Published in final edited form as:

J Nerv Ment Dis. 2010 December ; 198(12): 916–919. doi:10.1097/NMD.0b013e3181fe75b6.

UCSD SORT Test (U-SORT): Examination of a Newly Developed Organizational Skills Assessment Tool for Severely Mentally Ill Adults

Denisse Tiznado¹, Brent T. Mausbach, PhD², Veronica Cardenas, PhD², Dilip V. Jeste, MD^{2,3}, and Thomas L. Patterson, PhD²

¹Department of Psychology, San Diego State University

²Department of Psychiatry, University of California, San Diego

³Stein Institute for Research on Aging, University of California, San Diego

Abstract

The present investigation examined the validity of a new cognitive test intended to assess organizational skills. Participants were 180 middle-aged or older participants with a DSM-IV diagnosis of schizophrenia or schizoaffective disorder. Participants' organizational skills were measured using our newly developed UCSD Sorting Test (U-SORT); a performance-based test of organizational ability in which subjects sort objects (e.g., battery, pens) from a "junk drawer" into "keep" vs. "trash" piles. Significant correlations between U-SORT scores and theoretically similar constructs (i.e. functional capacity, cognitive functioning, and clinical symptoms), were acceptable (mean $r = .34$), and weak correlations were found between U-SORT scores and theoretically dissimilar constructs (e.g., health symptoms, social support, gender; mean $r = .06$). The correlation between assessment scores provides preliminary support for the U-SORT test as a brief, easily transportable, reliable and valid measure of functioning for this population.

Keywords

Organizational skills; performance-based tests; schizophrenia and schizoaffective disorder; functional capacity

INTRODUCTION

Schizophrenia has multiple effects on people who have the disease. Some of the most notable effects are clinical symptoms that include hallucinations and delusions. Antipsychotic medications can significantly reduce the severity of these symptoms. Despite the efficacy of these medications, patients continue to suffer from cognitive and functional deficits that affect their ability to function in the real world (Green, 1996; Green et al, 2000). The most notable of these functional deficits are the inability to hold a job (Anthony et al, 1987), failure to reside independently (Owen et al, 1996), and to perform everyday skills like paying bills and managing medications (Patterson et al, 2001; Patterson et al, 2002). These deficits reduce quality of life for the patient and place a high burden on society (Wyatt et al, 1995).

Organizational skills are of particular interest in schizophrenia. Patients with schizophrenia often have difficulty organizing their daily schedules, medications, or living quarters (Addington et al, 2000; Silverstein et al, 1998). Although it is generally understood that patients have difficulty in these areas, it is more difficult to assess their capacity to perform these actions in the real world. Traditionally, neuropsychological assessment has been used to assess organizational ability, but this assessment may not reflect real-world functioning (Bowie et al, 2008; Bowie et al, 2006). Thus other methods for assessing functional capacity in this population have been considered. These include self-report, direct observation, clinician ratings, and performance-based assessments (Mausbach et al, 2009). Recent reviews suggest that performance-based measures are highly reliable and offer insight into how patients actually perform in their natural environments (Mausbach et al, 2009; Patterson et al, In press).

Performance-based assessments require patients to perform actual behaviors in a controlled environment, similar to those they would need to perform in their daily lives. One scale that has received empirical support for predicting real-world functioning is the University of California, San Diego (UCSD) Performance-based Skills Assessment (UPSA)(Patterson et al, 2001), which measures ability in five functional domains: 1) planning and organization, 2) communication skills, 3) finance management, 4) transportation, and 5) household management. The purpose of the current study is to provide preliminary data for a new performance-based test of organizational skills, called the UCSD Sorting Test (U-SORT). We evaluated the validity of the U-SORT by exploring its relationship with assessments of functional capacity and cognitive functioning. We also examined discriminant validity by analyzing the relationship between performance on the U-SORT and theoretically unrelated variables such as gender, physical symptoms and social support.

