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Validation of the UCSD Performance-based Skills Assessment (UPSA) in Hispanics with and without schizophrenia

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Abstract

The UCSD Performance-based Skills Assessment (UPSA) is a widely used measure of functional capacity with strong reliability and validity. However there is a lack of psychometric data on Hispanics. The purpose of this study was to determine the impact of acculturation and education on UPSA performance among 62 Hispanic participants with schizophrenia or schizoaffective disorder and 46 healthy comparison subjects. Functional capacity was measured using the UPSA. Acculturation was measured using the Acculturation Rating Scale for Mexican Americans (ARSMA). Independent *t*-tests indicated that participants with schizophrenia had significantly lower UPSA total scores and scored lower on all UPSA sub-scales relative to the comparison group. Multiple regression also indicated that education and acculturation were significant predictors of UPSA total scores. These data provide a better understanding of UPSA scores in Hispanics with and without schizophrenia, and suggest that education and acculturation adjustments may be required to improve interpretation of test results.

Keywords

Functioning; Functional Capacity; Latino; Independent; Spanish; Norms

1. Introduction

Impaired functioning is one of the most common features of schizophrenia (Meesters et al., 2010), often contributing to a disproportionately low rates of employment (Wu et al., 2005) and high rates of residence in supported housing (Cohen et al., 2000; Palmer et al., 1999). Because psychosocial interventions often target functioning, researchers have sought to validate measures that adequately estimate real-world functional ability (Mausbach et al., 2009).

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Performance-based tests are believed to provide insight into a patient's real-world functioning by prompting him/her to perform everyday tasks in controlled settings that mimic real world situations (Patterson and Mausbach, 2010). One performance-based measure that has received a great deal of attention is the UCSD Performance-based Skills Assessment (UPSA) (Patterson et al., 2001). However, despite its strong psychometric properties (Green et al., 2011), much of the research on the UPSA has not included Hispanic participants, and in studies where Hispanics were included, most completed the UPSA in English. Thus, no normative data for Hispanics in the U.S. exist, and little is known about the UPSA's reliability and validity in monolingual patient populations.

In a prior study, the UPSA was translated into European Spanish (Sp-UPSA) and was found to significantly discriminate between a group of Spaniard patients (i.e., individuals with schizophrenia and bipolar disease) and healthy controls (Garcia-Portilla et al., 2013). The Sp-UPSA was also found to demonstrate adequate construct validity and reliability. However, during the translation of the Sp-UPSA, the authors did not include the Household domain of the UPSA, did not incorporate the check-writing item from the original UPSA as it was not applicable to the bill-paying process in Spain, and did not test for differences between their participants' scores and performance of Hispanic and non-Hispanic samples in the U.S. Previous research has demonstrated that Spanish-speaking Hispanics perform significantly worse than Caucasians on the UPSA (Jeste et al., 2005). Similarly, Patterson et al. (2005) found Hispanics scored significantly worse than Caucasians even when controlling for age and severity of illness. However, Bengoetxea et al. (2014) found no significant differences between monolingual Spanish speaking Hispanics, English-speaking Hispanics, and English-speaking non-Hispanics.

In a small sample of Hispanic patients with schizophrenia, Cardenas et al. (2008) linked scores on the UPSA to functional outcomes including working for pay, engaging in volunteering work, and going to school. In their study, participants performing the greatest number of real-world functional responsibilities had a mean UPSA score of 67.4 (range=0–100), suggesting that many scored well below the commonly accepted cutoff score of 75 indicative of capacity for functional independence (Mausbach et al., 2008). Thus, while Hispanics may score lower on the UPSA, Cardenas's study implies there is no evidence suggesting they should have poorer real-world functioning than other ethnic groups. This becomes particularly problematic since normative data currently only exist for non-Hispanic populations (Patterson et al., 2001), making it unclear if Hispanics underperform because they are more disabled or because the UPSA contains tasks not sensitive to cultural variation. Distinct procedures could be used to increase the cultural sensitivity of performance-based measures, such as revising the UPSA, re-norming to Hispanic populations, or developing new tests that are not as sensitive to ethnicity. Interestingly, no normative data have been collected on Spanish-speaking healthy comparison (HC) subjects who reside on their own and have functional independence, which we wished to address in the present study.

