenia. Actually, it can be said that negative symptoms of schizophrenia are the most invisible and annoying signs of this disease which includes regression to primitive behaviors, isolation and lack of communication, lack of attention to personal hygiene, and loss of contact with the outside world. This also leads to many problems for patients with schizophrenia and causes increased levels of stress and consequently ends up in facing difficulty in concentrating and organizing thoughts and attention (19). These factors prevent patients in giving timely response to visual and auditory stimuli. In addition, the presence of negative symptoms in patients prevents the motivation and energy required to cooperate in social activities and to enjoy activities which can affect responding to audio and visual stimuli (14). This is due to the fact that these patients think they are forced to get involved in activities.

Moreover, the results showed that there was a significant negative correlation between anxiety and depression with visual stimuli ( $r = -0.37$ ) in patients with schizophrenia ( $p < 0.05$ ). However, there was no significant correlation between anxiety and depression with auditory stimuli in patients with schizophrenia ( $p > 0.05$ ). In other words, with increasing levels of anxiety and depression visual stimuli estimate time becomes decreased whiles increase in the estimates of these variables does not affect the auditory stimulus. In other words, by increasing anxiety and depression, the time estimation of visual stimulus weakens. However, the increase of the variables over time does not have any effect on estimating the

auditory stimulus.

It is said that generally, people with high anxiety react faster to the stimuli compared to normal people. However, people with depression have inappropriate thought patterns. On the other, the presence of disruptive factors causes lack of focus. Thus, individuals cannot show their potential performance. These factors affect the results. In this study, the visual and auditory stimuli scores of the patients have been studied. Based on the results of the study, there is a significant difference between the responses of men and women.

Other findings of the study showed there was a significant correlation between signs of disorganization and the perception of time (visual and auditory stimuli) in patients with schizophrenia ( $p > 0.05$ ). In other words, with increasing the severity of the disorganization, the perception of time (estimated time audio) in these patients is weakened.

These results are consistent with that of Pinkham et al. (20), and Pinkham et al. (21). Results by Pinkham et al. (20) showed that the presence of problems with attention and concentration (the signs of disorganization) leads to difficulty in reaction time in patients with schizophrenia. It can be explained that the core of thought disorder in schizophrenia is the inability to withdrawal irrelevant stimulus. Most of us can focus on the issues of our choice. Among the sensory information we receive, we can choose the stimuli related to the task at hand and ignore the other stimuli. It seems that individuals with schizophrenia cannot abandon irrelevant stimuli or identify relevant data among inputs. According to Bozikas (22) and Langdon (23), schizophrenic patients had poorer performance in maintaining focus compared with normal subjects. In addition, patients may find that their action is increasingly considered maladaptive. Therefore, their focus on stimuli becomes less which leads to further delay in reaction time (20).

Also, given the results, positive and negative symptoms can predict visual stimuli and auditory stimuli by 25% and 16%, respectively. Thus, response time to audio and visual stimuli differs based on positive and negative symptoms. Although this study is among the first studies in this area in Iran and is considered a positive step, but it suffers from some limitations. Studying on a small sample and its peculiar schizophrenia patients in the Isar Hospital is among the most important constraints. It is recommended that a study be conducted with a larger sample size in order to analyze all types of clinical trials conducted with higher reliability.

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