Regional differences on a measure of functional capacity in healthy controls: Implications for detecting separation between schizophrenia patients and controls

The Methodological Issue **Being Addressed**

Does regional variation within healthy controls impact the separation of performance from people with serious mental illness?

Introduction

With a major focus on diversity in the recruitment of participants for clinical trials, attention to regional differences in performance on cognitively relevant outcomes measures is likely to be important. The extent to which performance on the part of healthy individuals differs across regions and clinical sites, and the impact of this variation on the performance of people with serious mental illness is potentially important.

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| Demographic | Breakdown | By Site | and Group |
|-------------|-----------|----------|-----------|
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| | | Miar | ni, FL | | Columbia, SC | | | San Diego, CA | | | | Durham, NC | | | |
|---------------------|--------|--------|--------|--------|--------------|--------|-------|---------------|-------|--------|-------|------------|-------|---------|--|
| | HC | | SCZ | | HC SC | | Z | H | C | SCZ | | HC | | | |
| | (n=52) | | (n=52) | | (n=54) | | (n=5 | (n=56) | | (n=55) | | (n=55) | | (n=409) | |
| | M/n | SD/% | M/n | SD/% | M/n | SD/% | M/n | SD/% | M/n | SD/% | M/n | SD/% | M/n | .SD/% | |
| Age | 41.67 | 14.096 | 41.31 | 12.869 | 44.19 | 14.268 | 44.88 | 11.068 | 42.29 | 13.836 | 44.84 | 11.703 | 46.96 | 13.229 | |
| Gender (F) | 17 | 33% | 19 | 37% | 35 | 65% | 32 | 57% | 24 | 44% | 19 | 35% | 216 | 53% | |
| Race (CA) | 29 | 55% | 23 | 45% | 29 | 54% | 22 | 39% | 41 | 75% | 36 | 65% | 280 | 64% | |
| Ethnicity (Hisp) | 17 | 32% | 17 | 32% | 2 | 4% | 2 | 4% | 10 | 18% | 14 | 26% | _ | - | |

Methods

- A multi-site validation study with participants with schizophrenia (SCZ) and healthy controls (HC) was conducted in the United States with a widely used assessment, the Virtual Reality Functional Capacity Assessment Tool (VRFCAT; Keefe et al., 2016).
- There were 161 HC participants and 163 SCZ across the three sites. Study sites included Columbia, SC, Miami, FL, and San Diego, CA.
- Further, a large racially and educationally diverse sample of 409 HC was collected in the Chapel Hill-Durham, NC area.
- We evaluated site-based differences in the racial/ethnic composition and educational attainment of the samples.
- VRFCAT performance was indexed by the primary dependent variable, total time to completion across 12 functional objectives.
- We examined the performance in HC across the sites with a one-way Analysis of Variance (ANOVA). We then examined effect sizes, Cohen's d, for separation of HC and SCZ participants at each site.

Results

There were no significant cross-site differences in self-reported education for HC (*M*'s = 14.3, 13.3, 14.3, and 14.3, at FL, SC, CA, and NC, respectively), but at each site HC had significantly more education than SCZ (compared to M's = 12.9. 12.7, 12.9 at FL, SC, and CA sites, respectively).

The difference in HC participants' VRFCAT performance across the sites were significant, F=5.12, p=.003. Although HC participants in both FL and SC did not significantly differ in performance, both groups performed significantly more poorly than HC in CA and the larger, NC sample. The CA and NC HC samples did not significantly differ.

Interestingly, one of the sites with the lower performance on the part of HC, SC, had the largest separation of HC and SCZ, d=1.21. At the FL and CA sites, the separation of the HC and SCZ participants was similar, d=.83 and d=1.10, respectively.



*** Group comparisons significant at p<.001

Conclusion

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• Regional variations in performance within HC were detected (effect sizes for differences between site HC samples range from .13 - .85). • Though HC average performance fluctuated across regions, separation between HC and SCZ was not diminished. Effect size overall for SCZ compared to HC were large (overall d = .99, site level effects ranging from .83 to 1.21). Notably, sites with poorer HC performance manifested larger separation between HC and SCZ participants.

• These findings are likely because participants with serious mental illness are likely even more affected by disadvantages, educational and otherwise, that lead to poorer cognitive performance across the regions. The site with the largest difference between HC and SCZ participants also ranks lowest of the four in assessments of socioeconomic and policy contexts that may impact disability (Montez et al., 2017)

• Regional differences in performance on the part of HC are notably smaller than the difference between performance of HC and participants with SCZ at each of the sites.

 These data suggest that, although there are clear and considerable regional differences in performance on cognitively demanding tasks, these differences are not substantial enough to compromise the validity of such assessments in typical multi-site studies.

References: Keefe et al. (2016). Validation of a Computerized test of Functional Capacity. Schizophrenia Research;175(1-3):90-96. DOI: 10.1016/j.schres.2016.03.038

Montez et al. (2017). Do U.S. states' socioeconomic and policy contexts shape adult disability? Social science & medicine; 178:115-126. DOI: 10.1016/j.socscimed.2017.02.012

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