



Facial and Prosodic Emotion Recognition Deficits Associate with Specific Clusters of Psychotic Symptoms in Schizophrenia

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Submitted to

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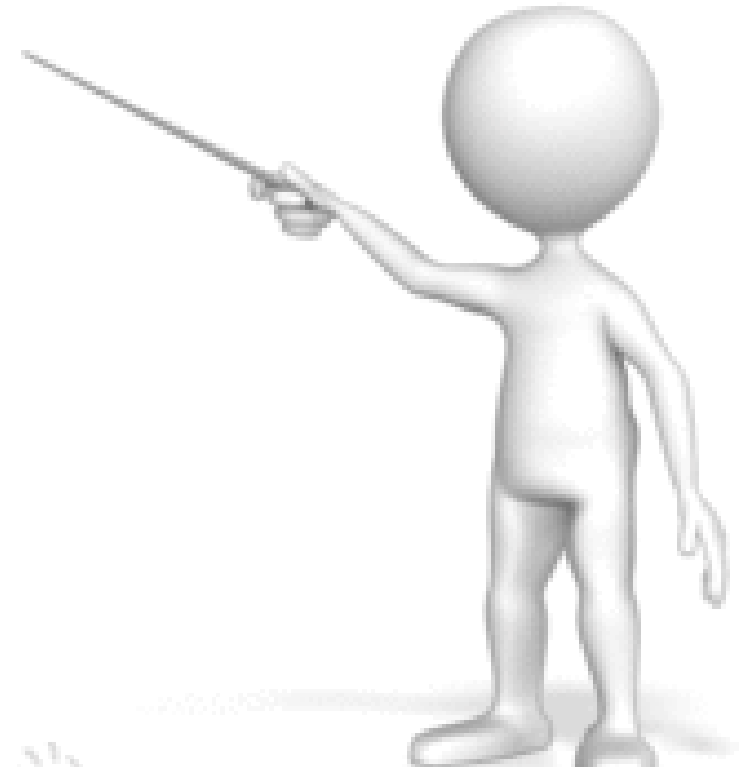
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Title Introduction

Meaning...

Facial and **Prosodic** Emotion Recognition **Deficits**
Face Expressions Tone of voice in speech Deficiency

Associate with Specific Clusters of **Psychotic Symptoms** in

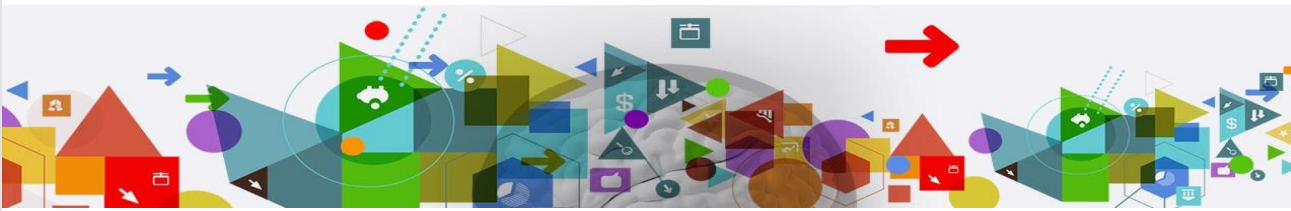
Schizophrenia

breakdown in the relation between **thought, emotion, and behavior/** breakdown from **reality/** live in **fantasy**

sensory experiences of things that **do not exist/**
Hallucination

EXECUTIVE FUNCTION & SUSTAINED ATTENTION

- Patients with schizophrenia perform significantly worse on emotion recognition tasks than healthy participants across several sensory modalities.
- Emotion recognition abilities are correlated with the severity of clinical symptoms, particularly negative symptoms.
- However, the relationships between specific deficits of emotion recognition across sensory modalities and the presentation of psychotic symptoms remain unclear.
- Aims is to explore how emotion recognition ability across modalities and neurocognitive function correlate with clusters of psychotic symptoms in patients with schizophrenia.



METHODS

- Participants
- Measurements
- Clinical and Neurocognitive Assessment Schedule
- Statistical Analyses



Who were the Participants?