Cultural mores, which may be linked to acculturation, contribute to the knowledge and skills one learns and uses on a daily basis. Yet, acculturation is rarely captured as a predictor of performance on tests of functioning. In much of the published UPSA literature, it is unclear

if English or Spanish was the preferred language of the participants. What is known is that individuals receiving the UPSA in Spanish may significantly underperform compared to those tested in English (Jeste et al., 2005). Jeste et al. (2005) assessed the relationship between acculturation and UPSA performance in 57 Mexican-American patients with schizophrenia, and found that acculturation was the second best predictor of UPSA performance behind global cognitive functioning. However, this study did not include healthy comparison subjects (i.e., without a psychiatric illness) or information on how to interpret test results in individuals of different acculturation levels. The current study seeks to provide clinicians with adequate information to aid in interpreting UPSA test scores.

The purpose of the present investigation was to determine preliminary validity for the UPSA for use with severely mentally ill Hispanic patients. It was hypothesized that participants with schizophrenia would perform significantly worse on the UPSA relative to individuals without schizophrenia. A second purpose of this study was to determine the relative weights of education and acculturation in predicting and interpreting UPSA scores so that clinicians may be better able to consider the role of these variables in determining a Hispanic patient's true level of functional impairment.

2. Methods

2.1. Participants

Sixty-two individuals with a DSM-IV based chart diagnosis of schizophrenia or schizoaffective disorder and 46 HCs participated in this study. Exclusion criteria for patients diagnosed with schizophrenia were a diagnosis of dementia, high suicide risk, or participation in a psychosocial treatment. The exclusion criterion for HCs was any diagnosis of a psychiatric illness. All participants self-identified as Hispanic. Participants with a diagnosis of schizophrenia were recruited from three mental health clinics located near the U.S.-Mexican border and 29 were part of a baseline assessment for a psychosocial intervention for Hispanics with schizophrenia entitled Programa de Entrenamiento para el Desarrollo de Aptitudes para Hispanics (PEDAL) (Patterson et al., 2005). HCs were recruited from churches, community meetings, parent and teacher meetings at an elementary school, and onsite referrals. Participants were offered a \$20 incentive, and all participants provided a written informed consent in their preferred language. The University of California, San Diego (UCSD) Institutional Review Board approved this study.

2.2. Measures

2.2.1. Functional capacity—Functional capacity was measured using the original version of the UCSD Performance Based Skills Assessment (UPSA) (Patterson et al., 2001). The UPSA uses a variety of props and role-play tasks to assess ability to perform a variety of everyday living tasks. These tasks fall into the following 5 subscale domains: 1) Planning and Organization (e.g., plan a trip to the zoo); 2) Finance (e.g., pay a utility bill); 3) Social/Communication (e.g., reschedule a doctor's appointment); 4) Transportation (e.g., read a bus schedule); and 5) Household chores (e.g., create a shopping list). The UPSA requires an average of 30 min to complete. Participants receive scores for each of the 5 subscales (range=0–20), which are summed to create an overall score. Upon enrollment to the study,

all participants were asked which language (Spanish or English) they preferred to be tested in. They were then administered the UPSA in either Spanish or English as per their preferred language. No participant required retesting or language switch preferences.

2.2.2. Acculturation—Acculturation was measured using the Acculturation Rating Scale for Mexican-Americans (ARSMA) (Cuéllar et al., 1980). The ARSMA contains 20 items assessing concepts relevant to acculturation, such as language use and preference, ethnic identification, cultural heritage, and upbringing. Each item is rated on a Likert-type scale ranging from ‘1’ (reflecting affiliation with Hispanic culture) to ‘5’ (reflecting affiliation with Anglo culture). The 20 items were averaged to create an overall acculturation score, with higher scores representing higher affiliation with Anglo/American culture. The ARSMA has good internal, test-retest, and inter-rater reliability, and validity (Cuéllar et al., 1980). In the present study, coefficient alpha was 0.95. All participants completed the ARSMA in their preferred language.

