Running Head: VALIDITY OF THE CANS

The Validity of the Child and Adolescent Needs and Strengths Assessment

Joseph B. Dilley, Dana A. Weiner,

John S. Lyons, & Zoran Martinovich

Feinberg School of Medicine, Northwestern University

Address correspondence to Joseph B. Dilley, 11500 W. Olympic Blvd. Ste, 420,

Los Angeles, CA 90064,

or e-mail (PhDilley@GMail.com).

The authors wish to thank the following persons for their consultation, provision of data, or both; their assistance was integral to the completion of this project: Carrie Dilley, Michelle Shasha, Kya Fawley, Nathan Groenendyk, Farah Quadrai, and Purva Rawal. This paper was presented as a poster at the American Psychological Association 2003 Convention in Toronto, Ontario.

Summary. The Child and Adolescent Needs and Strengths (CANS) is a functional assessment used in approximately 27 states to evaluate youth service outcomes. The CANS purports to measure both the youth's risk and protective factors, but its validity is largely un-researched. This study compares ratings of 304 delinquent youth on the CANS and ratings on a functional assessment whose validity is well established: The Child and Adolescent Functional Assessment Scale (CAFAS). Participants were selected from an Illinois juvenile justice program and had a mean age of 14 years, 7 months (*SD* = 1.30 years). Females constituted 33.3% of the sample and males 67.7%. It was hypothesized that correlations obtained between CANS items and CAFAS subscales purporting to measure the same general aspect of functioning would be positive, statistically significant, and of moderate to high magnitude. Results suggest the CANS is a valid measure of outcomes within this population. The implications of these results are discussed and recommendations for future research are made.

Providing adequate mental health services for America's youth is a challenging endeavor, requiring careful attention to the child's weaknesses and strengths so that suitable interventions can be implemented and their effectiveness evaluated. The repeated use of children's mental health assessments is a primary means of capturing the child's psychological functioning, to inform service delivery and ultimately to evaluate treatment outcomes. Ideally, functional assessments should be simple, inexpensive, usable by nonprofessionals, and allow for a standard means of comparing youth who experience a wide array of psychological disturbances (Bates, 2001). Many functional youth assessments used today, such as the Child and Adolescent Psychiatric Assessment (CAPA; Angold, Cox, Prendergast, Rutter, & Simonoff, 1995) and the Conners' Rating Scales – Revised (CRS R; Conners, 1997), are limited to evaluation of risk factors or needs, despite empirical support for the use of more comprehensive youth assessments (Lyons & Schaefer, 2000; Pobanz, 2001). Indeed, research indicates that the development of protective factors or strengths, is integral to child and adolescent development, and that strengths can be used to predict future behavior and adjustment (Lyons, Uziel-Miller, Reyes, & Sokol, 2000; Voegler, 2000; Loeber & Farrington, 2001). As such, the development and implementation of comprehensive functional youth assessments are currently of great importance.

The Child and Adolescent Functional Assessment Scale (CAFAS; K. Hodges, 1997) is the most widely used measurement for assessing overall psychological adjustment in children and adolescents (Bates, 2001). A more recently developed measure, the Child and Adolescent Needs and Strengths (CANS; Lyons, Sokol, Khalsa, & Lee, 1999) is a communication-based assessment option that is time- and thus cost-efficient and increasing in use (Lyons, Weiner, & Lyons, 2004). To establish the CANS' level of concurrent validity with the CAFAS, the present

study analyzes and discusses correlations between ratings on each measure that were obtained from youth enrolled in the Illinois Juvenile Justice System.

A Comparison of the CAFAS and the CANS:

Design, Utility, Reliability, and Validity (Table 1)

Table 1 summarizes comparisons between the CAFAS and the CANS. Design elements including the type of rating scale used, and clinical utility including prediction of service use, as well as evidence for reliability and validity are included in Table 1 and detailed in the following sections.

