Social Cognition in Schizophrenia - Assessment and Treatment

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Medical University of Vienna, Austria
Conflict of interest statement
Gabriele Sachs, Prof., M.D., Ph.D.

- Professor of Psychiatry, Medical University of Vienna, Austria
- Head: Clinical Cognitive Neuroscience, Department of Psychiatry and Psychotherapy, Medical University of Vienna, Austria
- Head: First Episode and Early Psychosis Program, Department of Psychiatry and Psychotherapy, Medical University of Vienna, Austria
- President: Austrian Society of Neuropsychopharmacology and Biological Psychiatry (ÖGPB)
- Member: ECNP European Network for Schizophrenia
- Member Supervisory Board: Johannes Kepler University Linz, Austria
- Paid lectures and advisory boards for major pharmaceutical companies with drugs used in psychiatric disorders
- No share holdings in pharmaceutical companies
Cognitive Deficits in Schizophrenia: Emil Kraepelin

Thought disorder as a consequence of deficits in attention and concentration are progressive ‘Dementia praecox’

Structural – functional deficits
Atypical Antipsychotics and „Neuroprotection“
Schizophrenia DSM -5

Criterion A. Characteristic symptoms: (Minor change)
Two (or more) of the following, each present for a significant portion of time
during a 1-month period (or less if successfully treated).
At least one of these should include 1–3

1) Delusions
2) Halluzinations
3) Desorganized speech
4) Desorganized or catatonic behaviour
5) Negative symptoms (e.g. diminished emotional expression or avolition)

Diagnostic and Statistical Manual of Mental Disorders. Fifth Edition
DSM-5, American Psychiatric Association.
Cognitive deficits in schizophrenia are common and are strongly linked to vocational and functional impairments. These deficits can include decrements in declarative memory, working memory, language function and other executive functions, as well as slower processing speed. Abnormalities in sensory processing and inhibitory capacity, as well as reductions in attention, are also found.

Some individuals with schizophrenia show social cognitive deficits, including deficits in the ability to infer the intentions of other people (theory of mind), and may attend to and then interpret irrelevant events or stimuli as meaningful, perhaps leading to the generation of explanatory delusions. These impairments frequently persist during symptomatic remission.
The Role of Cognition in the Psychopathology of Schizophrenia: Structure of the psychotic disorders classification in DSM-5
Social Cognition in Schizophrenia – Assessment and Treatment

- Social cognition
  - Emotion recognition
  - Neurobiological correlates

- Treatment of social cognitive impairment
  - Cognitive remediation
  - Training in Affect Recognition (TAR)
  - Mentalization-Based Training (MBT)
Social cognition in schizophrenia

- *Social cognition* is a **multidimensional construct** including emotional perception, social perception, „Theory of Mind“ and attributional style (Penn et al., 2005, Green 2015)

- Deficits of social cognition in schizophrenic patients are **stable throughout the course of illness** (Brekke et al., 2007)

- Research is focusing in particular on impairments in **facial affect recognition** (Edwards et al., 2002; Sachs et al. 2004; Wölwer et al., 2005, Sachs 2012).

- Link between facial affect recognition and social functioning including **quality of life** (Addington et al. 2006)
Social cognition in schizophrenia

Michael F. Green, William P. Horan and JunghLee

Social cognitive processes in schizophrenia.
Facial recognition deficits and cognition in schizophrenia

Gabriele Sachs\textsuperscript{a,}*, Dorothea Steger-Wuchse\textsuperscript{a}, Ilse Kryspin-Exner\textsuperscript{b}, Ruben C. Gur\textsuperscript{c}, Heinz Katschnig\textsuperscript{a}

\textsuperscript{a}Department of Psychiatry, University of Vienna, Währinger Gürtel 18-20, 1090 Vienna, Austria
\textsuperscript{b}Department of Psychology, University of Vienna, Vienna, Austria
\textsuperscript{c}Department of Psychiatry, University of Pennsylvania, Philadelphia, USA

Received 22 December 2002; accepted 20 April 2003

Abstract

Previous investigations have found impaired recognition of facial affect and cognition in schizophrenia. We compared patients with schizophrenia and healthy control volunteers on computerized tasks of emotion recognition, to determine whether emotion processing deficits were correlated with neurocognitive performance. A Computerized Neuropsychological Test Battery (CNP) was administered to 40 patients (25 male, 15 female, mean age ± S.D. 30.4 ± 8.1) with schizophrenia (DSM-IV, 15 first episode and 25 chronically ill patients) treated with atypical neuroleptics and 43 healthy volunteers. A German version of the PENN Facial Discrimination, Differentiation and Memory Test, including happy, sad and neutral faces was used. Additionally, all patients were tested with a standard neuropsychological battery and were rated for positive and negative symptoms. Patients with schizophrenia performed worse than control subjects on all emotion recognition tasks ($p < 0.01$). We found higher error rates for discrimination of emotion in happy ($p < 0.02$) and happy female faces ($p < 0.01$), for differentiation of sad versus happy faces ($p < 0.001$) and for facial memory ($p < 0.04$). Poorer performance in emotion discrimination and facial memory correlated with severity of negative symptoms, abstraction–flexibility ($p < 0.001$), verbal memory ($p < 0.01$) and language processing ($p < 0.001$). The study did not reveal a specific deficit for emotion recognition in schizophrenia. These findings lend support to the notion that difficulties in emotion recognition are associated in schizophrenia with key cognitive deficits.

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Social cognition in schizophrenia: Emotion recognition

ANCOVA *P<0.01

MATRICS Consensus Cognitive Battery (MCCB)

Measurement and Treatment Research to Improve Cognition in Schizophrenia: MATRICS

- Attention/information processing
- Processing speed
- Reasoning and problem-solving
- Verbal learning and memory
- Visual learning and memory
- Working memory
- Social cognition

