

DECONSTRUCTING THE WISCONSIN CARD SORT TEST: INVESTIGATING COGNITIVE IMPAIRMENTS IN SCHIZOPHRENIA USING EYE TRACKING

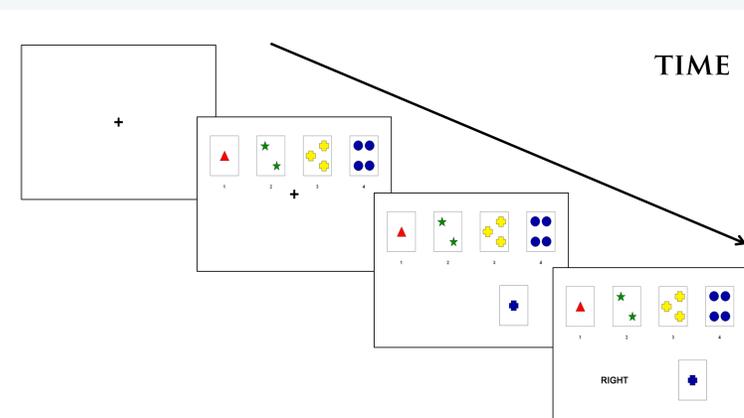
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INTRODUCTION

- Schizophrenia (SCZ) is a disorder characterized by perturbations in cognition, affect and behaviour, with pervasive and stable cognitive deficits closely associated with poor functional outcomes (Bowie & Harvey, 2006).
- SCZ-related cognitive impairments have been associated with poor performance on the Wisconsin Card Sort Test (WCST), a task that reliably discriminates individuals with SCZ from both healthy and clinical controls (Grant & Berg, 1948; Hans et al., 2010).
- Although known for its sensitivity to executive functioning deficits, the WCST is limited in its ability to measure distinct cognitive processes (Heinrichs & Zakzanis, 1998).
- Utilizing eye tracking while performing this test can provide us with an unobstructed insight into real-time visual and cognitive processes (Elahipianah et al., 2011; Rayner, 1998).
- The current study employed eye tracking technology to delineate cognitive impairments that drive poor performance on the WCST for individuals with SCZ.

METHODS

- Structured diagnostic interview (SANS / SAPS for SCZ group, MINI for control).
- Computerized WCST.
- SmartEye eye tracking system, 120Hz sampling rate.

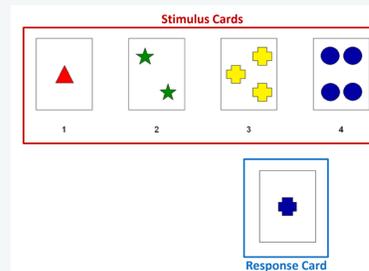


MEASURES

Variables of Interest

- Accuracy: percentage of correct sorts.
- Fixations: average number of fixations within an area of interest.
- Perseverative Error: persisting with a previous sorting strategy even when presented with negative feedback.

Areas of Interest



Areas of Conceptualization

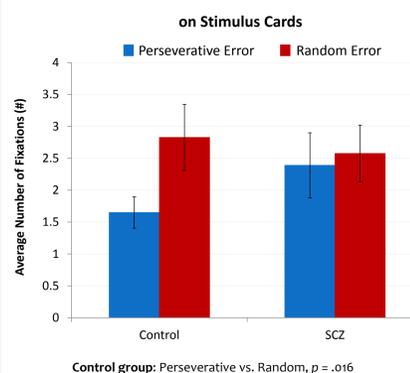
- Correct Section: the last five cards correctly sorted directly before a shift (representative of a well-established set).
- Shift Section: the first three cards directly after a shift (representative of the need to achieve a new set).
- Conceptual Level Response Section: the first three cards correctly sorted directly after a shift (representative of the achievement of new set).

RESULTS

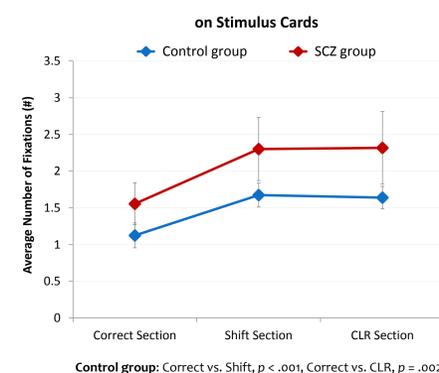
Demographics	SCZ group (n = 20)	Control group (n = 19)	p
Age	42.2 ± 13.4 years	49.2 ± 11.8 years	.12
Education	13.8 ± 2.6 years	14.6 ± 2.6 years	.33

- SCZ group: positive symptoms M 0.7 ± SD 0.7, negative symptoms M 1.9 ± SD 0.9.
- Accuracy: SCZ group M 66.4 ± SD 18.9 %, Control group M 83.7 ± SD 7.6 %, p = .001.

Fixations during Errors



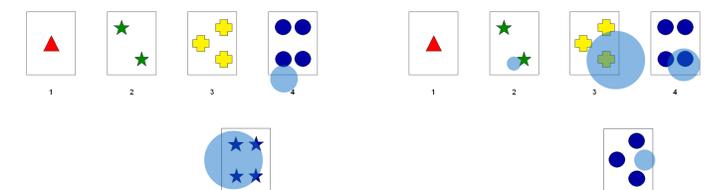
Fixations during Areas of Conceptualization



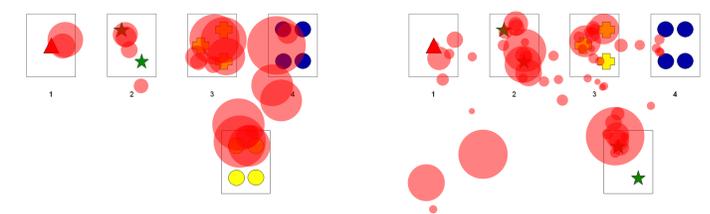
- No differences in fixations on Response Card.

FIXATION MAPS

Control group



SCZ group



CONCLUSIONS

- Individuals with SCZ performed significantly worse on the WCST than controls: higher percentage of errors, longer reaction times and larger number of fixations.
- Individuals with SCZ displayed rigidity in effortful planning during perseverative errors compared to controls.
- Individuals with SCZ also displayed deficits in appropriate attentional shifting in different areas of conceptualization compared to controls.

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