Assessing Multiple Approaches for Measuring Change Using the Child and Adolescent Needs and Strengths (CANS) Assessment

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Background & Significance

- The Child and Adolescent Needs and Strengths Assessment (CANS) is designed to assist children, families, their teams and the child serving system focus on personal transformation.
- The use of the RCI has been adopted by implementation sites in an effort to standardize the definition of positive change across groups of individuals.[1]
- This study examines various methods for measuring individual change over time using the CANS, and their criterion validity for predicting change in child welfare placement outcomes.

Method

- Secondary analysis of data from Maryland's Governor's Office for Children & Department of Social Service.
- Participants included 436 children & youth who were placed in residential child care or treatment foster care between 01/08 & 07/13 for at least 6 months, had CANS assessments at both intake & discharge, & for whom data on placement setting at intake & discharge were available.
- Multiple approaches for measuring individual change from intake to discharge on the CANS *Life Domain Functioning* (LDF) domain were computed.
  - Existing approaches for scale measures:
    - Standardized Effect Size (SES)[2]
      SES$= \frac{T1-T2}{SD1}$ (SES >.50 = change)
    - Standard Error of Measurement (SEM)[3]
      $S1\sqrt{1-r}$ (T1-T2>SEM = change)
    - Reliable Change Index (RCI)[4]
      $RCI = \frac{T1-T2}{Sdiff}$ (RCI>1.28 = change)
  - Proposed approach for CANS:
    - Dichotomized response change: Difference in number of actionable items (i.e., score 2 or 3)

Analysis & Findings

- Criterion validity was assessed by examining how well each approach to measuring change in LDF predicted move to a less restrictive child welfare placement setting.
- Placement settings were categorized into three levels of restrictiveness:
  - High-intensity treatment (e.g., residential treatment center, hospitalization)
  - Low-intensity treatment (e.g., treatment foster care, group home)
  - Non-treatment (e.g. foster care, adoptive care)
- Logistic regression and sensitivity & specificity analysis examined the extent to which improvement in LDF measured using SES, SEM, RCI, and dichotomized response change was associated with moving to a lower level of placement restrictiveness.
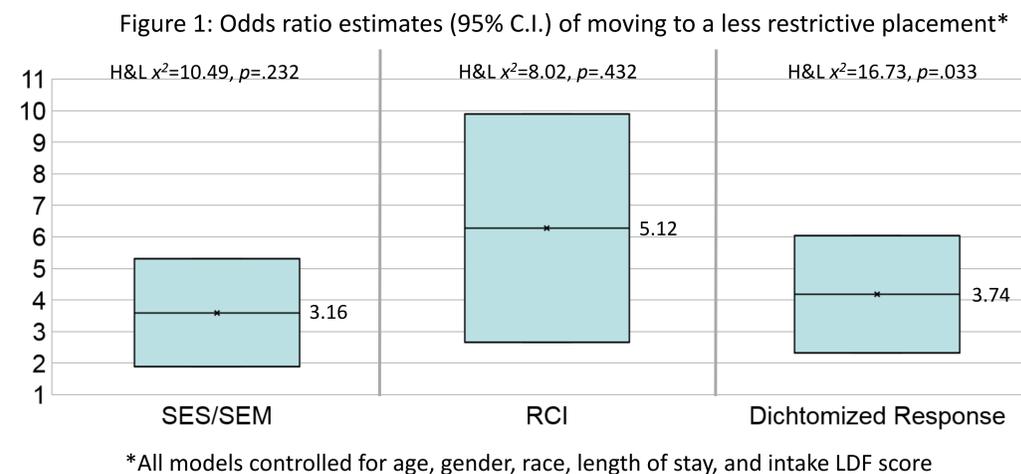
Figure 1: Odds ratio estimates (95% C.I.) of moving to a less restrictive placement*

*All models controlled for age, gender, race, length of stay, and intake LDF score

Table 1: Sensitivity & specificity of CANS improvement and moving to a less restrictive placement

	Sensitivity	Specificity	PPV	NPV	Accuracy
SES/SEM	34%	77%	51%	37%	60%
RCI	21%	90%	60%	62%	62%
Dichotomized Response	50%	56%	52%	66%	61%

- The SES and SEM approaches identified the same children as improving in LDF, thus their effects are reported interchangeably.
- All three approaches for measuring improvement in LDF were associated with greater odds of moving to a less restrictive placement at discharge.
- The logistic regression model that examined the effect of Dichotomized Response Change (OR=3.74) was the only model that fit the data (Hosmer & Lemeshow x^2=16.73, p=.033).
- The three approaches were similar in their overall accuracy in predicting moving to a less restrictive placement (60%-62%); Dichotomized Response had the highest sensitivity (50%), whereas SES/SEM and RCI had better specificity but their sensitivities were low.

Conclusions & Implications

- Findings suggest that Dichotomized Response Change may be a better approach for detecting client improvement with the CANS than SES, SEM, and RCI
- Given the nature of the CANS and its primary function as a case planning tool, common approaches for analyzing individual change over time using validated scale measures might not be a good fit for the CANS.
- The CANS domains are not measures of specific "constructs" and are therefore not psychometrically appropriate for analysis strategies that use reliable scale measures.
- Using an approach for measuring change that is more tailored to the nature and purpose of the CANS instrument – such as change in the number of actionable items – shows a slight improvement in criterion validity in predicting real-world outcomes.
- The Dichotomized Response Change approach could be improved by identifying items across CANS domains that are most associated with a particular outcome (such as change in placement setting), which would likely increase accuracy of prediction.

References

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