<table>
<thead>
<tr>
<th>Cognitive Domains in Schizophrenia</th>
<th>Neuropsychological Tests</th>
</tr>
</thead>
<tbody>
<tr>
<td>Information processing</td>
<td>Symbol Coding (BACS)</td>
</tr>
<tr>
<td></td>
<td>Verbal Fluency –Animal name (BVMT-R)</td>
</tr>
<tr>
<td></td>
<td>Trail Making Test- (TMT)</td>
</tr>
<tr>
<td>Attention/Vigilance</td>
<td>Continuous Performance Test (CPT-IP)</td>
</tr>
<tr>
<td>Working memory (nonverbal)</td>
<td>Wechsler Memory Test (WMS-II)</td>
</tr>
<tr>
<td>Working memory (verbal)</td>
<td>Digit – Letter Span (LNS)</td>
</tr>
<tr>
<td>Verbal Learning</td>
<td>Hopkins Verbal Learning (HVLT-R)</td>
</tr>
<tr>
<td>Visual Learning</td>
<td>Spatial Visual Memory-Shorttest</td>
</tr>
<tr>
<td>Logical thinking and problem solving</td>
<td>Maze test (NAD)</td>
</tr>
<tr>
<td>Social Cognition</td>
<td>Mayer-Salovey-Caruso Test emotional intelligence (MSCEIT)</td>
</tr>
</tbody>
</table>
The Course of Cognitive Dysfunction and Social Cognitive Deficits in Schizophrenia

Keefe et al. 2014 J Clin Psychiatry 75 (suppl 2), 8-13
Emotional Intelligence of Schizophrenia – First – Degree – Relatives

Mayer-Salovey-Caruso Test
Emotional intelligence (MSCEIT)

EI is the ability which enables cognitive processing of emotional information and can be measured with performance tasks Mayer, Salovey and Caruso 2000

Quality of Life (WHOQOL – Total Score)

R. Steinmayr, A. Schütz, J. Hertel, M. Schröder-Abé Verlag Hans Huber, Bern

Hainz K and Sachs G. 2014
Impaired facial emotion perception in schizophrenia: A meta-analysis
Raymond C.K. Chan a,b,*, Huijie Li a,b,c, Eric F.C. Cheung d, Qi-yong Gong e

TOTAL MEAN EFFECT SIZE = -0.85
Correlations between neurocognition, symptoms, facial recognition, and emotion processing.

<table>
<thead>
<tr>
<th>Neurocognitive Domains</th>
<th>Facial Recognition</th>
<th>Emotion Processing (Facial Stimuli)</th>
<th>Symptom Domains</th>
</tr>
</thead>
<tbody>
<tr>
<td>Verbal Memory</td>
<td>.21</td>
<td>.27</td>
<td></td>
</tr>
<tr>
<td>Visual Memory</td>
<td>.41</td>
<td>.30</td>
<td></td>
</tr>
<tr>
<td>Working Memory</td>
<td>.28</td>
<td>.28</td>
<td></td>
</tr>
<tr>
<td>Reasoning and Problem Solving</td>
<td>.45</td>
<td>.28</td>
<td></td>
</tr>
<tr>
<td>Speed of Processing</td>
<td>.24</td>
<td>.29</td>
<td></td>
</tr>
<tr>
<td>Attention/Vigilance</td>
<td>.28</td>
<td>.29</td>
<td></td>
</tr>
<tr>
<td>Reality Distortion</td>
<td>-.02</td>
<td>-.21</td>
<td>81 (2)</td>
</tr>
<tr>
<td>Disorganization</td>
<td>-.25</td>
<td>-.32</td>
<td>124 (3)</td>
</tr>
<tr>
<td>Negative Symptoms</td>
<td>-.22</td>
<td>-.25</td>
<td>312 (7)</td>
</tr>
<tr>
<td>Positive Symptoms</td>
<td>-.25</td>
<td>-.18</td>
<td>36 (1)</td>
</tr>
</tbody>
</table>

Facial recognition and emotion processing \( r = .51 \)

\( N = 102 \) studies
### Correlation Between Neurocognition (NC) or Social Cognitive (SCI) Performance and Community Functioning in Studies of Patients with Nonaffective Psychosis

<table>
<thead>
<tr>
<th>Cognitive Domain</th>
<th>Estimated Average Correlation</th>
<th>pValue</th>
</tr>
</thead>
<tbody>
<tr>
<td>Theory of mind/Mentalizing (SC)</td>
<td>0.48</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Social perception and knowledge (SC)</td>
<td>0.41</td>
<td>.004</td>
</tr>
<tr>
<td>Verbal fluency (NC)</td>
<td>0.32</td>
<td>.004</td>
</tr>
<tr>
<td>Emotion perception and processing (SC)</td>
<td>0.31</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Verbal learning and memory (NC)</td>
<td>0.26</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Processing speed (NC)</td>
<td>0.25</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Working memory (NC)</td>
<td>0.22</td>
<td>.01</td>
</tr>
<tr>
<td>Visual learning and memory (NC)</td>
<td>0.20</td>
<td>.003</td>
</tr>
<tr>
<td>Reasoning and problem solving (NC)</td>
<td>0.19</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Attention and vigilance (NC)</td>
<td>0.16</td>
<td>.01</td>
</tr>
</tbody>
</table>

Green M, J Clin Psychiatry 2016, 77 suppl2, 8-11
Fett Ak, Neurosci Biobehav Rev 2011, 35 (3) 573-588
Neurocognition and every day living activities

Neurocognition

Negative symptoms

Positive symptoms

Depression

Social cognition

Every day activities community

Relationship

Work

Please can you provide the paper where this diagram picture was taken from, so that we can attempt to improve the resolution of the image?

vinita.chambore; 06.09.2012
Social cognition in schizophrenia in comparison to bipolar disorder: A meta-analysis

26 studies
Facial emotion recognition  $d = 0.39$
Theory of mind (TOM)  $d = 0.59$

Bora et al. 2016 Schizophr Res

Social cognitive impairment is more severe in schizophrenia in comparison to BD comparable to other neurocognitive differences
Social Cognition in Schizophrenia – Assessment and Treatment

- Social cognition
  - Emotion recognition
  - Neurobiological correlates

- Treatment of social cognitive impairment
  - Cognitive remediation
  - Training in Affect Recognition (TAR)
  - Mentalization-Based Training (MBT)
1. **Medial prefrontal Cortex (mPFC)**
   Mentalizing, theory of mind (ToM)
   (Fletcher et al., 1995; Gallagher et al., 2000; Gilbert et al., 2006 (meta-analysis))

2. **temporo-parietal junction (TPJ)**
   Prediction: Biological motion, eye gaze
   Perspective-taking: Different physical points of view
   Pelphrey et al., 2004a,b; Kawawaki et al., 2006
   Mitchell 2007

3. **Amygdala**
   Emotion recognition, empathy
   -‘Approach’ vs. ‘avoid’
   -Facial Affect

4. **Temporal poles**
   Social scripts, complex event knowledge
   Funnell, 2001; Damasio et al., 2004;
Neural systems underlying social regulatory processes
The social regulation of emotion

Emotion processing in schizophrenia

VLPFC: Ventrolateral prefrontal cortex; DLPFC: Dorsolateral prefrontal cortex; ACC: Anterior cingulate cortex; OFC: Orbitofrontal cortex.