Patients

111 patients who met the DSM-IV diagnostic criteria for schizophrenia not having any other disorders like neurological, visual or hearing impairment were selected to participate after signing consent. Age, gender etc. not considered in selection criteria.

Healthy Participants

Seventy volunteers and hospital staffs without a lifetime or current history of psychiatric disorder based on the information selected as healthy participants.



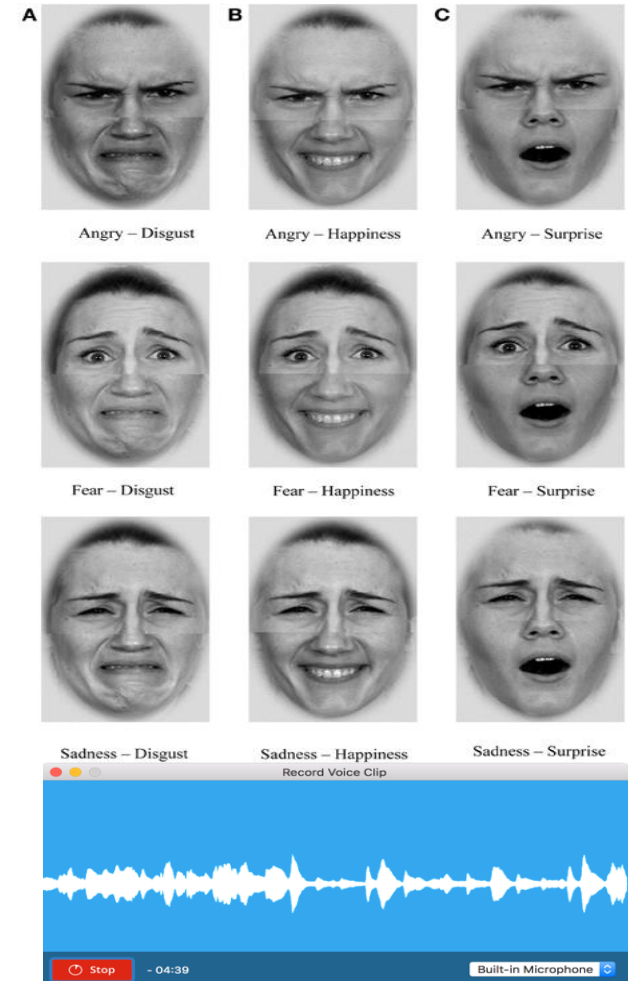
How to do Measurements?

Diagnostic Analysis of Non-verbal Accuracy(DANVA2-TW)

“A computerized measure, comprises 60 facial photographs and 60 voice clips representing specific emotions and intensities, including twelve for each of the four (happy, sad, angry, fearful) basic emotion categories, neutral stimuli or biased value not been considered here”

PROCEDURE

- The facial photos were displayed on a computer screen with a full screen size and a resolution of 1024x6768, and voice clips were delivered to the participants through an earphone.
- The faces and voices were presented in different sessions, and the participants were asked to make a forced choice among the four emotional categories.
- The result for (completely inaccurate=0) to 1 (complete accurate) were recorded and found satisfactory.



Positive and negative symptom scale (PANSS)

It is a clinical interview of symptom severity, the Positive and Negative Symptom Scale. Marking participant into four-dimension structure includes 26 items.

1. Delusion/Hallucination (P1,P3,P6,G9);
2. Negative Symptoms (N1,N2,N3,N4,N5,N6,G7,G10,G13);
3. Disorganized thought (P2,N7,G11,G15);
4. Hostility/excitement (P7,G4,G8,G14,G16,S1,S2,S3,S4).

Table 2. Clinical symptom ratings in patients with schizophrenia by PANSS and dimension scores.

PANSS total scores, scale scores and dimensional scores in patients with schizophrenia (n = 92/111)	
Total PANSS Scores	55.60±15.66
Positive Scale	11.91±4.43
Negative Scale	14.67±5.85
General Scale	25.33±7.88
Supplement Scale	3.69±1.39
Symptom Dimension Score	
Delusion/Hallucination	8.58±4.52
Negative Symptoms	17.37±6.54
Disorganized thought	11.64±4.11
Hostility/excitement	6.40±2.73

Clinical and Neurocognitive Assessment Schedule?