2.3. Procedures/Translation of UPSA to Spanish

The translation of the UPSA involved a series of steps. First, the UPSA was translated into Spanish and then back-translated by three different staff members who identified as having an Hispanic background. If meaning of a word or phrase was lost during the back-translation process, the procedure was repeated. If words or phrases were deemed problematic, step two involved having a 4-person committee review them, discuss the disagreements, and make final decisions on wording via consensus agreement. Step 3 involved comparing the Spanish and the English versions of the UPSA. The last step involved a final review of the Spanish UPSA by three bicultural/bilingual Hispanic staff members (1 Ph.D. and 2 master’s level).

2.4. Statistical analyses

Prior to conducting statistical analyses, linear predictor variables (i.e., age; acculturation) were examined for skewness using the adjusted Fisher-Pearson standardized third moment coefficient (Tabachnik and Fidel, 2001), with values >0.60 considered significantly skewed. Visual inspection of variable histograms was also conducted to evaluate skewness of the variables. Next, we compared demographic and background characteristics of the schizophrenia and HC samples using independent samples *t*-tests for continuous variables and either chi-square or Fisher’s Exact tests for categorical variables. We also conducted Pearson correlations to analyze the relationship between variables of interest. When comparing UPSA total and subscale scores, we calculated the Probabilistic Index effect size [$P(X < Y)$] (Acion et al., 2006), which represents the probability that a randomly selected person with schizophrenia has a worse score than a randomly selected HC subject on the particular outcome. Finally, a hierarchical multiple regression analysis was performed entering diagnostic group (schizophrenia vs HC), age, and gender in Block 1, education in block 2, and acculturation in Block 3. Of interest was the change in R^2 for each step, as well as the unstandardized regression coefficients to understand the weight that a 1-point change in the predictor variables had on UPSA total scores.

While the use of a 20-item scale may be preferred when assessing acculturation, it may be less feasible in clinical practice. Therefore, we conducted a second regression using

language preference as a proxy for acculturative status. Specifically, a single ARSMA item asked participants, “What language do you prefer?” Responses for this item were: 1=Spanish only, 2=Mostly Spanish, some English, 3=Spanish and English Equally, 4=Mostly English, some Spanish, and 5=English only.

3. Results

3.1. Characteristics of the sample

Comparisons of participants with schizophrenia vs. HCs are presented in Table 1. There were no significant group differences in age, education, acculturation, or language of UPSA administration. However, HCs were significantly more likely to be female and married/cohabitating than participants with schizophrenia. Correlations between demographic and UPSA scores are presented in Table 2. Older participants were more likely to be female and had lower ARSMA scores. Furthermore, higher ARSMA scores were related to more years of education, and to better performance on all UPSA subtests except Planning/Organization. Fisher-Pearson coefficients for both age and acculturation had skew values <0.6 (i.e., 0.59 and 0.52, respectively), and approximate normal distribution was confirmed through visual inspection of the histograms. Therefore, transformation of these variables was not undertaken.

3.2. Comparison of patients with schizophrenia and healthy comparison subjects on UPSA performance

Mean UPSA scores with 95% confidence intervals are presented in Table 3, along with Cohen's d and Probabilistic Index [$P(X > Y)$] effect sizes. Results of independent t -test analyses revealed that participants with schizophrenia had significantly lower scores on the UPSA total ($t = -6.53$, $df = 106$, $p < 0.001$), as well as each of the five UPSA sub-scales; planning and organization ($t = -4.77$, $df = 106$, $p < 0.001$), finance ($t = -7.70$, $df = 106$, $p < 0.001$), communication ($t = -3.80$, $df = 106$, $p < 0.001$), transportation ($t = -3.15$, $df = 106$, $p = 0.002$), and household chores ($t = -5.47$, $df = 106$, $p < 0.001$).

