A Latent Class Analysis of Agreement between Drug Use Indicators among Adults with Schizophrenia

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Introduction

The co-occurrence of schizophrenia and drug use is associated with heightened risk of serious adverse outcomes such as violence, homelessness, treatment noncompliance, and increased psychotic symptoms (Swanson et al., 2006; Reimherr et al., 2010; Swofford, et al., 2000). Accordingly, clinicians and researchers who work with adults with schizophrenia frequently conduct assessments both to identify drug use and inform treatment decisions.

In an effort to increase assessment accuracy, results of multiple assessment methods often are used in combination; however, there may be discordance between results. This discordance can contribute to false positives, which may result in the misallocation of limited treatment resources or preclude treatment and housing options for which abstinence is required. Furthermore, prior research suggests that results of drug use assessments may be affected by variables beyond use itself, including participant characteristics (e.g., sex, age, and race/ethnicity) (Drake et al., 1995; Van Dorn et al., 2012).

The Present Study

In a large, heterogeneous sample of adults with schizophrenia (*N*=1,460), we conducted latent class and multivariable analyses to: (1) identify classes of concordance/discordance between self-report, collateral report, clinician rating, hair radioimmunoassay (RIA), and urinalysis for drug use; and (2) identify characteristics that differentiate participants across classes.

Methods

Sample

We used baseline data of 1,460 adults with schizophrenia enrolled in the National Institute of Mental Health Clinical Antipsychotic Trials of Intervention Effectiveness (CATIE) study, a double-blind, randomized clinical trial that examined antipsychotic medication effectiveness for adults with schizophrenia (Lieberman et al., 2005). Inclusion criteria were: (a) 18 years of age or older; (b) schizophrenia; and (c) ability to take oral antipsychotics. First episode and treatment-refractory patients were excluded. There were few exclusion criteria; only 7% of screened patients were excluded from the study. Prior research illustrates that the CATIE sample resembles a usual-care, quasi-random, observational, and non-interventional population in its demographic and clinical characteristics (Swanson et al., 2006).

Measures

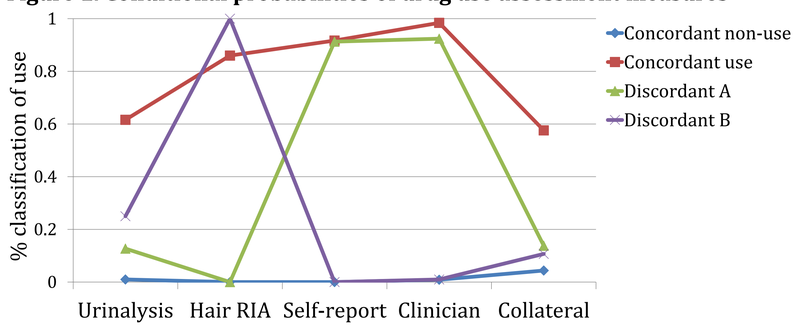
Use of marijuana, cocaine, opiates, PCP, amphetamines, and other illicit drugs was assessed at baseline through self-report, collateral report, clinician rating, hair RIA, and urinalysis. These data were dichotomized to indicate drug use or non-use. Self-report, clinician rating, and hair RIA examined drug use in the prior three months; collateral report, drug use in the prior month; and urinalysis, drug use in the prior one to four days (but up to three weeks).

Results

Latent Class Analysis

The best-fitting model consisted of four classes (sample-size adjusted BICs: three classes = 4371.41, four classes = 4353.48, five classes = 4372.36): *concordant non-use* (66.2% of the sample); *concordant use* (18.6%); *discordant A* (5.2%), in which urinalysis, hair RIA, and collateral report indicated non-use, and self-report and clinician ratings indicated use; and *discordant B* (10.1%), in which all measures except hair RIA indicated non-use. Conditional probabilities for each class are plotted in Figure 1.

Figure 1. Conditional probabilities of drug use assessment measures



Descriptive Statistics across the Latent Classes

Average age differed between classes, with the oldest participants in *discordant B* (*M* = 42.10, *SD* = 10.45) and *concordant non-use* (*M* = 41.73, *SD* = 10.99), followed by *concordant use* (*M* = 37.35, *SD* = 10.60) and *discordant A* (*M* = 34.20, *SD* = 11.27). The breakdown of sex and race/ethnicity also differed between classes, as illustrated in Figures 2 and 3, respectively.