Design

The CAFAS is a measure designed to provide ratings across five broad scales: Role Performance, Behavior toward Others, Moods/Self-Harm, Substance Use, and Thinking. A total of eight subscales are created by combining the Behavior toward Others, Substance Use, and Thinking Scales with subscales derived from breaking the Role Performance Scale into School/Work Role Performance, Home Performance, and Community Role Performance, and the Moods/Self-Harm Scale into Moods/Emotions and Self-Harmful Behavior. Ratings on items within each subscale are made on a four-point scale ranging in increments of 10 from ‘0’ - minimal or no impairment to ‘30’- severe impairment. On each item, a rating is made by selecting the most applicable descriptor of impairment out of 40 or less. A list of specific strengths and goals are also included within each CAFAS subscale, but the measure was designed to be used with or without an evaluation of strengths. As such, ratings on strengths items do not contribute to scoring, and therefore their inclusion in treatment planning is of qualitative rather than quantitative value.

The CANS is a 1-paged measure that is designed to integrate psychometric and clinimetric approaches to assessment by combining technical precision and clinical utility. Specifically, the CANS is designed from a communication-based approach to assessment that emphasizes the simple but comprehensive exchange of information among all parties responsible for the child and his or her mental healthcare (Lyons, et al., 2004). The CANS provides 42 ratings across six domains: Problem Presentation, Risk Behaviors, Functioning, Care Intensity and Organization, Caregiver Needs and Strengths, and Child/Adolescent Strengths. Each CANS domain consists of items rated on a four-point scale. With regard to the child or adolescent's needs, the scale ranges from '0' - no evidence, no need for action to '3' - clear evidence, immediate or intensive action. With regard to the child or adolescent's strengths, the scale ranges from '0'- a strength that may serve as the focal point of a strength-based intervention to '3' - no strength is recognized on this item. Rating strengths on the CANS is customary and contributes to scoring, making the inclusion of these ratings in treatment planning and evaluation of both qualitative and quantitative value.

Utility

The CAFAS can predict service utilization and cost, or retrospectively evaluate service efficacy. Specifically, evaluations based on the CAFAS can help classify diagnostic groups by problem type, which is conducive to service planning (Hodges & Wotring, 2000). However, its ratings do not correspond to levels of severity of disturbance (Bates, 2001), and thus additional information is required prior to service planning. It can be completed in approximately 30 minutes.

The CANS can be used in the same situations as the CAFAS. CANS ratings are designed to apply for all developmental stages occurring between ages five and 18. As detailed above,

ratings specify the level of intervention required. Therefore, CANS ratings are particularly useful in service planning and evaluation (Lyons, Kisiel, Dulcan, Chesler & Cohen, 1997). It can be completed in approximately 10 minutes.

Reliability and Validity

The reliability and validity of the CAFAS are well established (Bates, 2001). Evidence for the inter-rater reliability and predictive validity of the CANS was recently published (Lyons, Weiner, & Lyons, 2004). Individual CANS item ratings have proven reliable over time when used in planning clinical interventions (Anderson, Lyons, Giles, Price, & Estles, 2003). Of especial relevance to the present study, Lyons, Weiner, and Lyons (2004) conducted an investigation of concurrent and divergent validity between the CAFAS and CANS using a sample of 249 delinquent youth. The authors obtained a correlation of .63 between each measure's total score and subsequently obtained correlations between pairs of CAFAS subscales and CANS items purporting to measure the same general aspect of functioning, such as the Self Harm Subscale and the Danger to Self Item. These correlations ranged from .54 to .73. The moderate to high magnitude of these correlations reflected significant measurement overlap in that the tools appeared to be measuring similar, but *not identical* aspects of functioning. Indeed, these correlations were high enough to rule out the possibility that they were spurious, but not high enough to indicate that the tools are mere duplicates. As such, the study offered preliminary evidence that the CANS holds desirable levels of both concurrent and divergent validity with the CAFAS.

