Sample Description

- Forms were completed on 394 youth
  - 59% male
  - Mean age = 16.6 years
  - Less than 6 years of age: 3%
  - 6 – 10 years: 12%
  - 11 – 14 years: 12%
  - 15 – 18 years: 49%
  - 19 – 21 years: 33%
  - Race/ethnicity:
    - Caucasian: 39%
    - African American: 41%
    - Amer. Indian/Alaskan: 3%
    - Hispanic/Latino(a): 16%
- 58% received psychological, educational, substance abuse, welfare related, or court ordered services.

Sample Descriptive: Residential Setting

- Independent living by self: 1.8%
- Independent living with friend: 1%
- Home of natural parents for an 18-year-old: 1%
- Home of natural parents for a child: 6.6%
- Residential Job Corps center: 39.8%
- Group home: 10.9%
- Residential treatment center: 11.2%
- Group emergency shelter: 1.8%
- Youth correction center: 0.8%
- State mental hospital: 0.3%

The Rasch Measurement Model

- The Rasch model, as opposed to 2- and 3-parameter models, questions how well empirical data (measure scores/responses) fit in terms of the measurement model constraints.
  - The additional parameters in 2PL (item difficulty) and 3PL (respondents guessing) models are used to explain variance in the measurement model.
- The Rasch model provides "sample invariant" (sample independent) item calibrations, item difficulties, from easy to hard – no impairment to severe impairment.
- Rasch also yields fit statistics that provide information regarding a respondent’s expected response in comparison to his/her actual response.

Summarizing The Advantages Of The Rasch Measurement Model

- Ability to perform item level analysis
  - Error estimates and item fit indices
  - Reliability (both person and item reliability)
  - Assessment of item independence and item redundancy
  - Category (scale) analysis
    - Identification of response scale categories that offer little or no information
    - Identification of idiosyncratic use of scale categories
- Items are calibrated in terms of difficulty, and contribute differentially to the construct being measured
- Rasch model is closest in correspondence to the raw score model
- Differential item function (DIF)
  - Group bias (age, gender, racial/ethnic, cultural, language groups)

Hypothetical Example

Scale items represent a construct along a continuum from low to high, minimal to maximal, etc. Every scale item is calibrated along this continuum.
Measuring the Construct: Calibrating Items

- Person\(^2\) has no opportunity to demonstrate improvement, since this can only indicate stability or deterioration in terms of restriction.
- Person\(^3\) has no opportunity to demonstrate deterioration or minimal improvement.

Data Issues: Item Misfit*

<table>
<thead>
<tr>
<th>Item</th>
<th>Misfit</th>
<th>Threshold</th>
<th>Displacement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Item 1</td>
<td>1.4</td>
<td>-1.4</td>
<td>0.1</td>
</tr>
<tr>
<td>Item 2</td>
<td>1.2</td>
<td>-1.2</td>
<td>0.2</td>
</tr>
<tr>
<td>Item 3</td>
<td>1.0</td>
<td>-1.0</td>
<td>0.3</td>
</tr>
</tbody>
</table>

Reliability: 0.87
Separation Index: 2.85 (measure can segment sample into three statistically distinct subgroups).

Non-uniform Response Profiles

- Legal differences of less than the recommended 1.4 – indicating that the underlying response categories may increase the precision of the scale.
- Thresholds for Likert scale responses.

Likert Scale Assumption: Response Categories Are Equally Spaced AND Monotonically Ordered

- Several items are disordered.
- Many scores are not interval data.
- Recommendation: cognitive testing of response options.

Person-Item Map: REM-Y

(Adolescents 15 years and older)

- Item spread covers a broad range on the measured construct (restriction).
- Item range is more than two standard deviations.
- Some item content may be confounded with the resources available to the treatment setting (e.g., clothing allowance, employment opportunities)

Non-uniform Response Profiles

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Developmental Milestones: Differential Item Function – REM-Y

Interpreting Score Changes

10 points has a differential effect depending where on the continuum the change occurs.

Perceptions of restrictiveness differ across the developmental lifespan. For example, control over finances is minimally restrictive for children as compared to older adolescents, while removal from contact with others (time out) is considered more restrictive for older adolescents/young adults.

Differential Item Function – REM-Y
Sex of the Referent Youth (Total Sample)

Pattern Matrix (PAF – PROMAX Rotation)

Next Steps

- Continued scale refinement
- Profile development
  - General Environment Types
  - Developmental
- Examine relationship with outcomes
  - Extend use beyond change in restrictiveness at exit
Thank You!

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