Facial Emotion Recognition in Schizophrenia (fMRI)

Timing of stimulus presentation

"Presentation" Software package Power Lab (Drexel Univ, Philadelphia) via Videobeamer Menox Inc and two mirrors

Differences in amygdala activation between schizophrenic patients and healthy controls

Group difference (18 schizophrenics, 17 healthy controls)
Emotion minus age contrast

Differences in amygdala activation between schizophrenic patients and healthy controls

35 neuroimaging studies

Contrasts between negative and neutral stimuli

Effect size .20 SD
Meta-Analysis of Functional Neuroimaging Studies

Emotion Perception, General Emotion, Implicit and Explicit Face Emotion Processing in patients with schizophrenia compared to healthy controls

A) Emotion Perception

B) General Emotion, negative

C) Implicit processing

D) Explicit processing

Compensatory processes: greater cognitive effort to encode emotional stimuli

yellow HC > SP, blue SP > HC

HC>SP: Bilateral amygdala, Visual proc. areas, DLPFC, ACC, Medial FC, subcortical

SP>HC: cuneus, left parietal lobe, right precentral gyrus, left temporal lobe

Altered Visual-Limbic Subnetwork in Relatives of Patients With Schizophrenia During Emotional Face Processing

Cao et al. JAMA Psychiatry, 4/2016

Relatives N = 58
Controls N = 94

Patients with schizophrenia N = 31
Controls N = 45

Cao et al. JAMA Psychiatry, 4/2016
Social Cognition in Schizophrenia – Assessment and Treatment

- Social cognition
  - Emotion recognition
  - Neurobiological correlates
- Treatment of social cognitive impairment
  - Treatment with antipsychotics/cognitive enhancer
  - Cognitive remediation
  - Training in Affect Recognition (TAR)
  - Mentalization-Based Training (MBT)
Treatment of social cognition in schizophrenia

FDA–NIMH–MATRICS: clinical trial guidelines

The Food and Drug Administration
National Institute of Mental Health
Measurement and Treatment Research to Improve Cognition in Schizophrenia.

Antipsychotics + Cognitive enhancer = Psychosocial training
Cognitive remediation

Cognitive training
Training affect recognition
Facial affect processing deficits in schizophrenia: A meta-analysis of antipsychotic treatment effects

<table>
<thead>
<tr>
<th>Study</th>
<th>Drug</th>
<th>N</th>
<th>Weight (%)</th>
<th>Hedge's g</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bédicou</td>
<td>Haloperidol</td>
<td>44</td>
<td>3.8</td>
<td>0.15</td>
<td>-0.27, 0.56</td>
</tr>
<tr>
<td>Lewis</td>
<td>Haloperidol</td>
<td>18</td>
<td>1.5</td>
<td>0.06</td>
<td>-0.59, 0.72</td>
</tr>
<tr>
<td>Penn</td>
<td>Perphenazine</td>
<td>159</td>
<td>13.6</td>
<td>0.16</td>
<td>-0.06, 0.38</td>
</tr>
<tr>
<td>Sergi</td>
<td>Haloperidol</td>
<td>13</td>
<td>1.3</td>
<td>-0.58</td>
<td>-0.27, 1.37</td>
</tr>
<tr>
<td>Wölwer</td>
<td>Haloperidol</td>
<td>12</td>
<td>1.0</td>
<td>0.55</td>
<td>-0.27, 1.37</td>
</tr>
<tr>
<td>Wölwer</td>
<td>Perazine</td>
<td>20</td>
<td>1.6</td>
<td>0.72</td>
<td>0.07, 1.36</td>
</tr>
</tbody>
</table>

**TYPICAL (P = 0.20)**

<table>
<thead>
<tr>
<th>Study</th>
<th>Drug</th>
<th>N</th>
<th>Weight (%)</th>
<th>Hedge's g</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Behere</td>
<td>Risperidone</td>
<td>25</td>
<td>2.1</td>
<td>0.22</td>
<td>-0.34, 0.77</td>
</tr>
<tr>
<td>Cabral-Calderin</td>
<td>Quetiapine</td>
<td>19</td>
<td>1.6</td>
<td>0.25</td>
<td>-0.23, 0.73</td>
</tr>
<tr>
<td>Daros</td>
<td>Risperidone</td>
<td>19</td>
<td>1.6</td>
<td>0.29</td>
<td>-0.35, 0.93</td>
</tr>
<tr>
<td>Harvey</td>
<td>Quetiapine</td>
<td>124</td>
<td>10.6</td>
<td>0.14</td>
<td>-0.11, 0.39</td>
</tr>
<tr>
<td>Harvey</td>
<td>Risperidone</td>
<td>142</td>
<td>12.1</td>
<td>0.12</td>
<td>-0.12, 0.35</td>
</tr>
<tr>
<td>Penn</td>
<td>Olanzapine</td>
<td>170</td>
<td>14.5</td>
<td>0.11</td>
<td>-0.11, 0.32</td>
</tr>
<tr>
<td>Penn</td>
<td>Quetiapine</td>
<td>161</td>
<td>13.8</td>
<td>0.08</td>
<td>-0.14, 0.30</td>
</tr>
<tr>
<td>Penn</td>
<td>Risperidone</td>
<td>161</td>
<td>13.8</td>
<td>0.10</td>
<td>-0.12, 0.32</td>
</tr>
<tr>
<td>Sergi</td>
<td>Olanzapine</td>
<td>28</td>
<td>2.8</td>
<td>0.14</td>
<td>-0.35, 0.62</td>
</tr>
<tr>
<td>Sergi</td>
<td>Risperidone</td>
<td>32</td>
<td>3.0</td>
<td>-0.03</td>
<td>-0.49, 0.44</td>
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</tbody>
</table>

**ATYPICAL (P = 0.01)**

<table>
<thead>
<tr>
<th>Study</th>
<th>Drug</th>
<th>N</th>
<th>Weight (%)</th>
<th>Hedge's g</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
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<td></td>
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</tbody>
</table>