METHODS

Participants

One hundred and eighty people with a DSM-IV-based chart diagnosis of schizophrenia or schizoaffective disorder participated in this study. All participants were enrolled in the Functional Adaptations and Skills Training (FAST) program (Patterson et al, 2006), a randomized clinical trial examining the efficacy of a skills-training intervention for improving functioning in this population. All data for the current study were from the baseline assessment of the FAST study. Participants had to be at least 40 years of age and diagnosed with schizophrenia or schizoaffective disorder. They were excluded if they had a DSM-IV diagnosis of dementia, if they represented a serious suicide risk, or if they were participating in any other psychosocial intervention or drug research. Participants were recruited from board and care facilities, clubhouses, and community mental health clinics in San Diego County. All participants provided written, informed consent prior to enrollment, and the study design was approved by the UCSD Institutional Review Board (IRB).

Measures

Organizational Skills—Organizational skills were measured using our newly developed UCSD Sorting test (U-SORT). For this test, participants were given a bag containing 42 common household objects that might be found in a drawer at their home. They were then asked to review and sort the items into two separate piles: one that contained items that might be useful to keep (e.g., coins; paper clips; pens), and another they thought should be thrown away (e.g., bent paper clips; expired coupons; empty ketchup packets)(see Table 1). They were allowed 2 minutes to complete the test. One point was given for each item sorted correctly, with a maximum score of 42 points.

Functional Capacity—Functional capacity was measured using the UCSD Performance-Based Skills Assessment (UPSA) (Patterson et al, 2001). The UPSA is a role-play test in which individuals complete tasks similar to those experienced in their daily lives. These tasks assess five different domains: 1) planning and organization (e.g., planning a trip to the beach or zoo), 2) communication skills (e.g., calling 9-1-1; calling a doctor's office to reschedule an appointment), 3) finance management (e.g., pay a utility bill; count and make change), 4) transportation (e.g., planning a bus route), and 5) household management (e.g., create a shopping list of item needed to cook a meal).

Clinical Symptoms—Positive and negative symptoms were measured using the Positive and Negative Syndrome Scale (PANSS) (Kay et al, 1987). The PANSS has a total of 30 items, of which seven measure positive symptoms, another seven measure negative symptoms, and the remaining 16 measure general psychopathology. The PANSS is a semi-structured interview, during which an examiner determined whether the symptom was present, based on participants' responses, and then evaluated the severity of the symptom. Scores for each item range from 1–7, with 1 indicating that the symptom was 'absent', and 7 indicating that it was 'extreme.' A total score for positive and negative symptoms was used in the current study, with scores on these scales calculated as the sum of the seven items (possible range = 7–49 for each subscale).

Cognitive Functioning—Cognitive functioning was measured using the Mattis Dementia Rating Scale (DRS) (Mattis, 1973). This measure consists of five subscales: 1) attention, 2) initiation/perseveration, 3) construction (constructional abilities), 4) conceptualization and 5) memory. Total scores range from 0 to 144, and higher scores indicate better cognitive functioning.

Social (Expressive) Support—Social support was measured using an eight-item questionnaire described by Pearlin (1990). The questions included, "There is really no one who understands what you are going through," "You have at least one friend or relative you can really confide in," and "You have people around you who help you to keep your spirits up." Participants responded on a Likert Scale from 1 = "strongly disagree" to 4 = "strongly agree."

Medical Symptoms—Medical symptoms were assessed using an Interim Medical History (IMED), which requires participants to indicate whether or not they had experienced several health-related symptoms associated with 14 major systems (e.g., eyes, ears, nose, throat, chest) during the past 6 months. A score of '1' is assigned when the participant experienced the symptoms, and '0' is assigned when the symptom was not experienced. Overall, the IMED assesses 96 total symptoms, with a total score ranging from 0 to 96 and higher scores indicate poor health.

Data Analysis

To assess convergent validity, Pearson correlations were conducted to analyze the relationship between scores on the U-SORT test and functional capacity measures (UPSA), clinical symptoms (PANSS), and cognitive functioning (DRS). The correlations between the U-SORT and UPSA total scores were analyzed, as were those for the five UPSA subscales. Individual correlations for positive and negative clinical symptoms were also analyzed. To assess discriminant validity, we also examined the correlations between variables theoretically unrelated to our primary measures, such as gender, physical symptoms, and social (expressive) support.