The present study will obtain and examine correlations between more CANS items and CAFAS subscales in a larger sample of delinquent youth. It is hypothesized that results of the present study's analyses will corroborate the findings by Lyons and colleagues (2004). We

expect to obtain positive, statistically significant, and moderate to high correlations between items and subscales purporting to measure the same general aspect of functioning. For the purposes of this paper, a correlation's magnitude will be labeled low, moderate, or high based on percentages of shared variance between the measures. A correlation will be considered low if it falls below .30 (nine percent shared variance), moderate if between .30 and .70 inclusive, and high if above .70 (49% shared variance).

We expect that between items and subscales purporting to measure related, but somewhat different aspects of functioning, such as the CANS Antisocial Behavior Item and the CAFAS Behavior toward Others Subscale, the correlations obtained will be positive, statistically significant, and low to moderate in magnitude. Finally, we expect that between items and subscales purporting to measure altogether different aspects of functioning, such as the Psychosis Item and the Home Performance Subscale, the correlations obtained will not be statistically significant, and low in magnitude. Nonetheless, we expect many of these correlations to be positive, for the simple reason that a child or adolescent's impairments will likely impact functioning across contexts. For example, a child or adolescent experiencing psychotic thoughts might resultantly exhibit abnormal behavior in the home. In evaluating the accuracy of these hypotheses in light of the results obtained, we will be able to conclude more about the concurrent and divergent validity of these two measures.

Method

Participants

Participants were members of the Illinois Office of Mental Health's Mental Health Juvenile Justice Initiative. This program admits youth who meet both of two criteria: commission of a legal offense and severe mental illness, which is identified by the clinical

diagnosis of psychosis or emotional disturbance. Three hundred four (304) children and adolescents from the population were included in this study. Participants ranged in age from 10 to 17 years. Females constituted 33.3 % of the sample and males 67.7%. Over half (62.5%) of the sample were Euro-American, 29.2 % were African American, 5.6 % were Hispanic, one percent were nonHispanic Native American or nonHispanic Asian/Pacific Islander and 1.7 % represented unspecified ethnicities.

Procedures and Analyses

This study included initial CANS and CAFAS assessments administered within one month of each other by clinical staff who were trained and certified via interrater reliability tests to conduct each assessment. Clinical staff included residential care workers at the 17 juvenile detention centers across Illinois, case monitors, case managers, and liaisons responsible for intakes and screening. Eighty-four percent of the initial CANS tests were administered on the same day as the initial CAFAS tests. Staff either administered the assessments directly to the participants or obtained information from parents to complete the assessments. Another requirement for inclusion in the study was the completion of at least thirteen of fourteen total domains and subscales between the two measures (six CANS domains and eight CAFAS subscales). CANS domains were considered complete if three quarters of the items within that domain received ratings. No more than two item scores in a domain could be missing. Missing items were scored as zero - no evidence.

Pearson's r correlations were obtained between CANS items and CAFAS subscales (see Table 2). However, ratings on items within the CANS Family/Caregiver Capacity Domain and the Strengths Domain were not included in these analyses because corresponding ratings on the CAFAS were not collected. Ratings on the CAFAS Caregiver Resources Subscales may not

have been noted on CAFAS records because these ratings are not included when totaling the CAFAS Scale Scores for Youth's Functioning. Additionally, because the CAFAS was designed to be completed with or without an evaluation of strengths, some raters did not assess the child's strengths, and those who did have only the option of presenting their strengths assessments in a qualitative format. Ratings on the CANS Attachment Item were also not included in these analyses because this item is to be used only to rate children who are under six years old. Ratings on the CANS Situational Consistency Item were also not included in these analyses because there is not a CAFAS subscale that corresponds to this item.

Results

Insert Table 2 about here

As displayed in Table 2, a wide range of correlations was obtained between CANS items and CAFAS subscales. Almost half were significant ($p < .05$), with one reaching .72. Only ratings correlated at greater than or equal to $\pm$.10 are listed in Table 2.