Figure 2. Distribution of participants by sex

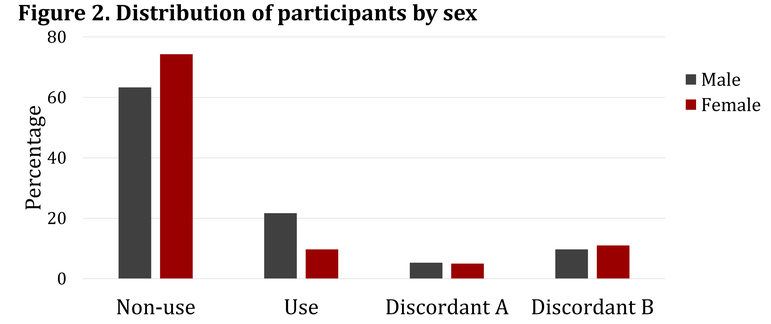
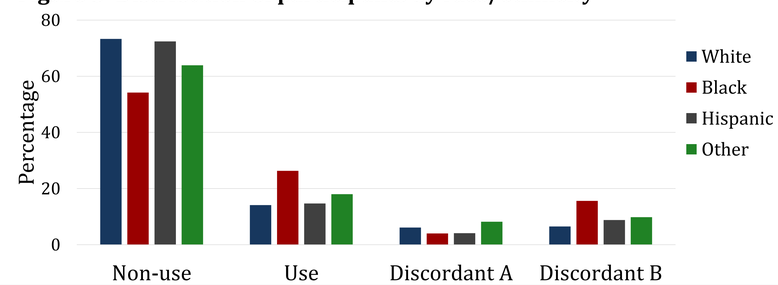


Figure 3. Distribution of participants by race/ethnicity



Results

Multivariable Analyses

Multinomial logistic regressions were conducted to examine the association between participant age, sex, and race/ethnicity and each latent class. In the first model, *concordant non-use* was the reference class (see Table 1); in the second, *concordant use* (see Table 2). White and female participants served as references for both models.

Table 1. Model with concordant non-use as the reference class

VARIABLES	Concordant Use		Discordant A		Discordant B	
	OR	95% CI	OR	95% CI	OR	95% CI
Age	0.97***	0.95-0.98	0.94***	0.92-0.96	1.00	0.99-1.02
Sex						
Male	2.73***	1.86-4.01	1.09	0.63-1.90	1.18	0.80-1.75
Race/Ethnicity						
Black	2.69***	1.98-3.65	0.88	0.50-1.53	3.31***	2.23-4.89
Hispanic	0.92	0.56-1.50	0.53	0.23-1.22	1.40	0.75-2.59
Other	1.49	0.72-3.06	1.26	0.47-3.43	1.83	0.73-4.58

Notes. ***$p < .001$.

As seen in Table 1, younger, male, and Black participants were more likely to be in *concordant use* than *non-use*. Younger participants were more likely to be in *discordant A*. Black participants were more likely than White participants to be in *discordant B.*

Table 2. Model with concordant use as the reference class

VARIABLES	Discordant A		Discordant B	
	OR	95% CI	OR	95% CI
Age	0.97*	0.95-1.00	1.04***	1.02-1.06
Sex				
Male	0.40**	0.21-0.76	0.43***	0.26-0.71
Race/Ethnicity				
Black	0.33***	0.18-0.59	1.23	0.78-1.93
Hispanic	0.57	0.23-1.44	1.52	0.73-3.17
Other	0.85	0.28-2.62	1.23	0.42-3.59

Notes. *$p < .05$; **$p < .01$; ***$p < .001$.

As seen in Table 2, compared to *concordant use*, younger and female participants were more likely and Black participants less likely to be in *discordant A*. Older and female participants were more likely to be in *discordant B* than *concordant use.*

Discussion

This study marks the first application of LCA to evaluate discordance between results of different drug use assessment methods in adults with schizophrenia or otherwise. Findings show that discordance between results occurs at non-trivial rates and is, in part, attributable to participant age, sex, and race/ethnicity. Researchers and clinicians should take into account the strengths and potential biases of available assessment techniques to match strategies to each individual. Furthermore, when multiple measures are used, assessors should consider requiring at least two positive test results for an individual to be classified as a drug user instead of one.