The schedule contained information regarding demographic features for all participants, including age, gender, educational level, and clinical features for patients, including age of onset of psychotic symptoms, and duration of illness.

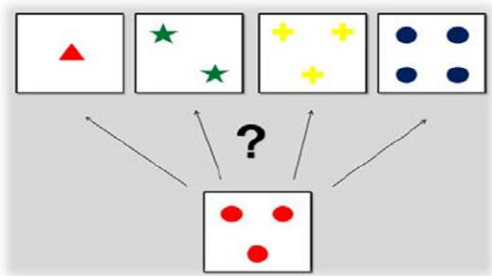
Continuous performance task (CPT).

Numbers from zero to nine were randomly presented for 50 milliseconds on CPT machine, each at a rate of one per second. Participants were asked to respond whenever the number nine appear before number one on the screen. Sensitivity was derived from the hit rate and false-alarm rate for non-target trials. CPT performance indicators were calculated as the **z scores**, which were adjusted for demographic features.



Wisconsin card sorting test (WCST).

Participants were asked to match 128 response cards to the four stimulus cards along one of three dimensions (color, form, number), by pressing one of the four number keys on the computer keyboard. Patients of Schizophrenia failed to do complete the tasks.



Subtests from wechsler adult intelligence scale –III.

To find out cognitive capacity of patients considered 5 factors. (digit span, block design, Arithmetic, digit symbol substitution and information)

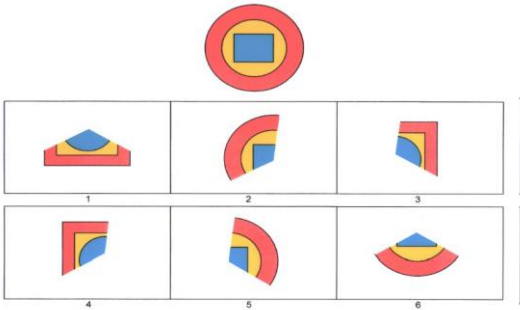


Table 4. ANCOVA for the differences of emotion recognition ability

	Schizophrenia (n= 111) Mean ± SD	Control (n=70) Mean ± SD
Overall Emotional Recognition Abilities		
Overall	0.67±0.13	0.79±0.08
Facial	0.68±0.13	0.77±0.08
Voice	0.66±0.16	0.81±0.10
Separate Emotional Categories		
Happy	0.79±0.15	0.89±0.09
Sad	0.71±0.18	0.84±0.12
Angry	0.67±0.15	0.74±0.12
Fearful	0.52±0.23	0.70±0.16



RESULTS

- Demographic and Clinical Characteristics
- Emotion Recognition
- Correlation Analysis
- Regression Analysis



Demographic and Clinical Characteristics

There were no significant differences in age and gender between healthy participants and patients with schizophrenia. However, patients with schizophrenia were significantly lower in education and all cognitive measures including estimated IQ. The mean dosages of various medications were around the recommended dose level.

Emotion Recognition

Emotion recognition ability of patients with schizophrenia was significantly worse than that of healthy participants, in both face and voice channels. Fearful emotion recognition was the most discriminative emotion between patients with schizophrenia and healthy participants (0.52 vs. 0.70, ANCOVA $F = 14.74$, $p = 0.001$).

Table 3. Current medication in Patients with Schizophrenia ($n = 111$).

Medication Name	Number of patients	Range of dosage (mg)	Average dosage (mg)
Antipsychotics			
Amisulpride	9	200–1200	522.22
Aripiprazole	6	7.5–30	17.50
Chlorpromazine	2	50–100	75.00
Clozapine	21	75–500	292.50
Flupentixol	1	5–5	5.00
Haloperidol	7	5–20	12.14
Olanzapine	18	2.5–30	15.42
Quetiapine	7	25–700	360.71
Risperidone	22	1–9	3.82
Sulpiride	16	200–1000	440.63

Table 4. ANCOVA for the differences of emotion recognition ability between patients with schizophrenia and healthy participants.