Discussion

The present study examined correlations between CANS and CAFAS ratings of delinquent youth to ultimately determine the levels of concurrent and divergent validity possessed by these tools. Consistent with our first hypothesis, items and subscales purporting to measure the same general aspect of functioning generally yielded positive, significant, and moderate to high correlations. In some instances however, we were curious as to why the correlations obtained were not greater, and compared the content of the corresponding items and subscales. We found that CAFAS ratings were qualified by highly specific examples of impairment, while CANS ratings were bound by more flexible parameters.

For example, the CANS Psychosis Item and the CAFAS Thinking Subscale were correlated at .55. Because both aim to capture the child or adolescent's level of thought disturbance, we hypothesized that their correlation would be higher. Content comparison revealed that the Psychosis Item qualifies its ratings by attaching diagnostic considerations; for a child or adolescent's thought disturbance to be rated as severe enough to warrant immediate or intensive action the symptoms should be consistent with DSM-IV criteria for a severe psychotic disorder. In contrast, the Thinking Subscale qualifies the ratings by attaching associated performance consequences to its ratings; for a child or adolescent's impairment in thinking to be rated "Severe", the criterion "cannot attend a normal school classroom, does not have normal friendships, and cannot interact adequately in the community due to any of the following [symptoms]" must also be met.

In a similar vein, the CANS School Item and the CAFAS School/Work Role Performance Subscale reflect misbehavior and impeded progress. Although their correlation was positive, and significant, it was of only moderate in magnitude. Content inspection revealed that the School Item rates youth based upon their level of functioning at school with general instances of misbehavior listed, to facilitate selection of a rating; indications such as "disruptive behavior and difficulties with learning consistent with IEP" warrant the rating of a moderate to severe school problem. In contrast, most CAFAS School/Work Role Performance Subscale criteria include highly specific results of the child or adolescent's misbehavior or impeded progress; indications such as "frequent absences from school which would be approximately once every two weeks or for several consecutive days due to impairing behavior and excluding truancy or physical illness" warrant the rating of a moderate impairment.

Consistent with our second hypothesis, correlations between items and subscales purporting to measure related but somewhat different aspects of functioning were positive, significant, and ranged from low to moderate. For example, the Oppositional Behavior Item and the Home Performance Subscale both aim to capture the child or adolescent's compliance with authority, but within different contexts. Thus, it stands to reason that these were moderately correlated at .40.

We hypothesized that items and subscales purporting to measure altogether different aspects of functioning would yield insignificant and low correlations. Although low, some of these correlations were significant. The probability of statistical significance was increased by the sample size of 304, which helps to explain these results. Additionally however, these results' level of significance serves as a reminder of the importance to treatment of considering the ways in which the child or adolescent's difficulties can be manifested across contexts. For example, the Attention Deficit Item and the School/Work Role Performance Subscale purport to measure different aspects of functioning. However, it is logical that ratings on this item and subscale are significantly correlated, because symptoms of attention deficit disorder would certainly impact the child or adolescent's functioning at school and work.

Results of this study support existing evidence that in a juvenile justice population, CANS items possess concurrent validity with corresponding CAFAS subscales, while maintaining divergent validity when compared to subscales purporting to measure different aspects of functioning. Differences between the tools with regard to specificity and detail of descriptors that aid ratings appear responsible for the magnitude of correlations that might otherwise have been greater, with the CANS relying upon more general action levels that indicate the required level of service intervention. Comparisons of other design and utility

characteristics reveals that the CANS necessarily and quantitatively rates the child or adolescent's strengths, but is still more time- and cost-efficient than the CAFAS.