RESULTS

Characteristics of participants can be found in Table 2.

Cronbach's alpha for the 42 U-SORT items was 0.86. Significant positive correlations were found between the U-SORT total correct scores and the UPSA total scores, $r(178) = .514, p < .001$. For the UPSA subscales, we also found significant positive correlations with shopping scores, $r(177) = .401, p < .001$, transportation skills scores, $r(178) = .408, p < .001$, communication skills, $r(178) = .406, p < .001$, financial management skills, $r(178) = .401, p < .001$, and planning skills, $r(178) = .366, p < .001$. Cognitive functioning (DRS total score) was significantly correlated with the U-SORT, $r(174) = .369, p < .001$. Significant correlations were also found for the DRS subscales of attention, $r(174) = .221, p < .005$, initiation/perseveration, $r(174) = .340, p < .001$, construction, $r(174) = .218, p < .005$, conceptualization, $r(174) = .231, p < .005$, and memory, $r(174) = .322, p < .001$. As expected, a negative correlation was found between U-SORT scores and positive symptoms [$r(175) = -.233, p < .05$] and negative symptoms [$r(175) = -.226, p < .05$].

Our discriminant validity analyses indicated that the correlation between U-SORT scores and gender [Spearman $r(178) = .036, p > .05$], medical physical symptoms, $r(175) = -.079$, and social support, $r(178) = .061, p > .05$, were all non-significant, suggesting good discriminant validity. Further analyses examined r-to-z transformations to determine whether expected correlations between the U-SORT and the UPSA, DRS, and PANSS scores were significantly different from correlations between the U-SORT and gender, medical symptoms, and social support. As expected the correlation between the U-SORT and the UPSA was significantly higher than the correlation between the U-SORT and gender ($z = 5.01, p < .001$); the correlation between the U-SORT and medical physical symptoms ($z = 6.06, p < .001$); and the correlation between the U-SORT and social support ($z = 4.77, p < .001$).

The correlation between the U-SORT and DRS was also significantly higher than the correlation of the U-SORT and gender ($z = 3.29, p = .002$); the U-SORT and medical physical symptoms ($z = 4.34, p < .001$); and the U-SORT and social support ($z = 3.05, p = .002$).

Significantly higher correlations were found between the U-SORT and PANSS positive symptoms, than between the U-SORT and gender ($z = -2.57, p = .01$) and between the U-SORT and social support ($z = -2.80, p = .006$). However, the U-SORT/PANSS positive correlation was not significantly different from that between the U-SORT and medical physical symptoms.

Finally, the correlation between the U-SORT and PANSS negative symptoms was significantly higher than the correlation between the U-SORT and gender ($z = -2.49, p = .012$); the U-SORT and social support ($z = -2.73, p = .006$). However, no difference was found for the U-SORT and medical physical symptoms correlation.

DISCUSSION

This study provided a preliminary evaluation of the validity and reliability of the University of California, San Diego Sorting Test (U-SORT). Our results provide encouraging support for use of the U-SORT as a measure of "real-life" organizational ability. First, we found high internal consistency of the items ($\alpha = .86$). Second, significant correlations between U-SORT scores and theoretically similar constructs (i.e. functional capacity, cognitive functioning, and clinical symptoms), were acceptable (mean $r = .34$). Finally, weak

correlations between U-SORT scores and theoretically dissimilar constructs (mean $r = .06$) were found.

The U-SORT provides several advantages over other tests of functioning. First, it is briefer requiring only 5 minutes to administer and score. Second, it has minimal props that can be easily transported and administered in field settings (e.g. board and care homes, day treatment facilities). Third, it requires only a minimum amount of specialized training to administer, thereby allowing easy administration by laypersons. Fourth, because the U-SORT test does not require the test-taker to read, it can accommodate individuals with any literacy level.