	Schizophrenia ($n = 111$) Mean \pm SD	Control ($n = 70$) Mean \pm SD	$F(1, 177)$	Effect size	p value
Overall Emotional Recognition Abilities					
Overall	0.67 \pm 0.13	0.79 \pm 0.08	14.16	1.11	<0.001***
Facial	0.68 \pm 0.13	0.77 \pm 0.08	6.69	0.83	0.01*
Voice	0.66 \pm 0.16	0.81 \pm 0.10	15.78	1.12	<0.001***
Separate Emotional Categories					
Happy	0.79 \pm 0.15	0.89 \pm 0.09	8.97	0.55	0.03*
Sad	0.71 \pm 0.18	0.84 \pm 0.12	8.00	0.84	0.02*
Angry	0.67 \pm 0.15	0.74 \pm 0.12	4.87	0.52	0.07*
Fearful	0.52 \pm 0.23	0.70 \pm 0.16	14.74	0.91	0.001***

Correlation Analysis

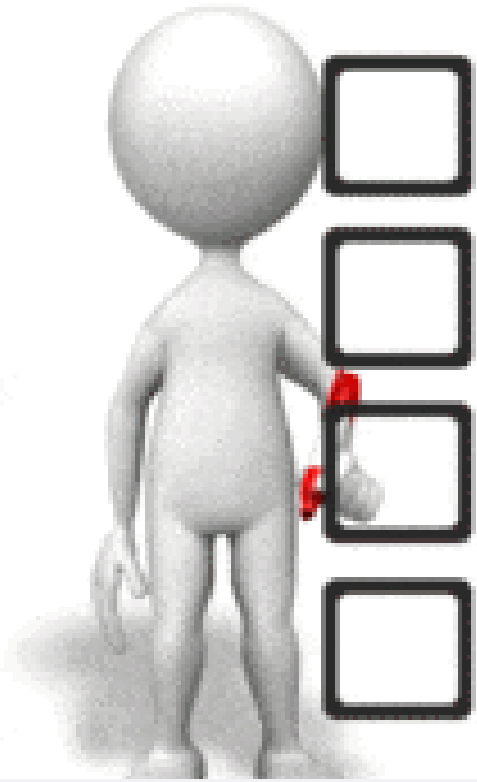
There was no correlation between PANSS total score and demographic but Correlation between nonverbal emotion recognition and PANSS scores is present. Only the accuracy in results of voice modality and happy emotion is correlated with PANSS total score.

Regression Analysis

Age, gender, education, duration of illness, age of onset, estimated full scale IQ, and WCST and CPT were entered as predictors. Multiple linear regression analyses were compared and led to the same results. When analyzed separately the accuracy of happy emotion recognition found significant predictors in errors in WCST. No significant results found on Facial emotions. Recognition of happy voices remained significant to predict both delusion/hallucination dimension and disorganized thoughts dimension. No significant findings were noted for recognition of happy faces.

Table 5. Correlations between emotion recognition and clinical symptoms ($n=92$).

	Overall Faces		Prosodic	Happy	Sad	Anger fear	
PANSS	-.21 ⁺	-.11	-.25 ⁺	-.33 ⁺	-.16	-.04	-.13
Negative Symptoms	-.21 ⁺	-.15	-.22 ⁺	-.18	-.19 ⁺	-.07	-.17
Delusion/ Hallucination	-.09	-.05	-.11	-.27 ⁺	-.13	.05	.02
Disorganized Thought	-.15	-.05	-.21 ⁺	-.27 ⁺	-.09	-.05	-.08
Excitement/ Hostility	-.12	-.04	-.17	-.17	-.07	.02	-.12



DISCUSSION



- In patients with schizophrenia relative to healthy participant their voice modality was more prominent than facial modality and greater impairment in distinguishing fear emotions.
- Lower accuracy of recognizing happy emotion was associated with higher levels of positive symptoms and disorganized thoughts.
- One of the limitations of the present study was the absence of an independent evaluation of concurrent mood status. Some might argue that failure of identifying happy emotion is secondary to depressive mood which is prevalent in patients of schizophrenia. But no comparable results found after considering who takes antidepressant and who don't take.
- Absence of a measurement of premorbid IQ is one of the greatest factor.
- Deficits in emotional processing in specific categories, i.e. in happy emotion, together with deficit in executive function, may reflect dysfunction of brain systems underlying severity of psychotic symptoms , in particular the positive dimension.

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Thank you!

Any Question??