**OVERALL (P = 0.003)**

<table>
<thead>
<tr>
<th>Study</th>
<th>Drug</th>
<th>N</th>
<th>Weight (%)</th>
<th>Hedge's g</th>
<th>95% CI</th>
</tr>
</thead>
</table>

Gabay et al. 2015, Journal of Psychopharmacology, 29(2) 224-229
No amygdala attenuation in schizophrenic patients treated with atypical antipsychotics

Gabriele Sachs a,*, Ewald. Moser b, c, Heinz Katschnerg d, Ruben C. Gur e, Raquel E. Gur e, Andreas Erfurth f

* Department of Psychiatry and Psychotherapy, Medical University of Vienna, Vienna, Austria
b MR Center of Excellence, Medical University of Vienna, Vienna, Austria
c Center for Biomedical Engineering and Medical Physics, Medical University of Vienna, Vienna, Austria
d Ludwig Boltzmann Institute, Vienna, Austria
e Department of Psychiatry, University of Pennsylvania, Philadelphia, PA, USA
f Otto-Wagner-Spital, Vienna, Austria

ABSTRACT

Functional magnetic resonance (fMRI) imaging was used to measure amygdala activation in an emotional valence discrimination task in clinically stable patients with schizophrenia treated with atypical antipsychotics and healthy controls. No difference was detected between patients with schizophrenia and controls.
No amygdala attenuation in schizophrenic patients: effects of a 6-week treatment with atypical antipsychotics.

‘Emotions plus age’ contrast $t$ values overlayed on anatomical slices covering the amygdalae.

Healthy controls (n=11)  Patients with schizophrenia (n=11)

Treatment of social cognition in schizophrenia (mentalization-based training and beyond): the Vienna experience

- Social cognition
  - Emotion recognition
  - Neurobiological correlates
- Treatment of social cognitive impairment
  - Effect of Antipsychotics
  - Cognitive remediation
  - Training in Affect Recognition (TAR)
  - Mentalization-Based Training (MBT)
Treatment with antipsychotics
Psycho-education - Compliance
Cognitive Remediation – COGPACK
Cognitive Behavioural Therapy – CBT
Training of Affect Recognition – TAR
Mentalization - based training - MBT

Neuronal mechanisms
Electrophysiological markers P300 and EEG Mapping – LORETA
Structural and functional imaging – MRI, fMRI, DTI, SPECT
<table>
<thead>
<tr>
<th>Treatment Model</th>
<th>Neurocognition - Social cognition areas</th>
<th>Methods of Intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cognitive Remediation COGPACK- Marker</td>
<td>Neurocognition</td>
<td>Psychoeducation</td>
</tr>
<tr>
<td>Training of Affect Recognition TAR</td>
<td>Emotion recognition</td>
<td>Exercises Errorless learning</td>
</tr>
<tr>
<td>Wölwer et al.2005</td>
<td>Emotion perception</td>
<td>Discrimination learning</td>
</tr>
<tr>
<td></td>
<td>Social interaction</td>
<td>Situative anchors</td>
</tr>
<tr>
<td>Mentalized Based Treatment i - MBT</td>
<td>Perspective Taking</td>
<td>Exercises Role playing</td>
</tr>
<tr>
<td>Fonagy and Bateman 2006</td>
<td>Social interaction</td>
<td>Clarification, Exploration</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Affect identification</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Interpersonal</td>
</tr>
</tbody>
</table>
Studies are listed by their Clinical Trial Assessment Measure scores (Table 1) in ascending order.
COGPACK®

Sub-programs

VISOMOTOR SKILLS: Steer, follow or mark a moving figure. Divide lines or pies. Reproduce or mirror a drawing. Catch a bouncing ball.


LANGUAGE MATERIAL: Various cues to find words or labels. Questions about text-content. Attribution of quotations to authors or titles to poems. Placing words or syllables into correct order. Anagrams. Semantic fields. Vocabulary.

MEMORY: remember series of words, images and labels, patterns, signs, addresses, routes, scenes. Various types of recall and repetition applicable.


KNOWLEDGE, ORIENTATION, EVERYDAY LIFE: Times, dates, compass, money, weights and measures, traffic signs, licence plates, abbreviations, keyboard, geography, etc.

SPECIAL ELEMENTS: labyrinths, color/word interference, note and tone, 3-D positioning, assumptions about public opinion.
Cognitive remediation
COGPACK Training

Sachs G et al. WCBP, 2005
Vol.6, Suppl 1, S10

executive function, memory, verbal and visual memory
Professor Sachs - Please can you provide a complete reference citations?
; 04.09.2012
SCIP - Screen for Cognitive Impairment in Psychiatry

1. Verbal Learning Test – Immediate
2. Working Memory Test
3. Verbal Fluency Test
4. Verbal Learning Test – Delayed
5. Processing Speed Test

SCIP S. Purdon

German validation: Sachs G et al. 2015
Neurocognitive diagnosis and cut-off scores of the Screen for Cognitive Impairment in Psychiatry (SCIP-S)

Emilio Rojo a, Oscar Pino a, Georgina Guilera b,*, Juana Gómez-Benito b, Scot E. Purdon c, Benedicto Crespo-Facorro d, Manuel J. Cuesta e, Manuel Franco f, Anabel Martínez-Arán g, Nuria Segarra h, Rafael Tabarés-Seisdedos i, Eduard Vieta g, Miguel Bernardo h, Francisco Mesa j, Javier Rejas k

and on behalf of the Spanish Working Group in Cognitive Function
Comparison of patients with schizophrenia (n=95), affective disorder (n=87) and healthy controls (n=65)

Cognitive function before and after COGPACK (SCIP = Cognitive Impairment in Psychiatry: total scores)

## Transfer – Effect
### Negative Symptoms and Functional Outcome

<table>
<thead>
<tr>
<th></th>
<th>Mean change Cognitive remediation</th>
<th>Mean change TAU</th>
<th>significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blunted affect</td>
<td>7.10</td>
<td>-0.80</td>
<td>***</td>
</tr>
<tr>
<td>alogia</td>
<td>5.40</td>
<td>0.30</td>
<td>***</td>
</tr>
<tr>
<td>apathy</td>
<td>3.50</td>
<td>0.70</td>
<td>***</td>
</tr>
<tr>
<td>anhedonia</td>
<td>3.20</td>
<td>-0.10</td>
<td>***</td>
</tr>
<tr>
<td>attention</td>
<td>5.30</td>
<td>0.10</td>
<td>***</td>
</tr>
<tr>
<td>MKS - S</td>
<td>-9.00</td>
<td>-7.40</td>
<td>**</td>
</tr>
</tbody>
</table>

**MKS – S : Competence Scale:**
**Every Day Living Activities** (Gauggel et al. 2000)
N-back Working Memory Test
Patients with schizophrenia

Dorsolateral prefrontal cortex
Cognitive Remediation in schizophrenia

Before therapy

![Before therapy images]

P<0.003

Activity increase: dorsolateral PFC, ant. Cingulum

After therapy

![After therapy images]

Sachs et al 2009, Abstract, WCBP S-13-004
WCBP, Athens 2015
Professor Sachs - Please can you provide a complete reference citations?