3.3. Predicting UPSA total scores

Results of the hierarchical regression using linear ARMSA acculturation scores are presented in Table 4. As a set, gender, age, and diagnostic group explained 29% of variance in UPSA scores. In step 2, education explained an additional 12% of UPSA variance. In step 3, acculturation explained an additional 5% of UPSA variance. The overall regression, including all five predictors, was statistically significant ($F = 19.45$, $df = 5102$, $p < 0.001$; Adjusted $R^2 = .46$).

Our secondary regression analysis replaced the full ARSMA score with participants' responses to the question about language preference (i.e., '1=Spanish only' to '5=English only'). Results of this analysis indicated that language preference significantly predicted UPSA scores ($B = 4.44$, $t = 3.17$, $df = 102$, $p = 0.002$). A final regression used the language of testing as a predictor of UPSA scores. In this analysis, participants tested in Spanish were assigned a value of '1', and individuals tested in English were assigned a value of '0'. Results of this analysis indicated that language of testing was a significant predictor of

UPSA scores ($B = -11.99$, $SE = 3.59$, $t = -3.34$, $df = 102$, $p = 0.001$), even after controlling for age, gender, diagnosis, and education.

4. Discussion

The United States is experiencing a rapid increase in its Hispanic population, and this increase will be accompanied by a growing number of Hispanics affected by serious mental illnesses such as schizophrenia. Therefore, it is essential to translate, validate, and collect normative data on measures that may be used to evaluate functional ability in these populations. This study provides preliminary data on the use of the Spanish-version of the UPSA. Consistent with our hypothesis, the UPSA adequately discriminated between HCs and people diagnosed with schizophrenia, whereby patients with schizophrenia had significantly lower UPSA total scores (i.e., mean of 22.4 points lower) and all 5 of its subscales. Furthermore, there was an 81% probability that a person with schizophrenia scored lower on the UPSA than an HC subject. These results are consistent with those presented by Patterson et al. (2001), who showed that schizophrenia patients scored, on average, 33.8 points lower than healthy control subjects. While it is difficult to know why there was a reduced discrepancy in scores in our sample relative to the Patterson sample, we believe it may be due to the fact that healthy comparison subjects in the Patterson study were more homogenous with respect to the two key predictors in our study; namely education and acculturation. Specifically, healthy comparison subjects in the Patterson study were more highly educated and cultural homogenous than healthy comparison subjects in our study.

Relationships between the UPSA score, years of education, and level of acculturation were also found. Participants with more years of education had higher UPSA total scores. Also, stronger affinity to Hispanic culture conveyed a downward pressure on UPSA scores, after controlling for education level. However, significant differences between patients and HCs persisted even when education and acculturation were accounted for, suggesting that the UPSA was sensitive in detecting diagnostic status despite the impact of acculturation and education.

The current study provides insights into performance on the UPSA for Hispanics with or without schizophrenia. First, when acculturation and education were not considered, the mean UPSA score for HCs was 76.5. However, in a large sample of English-speaking participants, Mausbach et al. (2008) found a score of 75 best predicted capacity to live independently. A significant proportion ($n = 18$, 39.1%) of our HCs did not meet this cutoff, despite all of the subjects residing independently in the community. Thus, interpreting Hispanic subjects' scores using non-Hispanic cutoffs could lead to potential problems with regard to "false negative" decisions. Second, clinical studies, designed to improve functioning in patients with schizophrenia, are increasingly using the UPSA as a primary outcome measure (Bowie et al., 2012; Mausbach et al., 2009) and there has been discussion of using cutoff scores on the UPSA as evidence of treatment success (Mausbach et al., 2007). Given our results, the 75 cutoff score to evaluate treatment success for Hispanics is not recommended.

