

Gender Influence on Cognition and Structure in People with Schizophrenia

Nadia Quyyum, Sarah Clark, Aral Ahmadi, Jessica A. Turner
Psychology, Georgia State University, Atlanta, GA



INTRODUCTION

- Previous studies have found gender differences in both cognition and brain structure.
- Cognition:** Women tend to excel on cognitive tests compared to men in all areas except for spatial reasoning; cognitive gender differences apply to schizophrenic patients, with patients performing worse than controls due to their deficit.^{1,3,4,6,8,9}
- Structure:** In the parietal lobe, which plays a role in spatial reasoning, women have greater gray matter volume while men have greater surface area.^{5,7}
- Frederikse et. al (2000) found differences in the inferior parietal lobe (IPL) between male controls and patients, but there were no differences between female controls and patients.
- We want to build off of Frederikse et al.'s (2000) results and see if there is a relationship between cognition and structure across diagnosis and gender.

RESEARCH QUESTIONS

- Will our results be consistent with Frederikse et al.'s (2000) results?
- Is there a gender difference in the effect of the diagnosis on the IPL?
- Is there a gender difference in the effect of diagnosis on cognition?
- Is there a relationship between cognition and structure across diagnosis and gender?

METHOD

Participants

- 67 healthy controls (HC) and 67 patients with schizophrenia (SZ)
- 102 men and 32 women

Cognitive Measures

- Verbal Learning & Memory:** Hopkins Verbal Learning Test (HVLT) Immediate & Delay
- Attention:** Continuous Performance Test—Identical Pairs Version (CPT-IP)
- Spatial Reasoning:** Neuropsychological Assessment Battery (NAB) Mazes Test

- Working Memory:** Wechsler Memory Scale—Third Edition (WMS-III)

Brain Measures

- Utilized Freesurfer to obtain brain measures of cortical thickness (CT)

Statistical Analyses

- SPSS was used to create partial correlations between each cognitive measure and CT of the IPL as well as calculate MANCOVA and MANOVA to compare diagnosis and gender

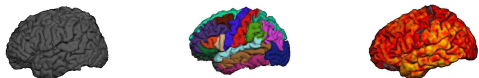


Table 1. Demographics

	Healthy Control (HC) N=67	Schizophrenia (SZ) N=67	T-Test	p-value
Age	36.03±11.9	36.90±13.64	$t=-0.391$	0.696
Gender (M:F)	47:20	55:12	$\chi^2=2.63$	0.105
Handedness (R:L)	64:3	54:12	$\chi^2=8.20$	0.017
Ethnicity			$\chi^2=343$	0.558
Hispanic	28	30		
Not Hispanic	39	37		
Race			$\chi^2=3.61$	0.462
American Indian	2	3		
White	58	56		
African American	7	5		
Native Hawaiian or Pacific Islander	2	1		
Asian	2	2		
Education			$\chi^2=16.22$	0.013
Grade 7-12 (without graduating)	1	12		
Graduated high school or equivalent	12	14		
Part college	26	25		
Graduated 2 yr college	7	7		
Graduated 4 yr college	17	5		
Post graduate/professional	3	2		
Completed graduate/professional	1	1		

RESULTS

Group Differences in Cognition

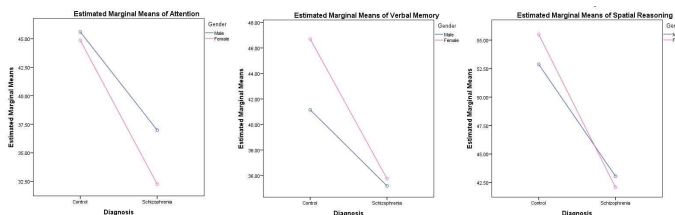


Figure 1.

- Men overall scored higher on attention ($M=41.29$, $SD=14.39$) than women ($M=38.55$, $SD=16.35$).
- Main effect of diagnosis on attention, $F(1, 130)=12.51$, $p=.001$.

Figure 2.

- Women overall scored higher on verbal memory ($M=41.23$, $SD=12.14$) than men ($M=38.17$, $SD=11.24$).
- Main effect of diagnosis on attention, $F(1, 130)=11.74$, $p=.001$.