04.09.2012
Treatment of social cognition in schizophrenia (mentalization-based training and beyond): the Vienna experience

- Social cognition
  - Emotion recognition
  - Neurobiological correlates

- Treatment of social cognitive impairment
  - Cognitive remediation
  - Training in Affect Recognition (TAR)
  - Mentalization-Based Training (MBT)
Training of affect recognition (TAR) in schizophrenia—Impact on functional outcome

G. Sachs a,*, B. Winklbaur a, R. Jagsch b, I. Lasser a, I. Kryspin-Exner b, N. Frommann c, W. Wölwer c

a Department of Psychiatry and Psychotherapy, Medical University of Vienna, Währinger Gürtel 18–20, 1090 Vienna, Austria
b Institute of Clinical, Biological and Differential Psychology, University of Vienna, Liebiggasse 5, 1010 Vienna, Austria
c Department of Psychiatry and Psychotherapy, Heinrich-Heine-University, Bergische Landstr. 2, 40620 Düsseldorf, Germany

ABSTRACT

Deficits in facial affect recognition as one aspect of social cognitive deficits are treatment targets to improve functional outcome in schizophrenia. According to preliminary results antipsychotics alone show little effects on affect recognition. A few randomized intervention studies have evaluated special psychosocial treatment programs on social cognition. In this study, the effects of a computer-based training of affect recognition were investigated as well as its impact on facial affect recognition and functional outcome, particularly on patients’ quality of life.

Forty clinically stabilized schizophrenic patients were randomized to a six-week training on affect recognition (TAR) or treatment as usual including occupational therapy (TAU) and completed pre- and post-treatment assessments of emotion recognition, cognition, quality of life and clinical symptoms. Between pre- and post treatment, the TAR group achieved significant improvements in facial affect recognition, in particular in recognizing sad faces and, in addition, in the quality of life domain social relationships. These changes were not found in the TAU group. Furthermore, the TAR training contributes to enhancing some aspects of cognitive functioning and negative symptoms. These improvements in facial affect recognition and quality of life were independent of changes in clinical symptoms and general cognitive functions. The findings support the efficacy of an affect recognition training for patients with schizophrenia and the generalization to social relationship. Further development is needed in the impact of a psychosocial intervention in other aspects of social cognition and functional outcome.

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Neuropsychological rehabilitation
Aim: Improvement of social-emotional information processing

6-week training of 2–4 patients, twice per week (12 sessions)


TAD > CRT TAU

Drusch et. Al. *Schizophr Res* 2014; 485-490.
TAD > CRT
Training of Affect Recognition (TAR)

Training of decoding other people’s facial affect using

- Computer-tasks
- Desk work
- Homework

Frommann, Streit & Wölwer (2003)
Training of Affect - Recognition (TAR) – Impact on functional outcome

Objectives of the study
- Effectiveness of the emotion training TAR with patients with schizophrenia
- Effects of the training on cognition, negative symptoms and quality of life

Inclusion Criteria
- Diagnosis Schizophrenia according to DSM IV
- Men and women
- Stable symptoms
- Atypical Neuroleptics

Measuring Tools
- SCID, PANSS, BECK Depression Score
- Quality of Life: WHOQOL-BREF
- Vienna Emotion Recognition Task: (VERT-K)
- Neurocognition: Wisconsin Card Sorting Test (WCST)
- Alertness, Vigilance, working memory (TAP)

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>SD</th>
<th>Mean</th>
<th>SD</th>
<th>p</th>
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<tbody>
<tr>
<td></td>
<td>TAR</td>
<td></td>
<td>TAU</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>8/12</td>
<td></td>
<td>10/8</td>
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<tr>
<td>Age</td>
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<td>7,8</td>
<td>31,7</td>
<td>9,3</td>
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<td>Education</td>
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<td>5,5</td>
<td>13,4</td>
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<td>First episode (years)</td>
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<td>6,7</td>
<td>24,33</td>
<td>9,6</td>
<td>n.s.</td>
</tr>
</tbody>
</table>

Sachs G et al. Schizophr Res 2012; 138 (2-3) 262-267
Mean Change in the Emotion Recognition Task (VERT-K) after Training of Emotion Recognition (TAR)

VERT-K: Vienna Emotion Recognition Task
Sachs G et al. Schizophr Res 2012; 138 (2-3) 262 -267
Training of Affect - Recognition (TAR) – Impact on functional outcome

WHOQOL-BREF

TAR – Quality of Life

Sachs G et al. Schizophr Res 2012; 138 (2-3) 262 -267
Training of Affect Recognition (TAR)

Treatment of social cognition in schizophrenia (mentalization-based training and beyond): the Vienna experience

- Social cognition
  - Emotion recognition
  - Neurobiological correlates

- Treatment of social cognitive impairment
  - Cognitive remediation
  - Training in Affect Recognition (TAR)
  - Mentalization-Based Training (MBT)
High functioning individuals with schizophrenia have preserved social perception but not mentalizing abilities

Tatiana M. Karpouzian\textsuperscript{a}, Eva C. Alden\textsuperscript{a}, James L. Reilly\textsuperscript{a,b}, Matthew J. Smith\textsuperscript{a,b,*}

\textsuperscript{a} Northwestern University Feinberg School of Medicine, Department of Psychiatry and Behavioral Sciences, 710 N Lake Shore Drive, Chicago, IL 60611, United States
\textsuperscript{b} Northwestern University Feinberg School of Medicine, Warren Wright Adolescent Center, 710 N Lake Shore Drive, Chicago, IL 60611, United States