Our study is not without limitations. First, our sample was comprised of patients living primarily in Board and Care facilities in San Diego, and we could not link scores on the U-SORT to markers of real-world functioning (e.g., messiness of one's home environment). Future studies should link scores on the U-SORT to markers of real world functioning, such as an organized home environment, ability to put together lists of things to do, presence of safety hazards, and the availability of needed equipment or supplies. Another limitation is that our data was cross-sectional. Therefore, we do not know the test-retest reliability of the U-SORT or the sensitivity of the test to within-person change (e.g., change in organizational ability following an intervention). Future studies should, therefore, investigate whether subjects receiving skills-based interventions for improving organizational ability show significant improvements on the U-SORT, relative to a control intervention. Finally, our population consisted of middle-aged and older patients with schizophrenia. While this population is known to have cognitive and organizational deficits, it will be important to validate this scale with other populations known to have similar deficits (e.g., patients with dementia, active Bipolar patients, etc).

In sum, we provided preliminary reliability and validity data for the U-SORT. As expected, performance on this test is correlated with other measures of cognitive and functional ability, as well as with symptomatology. While more data are needed to validate the U-SORT against real-world outcomes and to demonstrate sensitivity to change, we believe our study provides excellent preliminary support for the reliability and validity of the U-SORT for measuring cognitive and functional deficits.

Acknowledgments

This research was supported by the following research grants from the National Institute of Mental Health (NIMH): R01 MH062554, R01MH084967, and T34 MH065183. We would like to acknowledge Dr Terry Cronan for helpful edits to this manuscript.

References

- Addington J, Addington D. Neurocognitive and social functioning in schizophrenia: a 2.5 year follow-up study. *Schizophr Res.* 2000; 44:47–56. [PubMed: 10867311]
- Anthony WA, Blanch A. Supported employment for persons who are psychiatrically disabled: an historical and conceptual perspective. *Psychosocial Rehabilitation Journal.* 1987; 11:5–23.
- Bowie CR, Leung WW, Reichenberg A, McClure MM, Patterson TL, Heaton RK, Harvey PD. Predicting schizophrenia patients' real-world behavior with specific neuropsychological and functional capacity measures. *Biological Psychiatry.* 2008; 63:505–511. [PubMed: 17662256]
- Bowie CR, Reichenberg A, Patterson TL, Heaton RK, Harvey PD. Determinants of real-world functioning performance in Schizophrenia: Correlations with cognition, functional capacity, and symptoms. *American Journal of Psychiatry.* 2006; 163:418–425. [PubMed: 16513862]
- Green MF. What are the functional consequences of neurocognitive deficits in schizophrenia? *The American Journal of Psychiatry.* 1996; 153:321–330. [PubMed: 8610818]

- Green MF, Kern RS, Braff DL, Mintz J. Neurocognitive deficits and functional outcome in schizophrenia: are we measuring the “right stuff”? *Schizophrenia Bulletin*. 2000; 26:119–136. [PubMed: 10755673]
- Kay SR, Fiszbein A, Opler LA. The Positive And Negative Syndrome Scale (PANSS) for schizophrenia. *Schizophrenia Bulletin*. 1987; 13:261–76. [PubMed: 3616518]
- Mattis, S. Dementia Rating Scale. Odessa, FL: Psychological Assessment Resources; 1973.
- Mausbach BT, Moore R, Bowie C, Cardenas V, Patterson TL. A review of instruments for measuring functional recovery in those diagnosed with psychosis. *Schizophr Bull*. 2009; 35:307–18. [PubMed: 19023122]
- Owen C, Rutherford V, Jones M, Wright C, Tennant C, Smallman A. Housing accommodation preferences of people with psychiatric disabilities. *Psychiatric Services*. 1996; 47:628–632. [PubMed: 8726491]
- Patterson TL, Goldman S, McKibbin CL, Hughs T, Jeste DV. UCSD Performance-based Skills Assessment: Development of a new measure of everyday functioning for severely mentally ill adults. *Schizophrenia Bulletin*. 2001; 27:235–45. [PubMed: 11354591]
- Patterson TL, Lacro J, McKibbin CL, Moscona S, Hughs T, Jeste DV. Medication Management Ability Assessment: Results from a performance-based measure in older outpatients with schizophrenia. *Journal of Clinical Psychopharmacology*. 2002; 22:11–9. [PubMed: 11799337]
- Patterson TL, Mausbach BT. Measurement of Functional Capacity: Focus on Schizophrenia. *Annual Review of Clinical Psychology*. In press.
- Patterson TL, Mausbach BT, McKibbin C, Goldman S, Bucardo J, Jeste DV. Functional Adaptation Skills Training (FAST): A randomized trial of a psychosocial intervention for middle-aged and older patients with chronic psychotic disorders. *Schizophrenia Research*. 2006; 86:291–299. [PubMed: 16814526]
- Pearlin LI, Mullan JT, Semple SJ, Skaff MM. Caregiving and the stress process: an overview of concepts and their measures. *The Gerontologist*. 1990; 5:583–594. [PubMed: 2276631]
- Silverstein SM, Schenkel LS, Valone C, Nuernberger SW. Cognitive deficits and psychiatric rehabilitation outcomes in schizophrenia. *Psychiatr Q*. 1998; 69:169–91. [PubMed: 9682284]
- Wyatt RJ, Henter I, Leary MC, Taylor T. An economic evaluation of schizophrenia -1991. *Social psychiatry and psychiatric epidemiology*. 1995; 30:196–205. [PubMed: 7482004]