Regarding the current findings, a significant relationship between levels of acculturation and performance on the UPSA was noted. Specifically, low acculturated HC were more likely to experience difficulties performing the different UPSA tasks. One possible explanation for this pattern of results could be that Hispanics who have not acculturated to US cultural norms engage in a different set of everyday living tasks, or are unfamiliar with the tasks presented by the UPSA. Further, it is possible that low acculturated individuals may work from a different sociocultural context, such as endorsing stronger collectivist and familismo values (Perez-Brena et al., 2015), whereby differences exist on how daily living tasks are approached and completed (e.g., functional tasks may be distributed among family members). Future studies could qualitatively assess the range of tasks low acculturated Hispanics engage in and utilize the information to develop culturally appropriate instruments that assess functional capacity.

How then should we interpret UPSA scores among Hispanics? While past research found that patients with schizophrenia who preferred to take the UPSA test in Spanish scored significantly lower than patients of other ethnic groups (Jeste et al., 2005; Patterson et al., 2005), the present data suggest that differences between Hispanics and non-Hispanics (both HCs and patients) may be completely wiped out when education and acculturation are taken into consideration. Specifically, Patterson et al. (2001) reported mean UPSA scores of 92 for primarily non-Hispanic HCs. As we report in Table 4, the mean UPSA score for Hispanic HCs with 12 years of education and bicultural acculturation status (i.e., mean score of 3 on the Cuellar scale) was 79. Given a regression weight of 7.3 for acculturation, a mean ARSMA score of 4 would push the estimated UPSA score to 86, and a mean ARSMA score of 5 would make the estimated UPSA score to be 94, which is nearly identical to mean scores in the Patterson study. While clearly more work is needed, we temporarily recommend a regression-based adjustment to UPSA scores that takes into consideration both acculturation and education. Regression adjustment is based on the coefficients for the healthy comparison subjects, and are as follows:

$$UPSA_{\text{estimate}} = UPSA_{\text{actual}} + 0.72 * (\text{years of education}) + 7.41 * (\text{mean ARSMA response})$$

In the case that ARMSA scores are not obtainable, language preference may be used as follows:

$$UPSA_{\text{estimate}} = UPSA_{\text{actual}} + 0.92 * (\text{years of education}) + 3.50 * (\text{language preference})$$

This study has important limitations. First, the small sample sizes of both the schizophrenia and the HC groups may make the results difficult to generalize to the larger Hispanic population. Future studies should include larger samples that more adequately represent the diversity of the broader Hispanic population, including education and acculturation levels. Second, we did not assess for achievement of functional milestones, such as residential independence or employment, as has been done in other UPSA validation studies (Mausbach et al., 2008; Mausbach et al., 2010). Future studies should assess these functional milestones so that specific UPSA cutpoints can be determined for Hispanic populations.

Hispanics with schizophrenia scored significantly lower on the UPSA compared to those without schizophrenia. However, mean UPSA scores for both schizophrenia and HC subjects were lower than the reported means of non-Hispanic samples. After accounting for diagnostic status, greater educational attainment and greater Anglo orientation were associated with improved performance on the UPSA. When applying regression weights to education and acculturation, scores for Hispanics were nearly identical to published non-Hispanic norms. Thus, we recommend researchers and clinicians consider an adjusted UPSA score when interpreting results, and that further research be conducted with larger, more diverse samples.

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Table 1

Characteristics of the Sample.

	Range	Schizophrenia (n=62)	Healthy comparison subjects (n=46)	<i>t</i>	χ^2	<i>P</i>
Age (years), M (SD)	32–80	51.5 (8.8)	52.7 (14.1)	0.53		0.60
Education (years), M (SD)	3–17	9.9 (2.9)	11.0 (3.1)	1.93		0.06
Gender, n (%)						
Male		40 (64.5)	18 (39.1)		6.85	0.009
Female		22 (35.5)	27 (60.9)			
Marital status, n (%)						
Single		31 (50.0)	2 (4.3)			<0.001 ^a
Married/Cohabiting		12 (19.4)	36 (78.3)			
Divorced/Separated		17 (27.4)	5 (10.9)			
Widowed		2 (3.2)	3 (6.5)			
ARSMA, M (SD)	1.1–4.2	2.3 (0.9)	2.3 (0.9)	0.14		0.89
UPSA Administered Language, n (%)						
English		26 (41.9)	19 (41.3)		0.00	0.95
Spanish		36 (58.1)	27 (58.7)			

^a Fisher's exact test.