<table>
<thead>
<tr>
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<th>HF-SCZ (n = 35)</th>
<th>LF-SCZ (n = 24)</th>
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<tbody>
<tr>
<td>Social perception domain (z-score)</td>
<td>-0.178 (0.14)</td>
<td>-0.439 (0.14)</td>
<td>-0.929 (0.18)\textsuperscript{a,b}</td>
</tr>
<tr>
<td>Social perception (% accuracy)</td>
<td>0.767 (0.06)</td>
<td>0.730 (0.07)</td>
<td>0.691 (0.07)</td>
</tr>
<tr>
<td>Facial affect perception (% accuracy)</td>
<td>0.904 (0.08)</td>
<td>0.876 (0.10)</td>
<td>0.817 (0.11)</td>
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<tr>
<td>Mentalizing domain (z-score)</td>
<td>-0.190 (0.14)</td>
<td>-1.167 (0.14)\textsuperscript{a}</td>
<td>-1.284 (0.18)\textsuperscript{a}</td>
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<td>Theory-of-mind (% accuracy)</td>
<td>0.842 (0.09)</td>
<td>0.728 (0.11)</td>
<td>0.695 (0.13)</td>
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<tr>
<td>Cognitive empathy (% accuracy)</td>
<td>0.843 (0.08)</td>
<td>0.743 (0.10)</td>
<td>0.718 (0.10)</td>
</tr>
</tbody>
</table>

\( F = 5.426^{**} \)

\( F = 15.526^{**} \)
Review

Theory of mind impairments in first-episode psychosis, individuals at ultra-high risk for psychosis and in first-degree relatives of schizophrenia: Systematic review and meta-analysis

Emre Bora *, Christos Pantelis

Melbourne Neuropsychiatry Centre, Department of Psychiatry, The University of Melbourne and Melbourne Health, VIC, Australia

---

<table>
<thead>
<tr>
<th>Test</th>
<th>Samp</th>
<th>SchRel</th>
<th>HC</th>
<th>d</th>
<th>95% CI</th>
<th>Z</th>
<th>p</th>
<th>Q-test p</th>
<th>I²</th>
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<td>ToM</td>
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<td>2388</td>
<td>929</td>
<td>0.37</td>
<td>0.19-0.54</td>
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<td>2195</td>
<td>791</td>
<td>0.24</td>
<td>0.13-0.33</td>
<td>4.52</td>
<td>&lt;0.001</td>
<td>0.42</td>
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<td>-Eyes</td>
<td>5</td>
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<td>120</td>
<td>0.19</td>
<td>-0.10 to 0.48</td>
<td>1.31</td>
<td>0.19</td>
<td>0.13</td>
<td>0.05</td>
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<td>UHR-HC</td>
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<td>0.14</td>
<td>0.03</td>
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<td>133</td>
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<td>0.26-0.72</td>
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<td>0.75</td>
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<td>282</td>
<td>215</td>
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<td>0.14-0.70</td>
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<td>ToM</td>
<td>8</td>
<td>285</td>
<td>228</td>
<td>1.0</td>
<td>0.81-1.18</td>
<td>10.54</td>
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<td>0</td>
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<tr>
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<td>188</td>
<td>132</td>
<td>0.99</td>
<td>0.76-1.23</td>
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<tr>
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<td>137</td>
<td>124</td>
<td>0.94</td>
<td>0.69-1.20</td>
<td>7.26</td>
<td>&lt;0.001</td>
<td>0.42</td>
<td>0</td>
</tr>
</tbody>
</table>
Impairments of the ability to mentalize:
to think about states of mind in the self and others, such as thoughts, feelings, or intentions

Harrington, Siegert, & McClure, 2005
Sprong et al 2007
Bora, Yucel & Pantelis, 2009
Brent 2015

Deficits of mentalization have been linked with key aspects of the phenomenology of schizophrenia:
(a) core psychotic symptoms (e.g. delusions and hallucinations) Harrington et al. 2005);
(b) poorer insight into illness Bora et al. 2007
(c) greater social dysfunction Fett et al. 2011
Differentiation of deficits in mentalizing in patients with schizophrenia

- poor mentalizing: False attribution of inner states of others (e.g. because of delusions), loss of mentalizing

- over-mentalizing: over-estimation of inner states of others (e.g. assumption of evil intentions of others)

- under-mentalizing: as in autism and in severe negative symptomatology
Comprehensive treatments for social cognitive deficits in schizophrenia: A critical review and effect-size analysis of controlled studies

Matthew M. Kurtz a,b,*, Emily Gagen c, Nuno B.F. Rocha d, Sergio Machado e,f, David L. Penn c,g

* Department of Psychology and Program in Neuroscience and Behavior, Wesleyan University, Middletown, CT, United States
† Department of Psychiatry, Yale School of Medicine, New Haven, CT, United States
‡ Department of Psychology, University of North Carolina — Chapel Hill, United States
§ Politecnico Institute of Porto, School of Allied Health Technologies, Porto, Portugal
¶ Laboratory of Panic and Respiration, Institute of Psychiatry, Federal University of Rio de Janeiro, Brazil
¶ Physical Activity Neuroscience, Physical Activity Sciences Postgraduate Program, Salgado de Oliveira University, Niterói, Brazil
¶ Australian Catholic University, Melbourne, VIC, Australia

Facial Affect
Theory of Mind
## Mentalization – Based Treatment

<table>
<thead>
<tr>
<th>Characteristics</th>
</tr>
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<tbody>
<tr>
<td>psychodynamic</td>
</tr>
<tr>
<td>Integrative</td>
</tr>
<tr>
<td>attachment oriented</td>
</tr>
<tr>
<td>Multimodal</td>
</tr>
<tr>
<td>manualised</td>
</tr>
<tr>
<td>Team oriented</td>
</tr>
</tbody>
</table>

### Halliwick Unit St.Ann's Hospital London

- Therapeutic alliance
  - secure
  - thinking about self and other
  - Reflective mode

### Bateman & Fonagy 2004, 2006

- Outpatient clinic for 18 – 24 month, randomized controlled trial
- Bateman and Fonagy Am J Psych 2009

### Bateman & Fonagy 2004, 2006

- Severely ill comorbid (B)PS – patients

### Mentalizing about

- Self
- Other’s
- Relationships
Mentalization-Based Treatment in Schizophrenia

Psychotherapeut 2013 - 58:339–343
DOI 10.1007/s00278-013-0992-6
© Springer-Verlag Berlin Heidelberg 2013