There are two primary limitations of the present study. First, the use of a distinctive sample requires caution in extrapolating results. Indeed, generalizations to other populations should be made carefully. Further, the sample size prevented meaningful stratification across age and sex, which would have provided important information regarding the effects of developmental changes. As noted above, CANS items in particular are designed to span developmental stages occurring between ages five and 18 years. Second, the present design precluded an analysis of correlations between individual items within the CANS Family/Caregiver Capacity Domain or within the CANS Strengths Domain and CAFAS subscales. Such an analysis would provide additional meaningful information regarding the concurrent validity of the CANS and the CAFAS.

Within the juvenile justice population and across the spectrum of children's mental healthcare services, functional assessments are a means of evaluating the child's psychological status, informing treatment delivery, and evaluating treatment outcomes. To provide an accurate psychological profile of the child, functional assessments must be reliable and valid. To facilitate collaboration among all parties responsible for the child and the planning, delivery, and evaluation of his or her mental healthcare, functional assessments should be comprehensive, yet simple and user-friendly. The present study indicates that the CANS is both psychometrically sound and clinically useful, thus supporting the CANS as a viable assessment of youth.

References

Anderson, R. L., Lyons, J. S., Giles, D. M., Price, J. A., & Estles, G. (2003) Examining the reliability of the Child and Adolescent Needs and Strengths-Mental Health (CANS MH) Scale. *Journal of Child and Family Studies, XII,* 279-289.

Angold, A., Cox, A., Prendergast, M., Rutter, M., & Simonoff, E. (1995) The Child and Adolescent Psychiatric Assessment. *Psychological Medicine, XXV,* 739-753.

Bates, M. P. (2001) The Child and Adolescent Functional Assessment Scale (CAFAS): review and current status. *Clinical Child and Family Psychology Review, IV,* 63-84.

Conners, C. K. (1997) *Conners' Rating Scales Revised: technical manual.* New York: Multi Health Systems.

Hodges, K. (1997) *CAFAS manual for training coordinators, clinical administrators, and data managers.* Ann Arbor, MI: Kay Hodges.

Hodges, K., & Wotring, J. (2000) Client typology based on functioning across domains using the CAFAS: implications for service planning. *Journal of Behavioral Health Services & Research, XXVII,* 257-271.

Loeber, R. & Farrington, D. P. (2001) Young children who commit crime: epidemiology, developmental origins, risk factors, early interventions, and policy implications. *Development and Psychopathology, XII,* 737-762.

Lyons, J. S., & Schaefer, K. (2000) Mental health and dangerousness: characteristics and outcomes of children and adolescents in residential placements. *Journal of Child and Family Studies, IX,* 67-73.

Lyons, J. S., Kisiel, C. L., Dulcan, M., Chesler, P., & Cohen, R. (1997) Crisis assessment and psychiatric hospitalization of children and adolescents in state custody. *Journal of Child and Family Studies, VI,* 311-320.

Lyons, J. S., Sokol, P. T., Khalsa, A., & Lee, M. (1999) *The Child and Adolescent Needs and Strengths for children with mental health challenges (CANS MH)*: manual. Winnetka, IL: The Buddin Praed Foundation.

Lyons, J. S., Uziel-Miller, N. D., Reyes, F., & Sokol, P. T. (2000) Strengths of children and adolescents in residential settings: prevalence and associations with psychopathology and discharge placement. *Journal of the American Academy of Child and Adolescent Psychiatry, XXXIX*, 176-181.

Lyons, J. S., Weiner, D. A., & Lyons, M. (2004) Measurement as communication in outcomes management: the Child and Adolescent Needs and Strengths. In M. Maruish (Ed.), *The use of psychological testing for treatment planning and outcome assessment.* (3rd ed.) Vol. 2. Mahwah, NJ: Erlbaum.

Masten, A. S. (2001) Ordinary magic: resilience processes in development. *American Psychologist, LVI*, 227-238.

Pobanz, M. S. (2001) Using protective factors to enhance the prediction of negative short-term outcomes of first-time juvenile offenders. *Dissertation Abstracts International, LXII*, 5-A, 1948.

