

Exploration of source flexibility in schizophrenia: Specificity and relationships with real world functioning and hallucinations

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BACKGROUND

- ❖ Source flexibility in one important aspect of human cognition (Burgess et al., 2007)
- ❖ This cognitive mechanism is hypothesized to be implicated in a number of different activities of real world (Burgess et al., 2007)
- ❖ It may also play a central role in the apparition and maintenance of specific symptoms such as hallucinations
- ❖ Such a hypothesis is congruent with the self-regulatory executive function model (Wells and Matthews, 1994)
- ❖ However, it has received very little interest in the literature
- ❖ Moreover, this is unclear if such mechanism is independent of cognitive flexibility and processing speed
- The aim of the present study is to explore a potential impairment of source flexibility in a group of persons diagnosed with schizophrenia and to examine whether or not this mechanism is independent from processing speed and cognitive flexibility
- A second aim is to examine the extent to which source flexibility is related to real world functioning and auditory hallucinations

METHODS

Participants

- ❖ 36 patients diagnosed with schizophrenia
- ❖ 28 healthy controls

Materials

- ❖ Computerized tasks
 - ❖ Source flexibility – Alphabet task (Gilbert et al., 2005)
 - ❖ Cognitive flexibility (Zimmermann and Fimm, 2010)
 - ❖ Processing speed (Verhaegen and Poncelet, 2013)

Clinical measures

- ❖ FROGS
- ❖ PSP
- ❖ PSYRATS/Hallucination subscale: Emotion, Cognitive interpretation, Disruption, and Physical characteristics

RESULTS

1. Performance on the cognitive tests in the two groups

	Patients - Mean(SD)	Healthy controls - Mean(SD)	t (62)
Source flexibility			
RT – SO (ms)	1076.79 (221.94)	882.60 (149.72)	3.97***
RT – SI (ms)	1348.28 (406.49)	1040.47 (212.11)	3.63***
RT – SI to SO (ms)	1584.33 (599.00)	1160.58 (338.10)	3.34***
RT – SO to SI (ms)	1910.05 (770.15)	1329.62 (366.60)	3.67***
RT -Mean slowing Switch vs Stay (ms)	534.65 (448.04)	283.56 (221.90)	2.71***
RT -Mean slowing SI vs SO (ms)	298.60 (333.50)	163.45 (176.40)	1.94*
Error % - SO	8.64 (13.66)	2.28 (3.24)	2.40*
Error % - SI	14.55 (18.75)	4.26 (6.94)	2.75**
Error % – SI to SO	5.82 (12.37)	4.46 (6.20)	0.53
Error % – SO to SI	15.30 (19.79)	2.77 (6.92)	3.19**
Cognitive flexibility			
RT (ms)	1440.44 (502.23)	846.05 (293.54)	5.56***
Error %	15.18 (12.47)	5.84 (5.65)	3.67***
Processing speed			
RT (ms)	777.14 (129.40)	645.25 (131.88)	4.01***
Error %	12.00 (10.56)	6.11 (10.64)	2.20*

* = p<0.05; ** = p< 0.015(Benjamini-Hochberg-Yekutieli correction); *** = p<0.001

➔ Controlling for processing speed or cognitive flexibility did not affect the original differences

2. Correlations between cognitive variables and clinical variables in the patient group

	PSP	FROGS	PSYRATS Emotion	PSYRATS - Cognitive interpretation	PSYRATS- Disruption	PSYRATS- Physical charact.
Source flexibility						
Reaction time – SO	0.12	0.06	0.01	-0.21	-0.17	-0.13
Reaction time – SI	0.09	0.00	-0.03	-0.19	-0.20	-0.17
Reaction time – SI to SO	0.07	-0.01	-0.08	-0.27	-0.26	-0.17
Reaction time – SO to SI	-0.19	-0.16	0.18	-0.04	0.08	-0.02
Reaction time - Mean slowing Switch vs Stay	-0.19	-0.17	0.11	-0.08	0.03	-0.02
Reaction time - Mean slowing SI vs SO	-0.27	-0.21	0.25	0.14	0.27	0.06
Error % - SO	-0.18	-0.16	0.12	0.36*	0.23	0.21
Error % - SI	-0.33*	-0.23	0.20	0.33*	0.32	0.17
Error % – SI to SO	-0.17	-0.09	-0.04	0.08	0.10	0.02
Error % – SO to SI	-0.28	-0.23	0.05	0.23	0.22	0.07
Cognitive flexibility						
Reaction time (ms)	-0.23	0.07	0.11	-0.11	-0.01	-0.08
Error %	-0.42**	-0.23	0.27	0.12	0.23	0.03
Processing speed						
Reaction time (ms)	-0.21	-0.07	0.05	-0.35*	-0.20	-0.24
Error %	-0.11	-0.30	-0.12	0.01	0.02	-0.08

* = p<0.05; ** = p<0.01 (Benjamini-Hochberg-Yekutieli correction)

DISCUSSION

- ❖ Persons diagnosed with schizophrenia presented significant slower RT and a higher percentage of errors for all the cognitive measures
- ❖ Controlling for the impact of processing speed or cognitive flexibility on the source flexibility tasks did not affect the original differences
 - Such results suggest the specificity of source flexibility abilities
- ❖ Patient’s difficulties in maintaining attention to one’s inner thoughts was related to real world impairments
- ❖ Moreover, difficulties in maintaining attention to one’s inner thoughts and to the outside world were related to the presence of hallucinations
- ❖ The present results have several clinical implication. In particular, Wells (1990, 2006) described an attention training technique designed to reduce the self-focused attention by training the patient to focus on several external sounds introduced in the treatment room. Recently, a case study (Levaux et al., 2011) demonstrated this technique to be effective in reducing positive symptoms in a patient diagnosed with schizophrenia. However, the results of the present study suggest that adding a specific training aiming to increase the focus on the internal world would benefit the reduction of hallucinations