Gabriele Sachs¹,² · Helga Felsberger²
¹ Landes-Nervenklinik Wagner-Jauregg, Linz, Österreich
² Universitätsklinik für Psychiatrie und Psychotherapie, Medizinische Universität Wien, Österreich

Mentalisierungsbasierte Psychotherapie bei schizophrenen Psychosen
Mentalization-Based Treatment in Schizophrenia

Setting:
Twice weekly, 60 min group therapy
12 sessions
introduction group, psychoeducation

„The group is a hall of mirrors“ Malcom Pines 2002
In learning to communicate, restitute the loss of attachment
Foulkes & Anthony 1964

Diagnosis: schizophrenia

Method: „i-MBT“ Introduction into Mentalizing
Introduction: What is mentalizing?
Exercises: to reflect about self and others

Exercises: using a picture to train recognition of inner dialogue or mentalizing

Mentalizing a scene - perspective taking
A and B have an appointment. B is 30 min late.
Reflection about the inner monologues of A and B: e.g.
What do you think A is thinking?

Exercises and talking about scenes of every day activities

Adapted from Fonagy & Bateman 2006, Allen et al. 2012
### Brain areas involved in mentalization

<table>
<thead>
<tr>
<th>Structure</th>
<th>Function</th>
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</thead>
<tbody>
<tr>
<td>Amygdala, gyrus fusiformis</td>
<td>Face perception</td>
</tr>
<tr>
<td>Superior temporal gyrus</td>
<td>Voice perception, intentionality</td>
</tr>
<tr>
<td>Amygdala</td>
<td>Emotion regulation, emotion experience</td>
</tr>
<tr>
<td>Anterior insula</td>
<td>Affect processing, emotion experience</td>
</tr>
<tr>
<td>Anterior cingulate</td>
<td>Control for cognition and emotion</td>
</tr>
<tr>
<td><strong>Medial prefrontal cortex</strong></td>
<td><strong>Mentalization</strong></td>
</tr>
<tr>
<td><strong>Temporoparietal junction</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Temporal pole</strong></td>
<td></td>
</tr>
</tbody>
</table>

Sachs and Felsberger 2014
The mirror neuron system and the mentalizing network

mirror neuron system (MNS) in red; the mentalizing network (MENT) in blue


Schilbach et al. Schizophrenia Bulletin
doi:10.1093/schbul/sbw015
First episode schizophrenia: Effects of mentalization-based treatment

Pre- post Measurements

FWE korrigiert 0.0.5, 36s, TR=3.62

Änderung der Clusteranzahl: Mittel: 5.53 (12.79 SD)
First episode schizophrenia:
Effects of TAU (atypical antipsychotics)

FWE korrigiert 0.0.5

Änderung der Clusteranzahl: Mittel: - 5.80 (6.91 SD)
Social cognitive trainings such as the training of affect recognition and mentalizing based treatment are a promising approach in the treatment of schizophrenia.

Holistic strategies including both treatment with atypical antipsychotics and social cognitive training can improve functional outcome.
Thank you for your attention!

gabriele.sachs@meduniwien.ac.at

The Vienna Team:
Harald Aschauer
Willeit Matthäus
Konstantinos Papageorgiou
Stephanie Hauska
Bernadette Winklbaur
Iris Lasser
Monika Schlögelhofer
Ana Popovic
Lucie Bartova
Karin Futschek
Andreas Erfurth
## Assessments

### Mentalizing – Theory of Mind

- Reflective Functioning Questionnaire (RFQ)

- Brief Reflective Function Interview (BRFI)
  Semi-structured Interview

- The MBT Adherence and Competence Scale (MBT – ACS)
  Karterud et al. 2012

- Faux Pas Recognition Test
  V. E. Stone and S. Varon-Cohen 1998
  10 Faux Pas stories
  10 control stories without Faux Pas.

### Attachment –Interaction - Trauma

- Experiences in Close Relationships-Revised questionnaire (ECR-R)

- Childhood Trauma Questionnaire (CTQ)

- Inventory of Interpersonal Problems (IIP)
  Horowitz et al. 1988

- Adult Attachment Interview MB. Main

### Neurocognition - Social Cognition

- SCIP S. Purdon

- MATRICS Consensus Cognitive Battery (MCCB) K.H. Nuechterlein, M. F. Green

- MSCEIT Mayer, Salovey and Caruso

Training of Affect Recognition (TAR)

**Session 1-4:** Identification and Discrimination of basic emotions (Happiness, Sadness, Fear, Anger, Surprise, Disgust) and their prototypical units

**Session 5-8:** Focusing holistic and nonverbal processing, Intensity of facial emotions, to establish different strategies of facial affect decoding

*Which facial expression does this person show?*

happy
sad
fearful
surprised
disgusted
angry

Wölwer et al., 2005; Frommann et al. 2003
The course of Cognitive Dysfunction and Social Cognition in Schizophrenia

Premorbid Prodrome First episode

Brain development
Structural and Functional changes

Cognitive deficits Neurotoxic Effect?

Functional outcome Reversible?

Andreasen, Arch Gen Psych 1999

Adapted from: Lieberman J. Presented at: 154th APA Annual Meeting; May 5-10, 2001; New Orleans, La.
Cognitive Dysfunction and Social Cognitive Deficits in Unmedicated Patients with Schizophrenia

23 Studies, 1992 - 2013

N = 1106 Patienten
N = 1384 Kontrollen

H. Fatouros-Bergmann et al. 2014 Schizophr Res. 156 - 162
Comparison of Cognitive Function in Schizophrenia and Bipolar Disorder

Executive functions

**WCST**

Total correct (z-Scores of %)

\[ p = 0.007 \]

Sustained Attention

**CPT**

Hits total (z-Scores)

\[ p < 0.001 \]

Sachs et al. 2008, Eur Psychiatry 23, Suppl.2:142
Neurocognition in Schizophrenia

BACS
Brief Assessment of Cognition in Schizophrenia

Short version
Duration 25 min

The Brief Assessment of Cognition in Schizophrenia: reliability, sensitivity, and comparison with a standard neurocognitive battery.