Table 1

The U-SORT 42 items.

Item	Correct Sort
1. Battery (good)	Keep
2. Card with emergency numbers	Keep
3. Chopstick in paper sleeve	Trash
4. Coin (dime)	Keep
5. Coin (nickel)	Keep
6. Coin (penny)	Keep
7. Coin (penny)	Keep
8. Coin (penny)	Keep
9. Coin (penny)	Keep
10. Coupon (expired)	Trash
11. Coupon (expired)	Trash
12. Fork with missing tines	Trash
13. Glove (rubber) (1 torn)	Trash
14. Ketchup packet (1 empty)	Trash
15. Ketchup packet (1 good)	Keep
16. Mustard packet (1 good)	Keep
17. Pad of sticky notes (good)	Keep
18. Paper (with doodles)	Trash
19. Paper clip (bent one)	Trash
20. Paper clip (bent one)	Trash
21. Paper clip (good one)	Keep
22. Paper clip (good one)	Keep
23. Paper clip (good one)	Keep
24. Paper clip (good one)	Keep
25. Pen (good one)	Keep
26. Pen (good one)	Keep
27. Pencil (broken)	Trash
28. Pencil (good one)	Keep
29. Pill bottle labeled discard 5/98	Trash
30. Pill dispenser with 4 sections	Keep
31. Rubber band (broken one)	Trash
32. Rubber band (broken one)	Trash
33. Rubber band (good one)	Keep
34. Rubber band (good one)	Keep
35. Rubber band (good one)	Keep
36. Rubber band (good one)	Keep
37. Salt packet (1 empty)	Trash

Item	Correct Sort
38. Salt packet (1 empty)	Trash
39. Soy sauce packet (1 good)	Keep
40. Stick (wood)	Trash
41. Sugar packet (1 empty)	Trash
42. Sugar packet (1 empty)	Trash

Table 2

Participant Characteristics

Sample Characteristics	M	SD	n	%
Age at Study Enrollment	49.93	7.43		
Gender				
Male			122	67.8%
Female			58	32.2 %
Years of Education	11.79	2.76		
Marital Status				
Single			105	58.3%
Cohabiting			3	01.7%
Separated			14	07.8%
Divorced			41	22.8%
Widowed			6	3.30%
Married			11	6.10%
Ethnicity				
Caucasian			101	56.1%
African- American			31	17.2%
Hispanic			31	17.2%
Asian			6	03.3%
Native-American			7	03.9%
Native Hawaiian/Other			3	01.7%
Pacific Islander				
Other			1	0.60%
Living Situation				
Alone in Apartment			11	06.1%
Alone in House			2	01.1%
With Someone in Apt.			12	06.7%
With Someone in House			12	06.7%
Board and Care			114	63.7%
SNF			1	0.60%
Assisted Living			18	10.1%
Homeless			3	01.7%
SRO			6	03.4%
UPSA Total T-Score	64.16	19.65		
U-SORT Percent Sorted Correctly	71.90	16.20		