Voegler, M. E. (2000) Risk and protective factors associated with social resilience in homeless youth. *Dissertation Abstracts International, LXI*, 4-B, 2228.

Werner, E. E., & Smith, R. S. (2001) *Journeys from childhood to midlife: risk, resilience, and recovery.* Ithaca, NY: Cornell.

Table 1

A Comparison of CAFAS and CANS Design, Utility, Reliability, and Validity

	CAFAS	CANS
Design		
Overall	Five scales of functioning, each with specific indicators: Role Performance Behavior Toward Others Moods/Self-Harm Substance Use Thinking	Six domains of functioning, each with general indicators: Problem Presentation Risk Behaviors Functioning Care Intensity and Organization Caregiver Needs and Strengths Strengths (of the child or adolescent)
Rating Scales	Four-point, aggregated across up to forty descriptors	Four-point
Assessment of Strengths	Optional Does not affect scoring	Customary Affects scoring
Utility	Predicts service utilization Predicts service cost Retrospectively evaluates service efficacy Available for a fee 30-minute completion time	Indicates level of service intervention required Retrospectively evaluates service efficacy Available at no charge 10-minute completion time
Reliability	Well established: Internal	Recently established: Inter-rater
Validity	Well established: Concurrent Construct Face	Recently established: Concurrent

Table 2

Pearson's r Correlations between CANS Items and CAFAS Subscales

				CAFAS Subscales							
CANS Domains	CANS Items			School / Work Performance	Home Performance	Community Performance	Behavior Toward Others	Moods / Emotions	Self-Harmful Behavior	Substance Use	Thinking
			M	21.91	21.12	21.78	18.06	2.01	5.71	9.51	4.80
		M	SD	10.03	9.72	7.37	7.87	.28	9.14	10.93	7.83
Problem Presentation	Psychosis	.44	.71			.15**	.14*	.14*	.22**		.55**
	Attention Deficit	1.41	.69	.14*	.15*	.16**	.16**				.16**
	Depression / Anxiety	1.89	.39	.19**	.12*		.15*	.18**	.12*		
	Oppositional Behavior	1.62	.65	.20**	.40**	.17**	.20**		.15*		
	Antisocial Behavior	1.40	.67		.20**	.20**	.26**				
	Substance Abuse	.86	.81						.14*	.72**	
	Adjustment to Trauma	1.11	.85		.11			.18**	.13*	.12*	
	Temporal Consistency	1.72	.74	.24**	.23**	.10	.18**	.18**		.18**	
Risk Behavior	Danger to Self	.67	.70				.12*	.26**	.63**	.19**	
	Danger to Others	1.29	.73		.19**	.24**	.23**		.11		

Table 2 (cont'd)

	Runaway	.75	.92	.11	.24**					.25**	
	Sexually Abusive Behavior	.21	.60		.15*	.19**	.16**		.12*		
	Social Behavior	1.05	.71	.18**	.21**	.21**	.33**	.15*			.10
	Crime / Delinquency	1.48	.73		.14*	.27**	.17**	.11*		.12*	
Functioning	Intellectual / Developmental	.34	.56			.				-.12*	.25**
	Physical / Medical	.20	.44							-.14*	
	Family Functioning	1.62	.77	.13*	.26**		.17**	.11	.17**	.10	
	School / Day Care Functioning	1.81	.93	.63**	.19**		.17**	.14*		.16**	
	Sexual Development	.42	.76		.12*	.21**	.18**		.11		.12*
Care Intensity & Organization	Monitoring	.64	.83	.14*	.24**	.14*	.14*		.16**		.29**
	Treatment	1.39	.84		.26**		.17**		.15**		
	Transportation	.64	.71	.11							.16**
	Service Permanence	1.01	1.08	.15*	.15*			.10			

** Correlation is significant at the $p < .01$ level; * Correlation is significant at the $p < .05$ level.