Keefe RS, Goldberg TE, Harvey PD, Gold JM, Poe MP, Coughenour L.
Schizophr Res. 2004 Jun 1;68(2-3):283-97
The Theory of Mentalizing

Psychology of cognition (Theory of Mind)

- To understand the behaviour of others in a social environment
- To take other people's viewpoint into account
- To make inferences about the mental states of others based on available social cues and context
- Ability to infer mental states of other people (including their intentions, beliefs, emotions)


Psychoanalytic theory of object relation (Theory of thinking)

- Bion 1962, 1967

Attachment theory (Psychopathology of development)

- Bowlby 1969, Winnicott 1971
- Fonagy & Target 1997

Neuroimaging - Neurobiology

Gene - Environmental Interaction (Epigenetics)
Short communication

Validation of the German Version of the Brief Assessment of Cognition in Schizophrenia (BACS) – Preliminary Results

G. Sachs a, *, B. Winklbauro, R. Jagscho, R.S.E. Keefe c

aDepartment of Psychiatry and Psychotherapy, Medical University of Vienna, Währinger Gürtel 18-20, 1090 Vienna, Austria
bInstitute of Clinical, Biological and Differential Psychology, University of Vienna, Liebigasse 5, 1010 Vienna, Austria
cDepartment of Psychiatry and Behavioral Sciences, Duke University Medical Center, P.O. Box 3270, Durham, NC 27710, USA

ARTICLE INFO

Article history:
Received 7 June 2009
Received in revised form 18 September 2009
Accepted 24 October 2009
Available online 27 April 2010

ABSTRACT

The German version of the BACS showed high test-retest reliability. Sensitivity and specificity scores demonstrated good ability to differentiate between patients and controls. The study suggests that the German Version of the BACS is a useful scale to evaluate cognitive functioning.

© 2009 Elsevier Masson SAS. All rights reserved.
Brief assessment of cognition in schizophrenia: BACS (Keefe et al.)

* p < 0.05, ** p < 0.01

Please can you confirm the meaning of **, is it a p value number?

vinila.chambore; 06.09.2012
TAR: Training Strategies

The principles of

- Errorless learning
- Repetitive (over-)learning
- Immediate positive feedback and
- intensive coaching, succeeded by fading

are combined with the cognitive strategies of

- verbalisation,
- self instruction,
- feature abstraction,
- establishment of associations using cognitive and situative anchors.

⇒ Training of decoding affect is based on restitution strategies in combination with methods to establish alternative strategies for compensation
TAR - Treatment of Affect Recognition (Wölwer et al., 2005)

• Treatment of Affect Recognition

<table>
<thead>
<tr>
<th>Patients</th>
</tr>
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<tbody>
<tr>
<td>Randomized three group pre-post design in n=77 post-acute schizophrenia patients:</td>
</tr>
<tr>
<td>1. TAR group</td>
</tr>
<tr>
<td>2. Remediation training program (CRT)</td>
</tr>
<tr>
<td>3. TAU group</td>
</tr>
</tbody>
</table>

 seulement TAR group significantly improved in facial affect recognition

► CRT group improved in verbal memory functions
TAR and Neurobiological Correlates (Habel et al. 2009)

Effects of TAR on cerebral correlates by using repeated fMRI event-related measurements in a group of schizophrenia patients

<table>
<thead>
<tr>
<th>Patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Group of schizophrenia patients (n=10)</td>
</tr>
<tr>
<td>• compared to a control group of schiz. patients (n=10) and</td>
</tr>
<tr>
<td>• healthy controls</td>
</tr>
</tbody>
</table>

- Improvements facial emotion recognition only in TAR group
- Increased activation in
  - left middle and superior occipital lobe
  - right inferior and superior parietal cortex
  - inferior frontal cortex bilaterally in TAR-trained schizophrenic patients
- Activation changes correlated with the improvement in facial affect recognition.
Interpersonal behaviour characterized by an expectation that one’s mind may be influenced, surprised, changed and enlightened by learning about another’s mind.

A. Bateman 2007

The capacity to identify and reflect about states of mind in oneself and other people is thought to be a key to understanding social experience and to the navigation of the interpersonal sphere.

Fonagy, Gergely, Jurist & Target, 2002
Summary

- Impairments in cortical and subcortical limbic areas specifically in anterior cingulate, insulate and posterior-parietal cortex, amygdala, caudato-putamen and the interaction and networks

- Training strategies can modify this impairments –

- There is no evidence for a „pure“ cognitive model

- Therapeutic changes may be due to changes in the cortical - limbic – areas
Clinical practical recommendations

A) Interventions in social cognition are recommendable to improve affect recognition, theory of mind, the total psychiatric symptoms and community and institutional functioning of patients with schizophrenia in out-patient and in-patient contexts.

B) Meta-cognitive training (MCT) is recommended for patients with schizophrenia in out-patient and in-patient contexts to reduce delusions and positive symptoms in general.

C) SCIT is recommended for patients with schizophrenia in out-patient context to improve attributional biases, social functioning and to reduce negative symptoms.
Symptoms of schizophrenia

Social cognitive deficits

Social cognitive deficits and functional outcome

Diagnosis and assessments of social cognitive impairment

Treatment options
Psychopathological features
Definitions

<table>
<thead>
<tr>
<th>Cognition: the manner in which individuals process information</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Perception</strong>: how information is detected and initially processed</td>
</tr>
<tr>
<td><strong>Attention</strong>: how information is selected for processing</td>
</tr>
<tr>
<td><strong>Memory</strong>: how information is preserved for later use</td>
</tr>
<tr>
<td><strong>Judgement</strong>: how information is acted upon</td>
</tr>
</tbody>
</table>
Psychopathological features of Schizophrenia

Positive symptoms
- Delusions
- Hallucinations

Negative symptoms
- Restricted affect
- Passive social withdrawal
- Apathy

Primary – secondary

Disorganized actions
- Thought disorder
- Inappropriate affect

Psychosocial Functioning

Depressive symptoms
- Anxiety

Social Cognition
- Executive functioning
- verbal fluency
- Motor speed
- Working memory
Arrange the pictures according to the intensity of the facial expression!

Session 9-12: The role of facial expression in social context
Focusing on the association between cognition, situation and emotion
Interpretation of emotional expression in social interactions

Which person has just received flowers and thinks: „They are beautiful!“
Vienna Emotion Recognition Tasks (VERT)

VERT:
-36 ITEMS
-5 basic emotions (Happiness, Sadness, Anger, Fear, Disgust) and Neutral
• caucasian people
- half of the pictures female faces

Kryspin - Exner et al. 2005
Pawelak, 2004
Hoheisel, 2003