Much ado about norming: Ethnic differences across three normative systems for COWAT/FAS performance

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Background and Objective

- The Controlled Oral Word Association Task (COWAT)/FAS is phonemic verbal fluency measure that is sensitive to cognitive dysfunction related to several neurological conditions.
- Demographic correction of cognitive data is being increasingly scrutinized. We compared phonemic fluency for African American and Caucasian participants using three normative systems.
- It was hypothesized that normed performance on fluency tests would differ between groups.

Methods

- This study examined raw scores from the Controlled Oral Word Association Test (COWAT) and phonetic fluency/FAS tests from a sample of 321 African Americans (56.4% female, mean age 50 years, mean education 13 years) and a matched sample of 330 Caucasians (53.6% female, mean age 47, mean education 13.5 years).
- Raw scores were converted to T-scores using three normative systems (Heaton et al., 2004; Mitrushina et al., 1999; Schretlen et al., 2010).
- ANOVA was used to compare differences for the overall sample as well as for education level (<12, 12, 13-15, and >15 years) and age range (18-35, 36-50, 51-65, and >65 years old).

Results

Demographics

	n	% Female	Mean Age	Mean Education
African American	321	56.4	50	13
Caucasian	330	53.6	47	13.5

The interpretation of FAS performance for African American and Caucasian participants differed by the normative system utilized with different effects for age and education noted between normative approaches.

Results

ANOVA
FAS total T scores by normative system between African Americans & Caucasians

	df	F	Sig.	Eta-squared
Heaton	1,516	6.77	.01	.01
CNNS	1,516	14.15	<.01	.03
Mitrushina	1,509	10.32	<.01	.02

- Overall normative outcomes were significantly different between African American and Caucasian participants [Heaton (F (1,516) = 6.77, p=.01; Mitrushina F (1,509) = 10.32, p=.001; Shretlen F (1,516) = 14.15, p=.001].

ANOVA
FAS total T scores by normative system between African Americans and years of education

	df	F	Sig.	Eta-squared
Heaton				
<12	1,82	6.20	.02	.02
13-15	1,126	5.85	.02	.05
CNNS				
>15	1,130	10.13	.002	.02
Mitrushina				
>15	1,130	9.07	.003	.07

Results continued

- Heaton norms were significantly different for ethnicity for all education levels except >15 years of education.
- Mitrushina meta-norms and CNNS (Schretlen et al., 2010) were significantly different for ethnicity on FAS scores only for >15 years of education.

ANOVA
FAS total T scores by normative system between African Americans and age groups

	df	F	Sig.	Eta-squared
Heaton				
18-35	1,108	7.21	.01	.06
51-65	1,132	4.43	.37	.03
CNNS				
36-50	1,156	9.48	<.01	.06
Mitrushina				
36-50	1,156	10.16	<.01	.06

- Heaton norms were significantly different for ethnicity for the ranges of 18-35 years old and 51-65 years old.
- Mitrushina meta-norms and CNNS were significantly different for ethnicity only for the 36-50 years range. None of the norming systems were significantly different for >65 years.

Discussion

- FAS performance for African American and Caucasian participants differed by the normative system utilized with different effects for age and education noted between normative approaches.
- Ethnicity adjusted norms may improve diagnostic accuracy in diverse populations but not all normative systems function the same way.