Table 2

Pearson correlations between study variables (N=108).

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
1. Schizophrenia	–									
2. Age	–0.05	–								
3. Female	–0.25**	0.23*	–							
4. ARSMA	0.01	0.26**	–0.18	–						
5. Years of Education	–0.18	0.02	–0.11	0.51**	–					
6. UPSA Comprehension	–0.42**	0.00	0.05	0.15	0.24*	–				
7. UPSA Finances	–0.60**	0.08	0.11	0.32**	0.44**	0.57**	–			
8. UPSA Communication	–0.35**	0.11	0.11	0.42**	0.42**	0.43**	0.65**	–		
9. UPSA Transportation	–0.29**	0.03	–0.05	0.36**	0.38**	0.37**	0.54**	0.51**	–	
10. UPSA Household	–0.47**	–0.03	0.06	0.26**	0.35**	0.47**	0.70**	0.54**	0.51**	–
11. UPSA Total	–0.54**	0.05	0.07	0.39**	0.47**	0.66**	0.88**	0.79**	0.75**	0.85**

Note. Df=106.

* $P<0.05$ (2-tailed).

** $P<0.01$ (2-tailed).

Table 3

Mean (SD) scores on UPSA subscales by group.

UPSA subscales	Schizophrenia mean (SD) N=62	Healthy comparison mean (SD) N=46	95% CI	Cohen's d	P (X < Y)
Planning and Organization	14.2 (3.7)	17.0 (2.09)	1.7, 4.1	9.93	0.76
Finance	10.1 (5.4)	16.6 (2.4)	4.8, 8.2	1.51	0.86
Communication	8.0 (5.2)	11.6 (4.4)	1.7, 5.5	0.75	0.71
Transportation	12.4 (5.9)	15.7 (4.3)	1.2, 5.3	0.62	0.67
Household Chores	9.4 (6.8)	15.6 (4.0)	3.9, 8.4	1.07	0.76
UPSA Total Score	54.1 (21.4)	76.5 (10.3)	15.6, 29.2	1.18	0.81

Note. P(X < Y)=Probability that a randomly selected patient with schizophrenia scores lower than a randomly selected Healthy comparison subject.

Table 4

Linear Regression predicting UPSA total scores.

Predictor	B	β	t-value	P	df	Adjusted R ²
Step 1					3104	0.29
Intercept	76.67					
Age (years)	0.06	0.03	0.41	0.685		
Gender	-3.18	-0.08	-0.88	0.383		
Diagnosis group	-23.11	-0.55	-6.49	<0.001		
Step 2					4103	0.41
Intercept	78.99					
Age (years)	0.03	0.01	0.19	0.853		
Gender	-0.41	-0.01	-0.12	0.903		
Diagnosis group	-19.53	-0.47	-5.92	<0.001		
Education (years)	2.58	0.38	4.94	<0.001		
Step 3					5102	0.46
Intercept	83.21					
Age (years)	-0.14	-0.08	-0.97	0.333		
Gender	1.77	0.04	0.55	0.585		
Diagnosis group	-20.53	-0.49	-6.52	<0.001		
Education (years)	1.53	0.23	2.64	0.010		
Cuellar Acculturation	7.27	0.31	3.46	0.001		

Note. B=unstandardized regression coefficients. β =Standardized regression coefficients. df=degrees of freedom. Intercept corresponds to the UPSA score when all variables in the model=0. Age was centered at 50 years, acculturation was centered at 3, and education was centered at 12 years. Gender was centered with 0.5=Female and -0.5=Male. Diagnosis group was entered as 1=Schizophrenia and 0=healthy control.