Figure 3.

- HC women scored higher on spatial reasoning ($M=55.50$, $SD=9.86$) than HC men ($M=52.87$, $SD=13.78$); however, SZ men scored higher ($M=43.05$, $SD=13.64$) than SZ women ($M=42.08$, $SD=10.47$).
- Main effect of diagnosis on spatial reasoning, $F(1, 130)=18.60$, $p=.000$

Group Differences in Structure

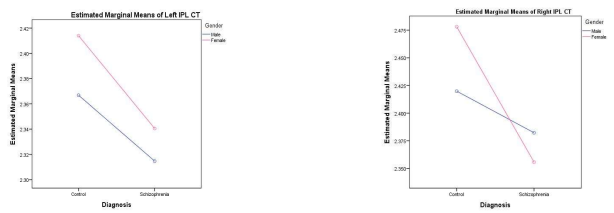


Figure 4.

- Women overall have greater CT in the left IPL ($M=2.37$, $SD=.13$) compared to men ($M=2.34$, $SD=.13$).
- Main effect of diagnosis on the left IPL CT, $F(1, 129)=6.59$, $p=.011$.

Figure 5.

- HC women have greater CT in the right IPL ($M=2.48$, $SD=.11$) than HC men ($M=2.42$, $SD=.12$); however, SZ men have greater CT in the right IPL ($M=2.38$, $SD=.13$) than SZ women ($M=2.35$, $SD=.12$).
- Main effect of diagnosis on the right IPL CT, $F(1, 129)=10.28$, $p=.002$.

Cognition x Structure: Men vs Women

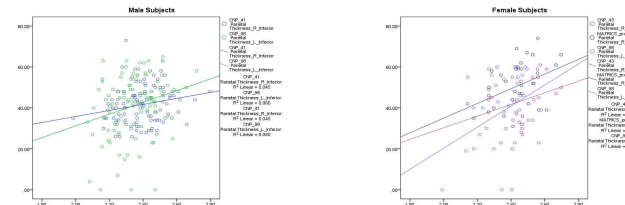


Figure 6.

- In male subjects...
 - Left IPL CT & attention score were positively correlated, $r(100)=.30$, $p<.05$.
 - Right IPL CT & verbal learning were positively correlated, $r(100)=.26$, $p<.05$.

Figure 7.

- In female subjects...
 - Right IPL CT & verbal memory score was positively correlated, $r(30)=.36$, $p<.05$
 - Right IPL CT & spatial reasoning score was positively correlated, $r(30)=.46$, $p<.05$.
 - Left IPL CT & attention score were positively correlated, $r(30)=.41$, $p<.05$.

RESULTS CONT'D

Cognition x Structure: Male HC vs Male SZ

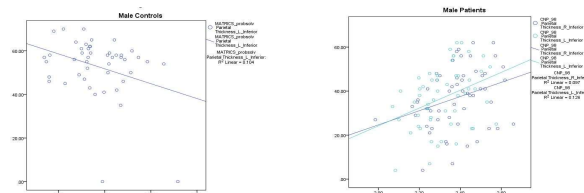


Figure 8.

- In male HC...
 - Left IPL CT & spatial reasoning score were negatively correlated, $r(45)=-.30$, $p<.05$.

Figure 9.

- In male SZ...
 - Right IPL CT & attention score were positively correlated, $r(53)=.30$, $p<.05$.
 - Left IPL CT & attention score were positively correlated, $r(53)=.35$, $p<.05$.

CONCLUSION

- Our results revealed that there are differences in cortical thickness in not only men, but also women; therefore, our results were not consistent with Frederikse et al.'s (2000) results.
- There were no significant gender differences regarding the effect of diagnosis on structure and cognition; however, diagnosis plays a key role in cortical thickness and cognitive measures, which is consistent with previous research.
- There is a relationship present between cognition and structure across diagnosis and gender.
- By looking into cognitive and structural differences between men and women with schizophrenia, clinicians may obtain a better understanding of expression of the illness and provide a suitable treatment plan for each group.

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