Executive Functioning in Rating Scales for ADHD Assessment: Ecologically Valid or Construct Invalid?

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Introduction

ADHD & Executive Function (EF)
- ADHD
  - Pervasive and chronic neurodevelopmental disorder associated with impairments in academic functioning and academic achievement (nons.
  - Early detection and intervention reduce symptom severity and functional impairment (Happ, 2000)
- Executive Function (EF)
  - Higher-order cognitive processes associated with behavior and thought regulation (API/IC, SS, WM) (Dawson et al., 1995)
  - May underlie ADHD behavior symptoms (Happ et al., 2006, 2007)
  - EF is a potentially important candidate to target for early assessment and intervention

Types of EF Assessments
- Rating Scales
- Performance Tests

Purpose of Study
- Recent work suggests strong discord between EF rating scales and performance tasks (Happ et al., 2015)
- Rating scales frequently interpreted as reflecting improved ecological validity
- Few studies have examined convergent validity of rating scales and performance tests for predicting ecologically valid outcomes (e.g., academic functioning and academic achievement)

Participants
- 53 children referred to ADHD specialty clinic in Southeastern U.S. participating in a behavioral treatment (N = 38) or cognitive training study (N = 15)
  - 18 girls and 35 boys
  - Ages 7–13 years old (M = 10.20, SD = 1.44)
  - 42 met criteria for ADHD based on parent K-SADS and multiple parent and teacher reports
  - 6 met criteria for other clinical disorders, but not ADHD
  - 5 did not meet criteria for any clinical disorders

Academic Measures

Academic Functioning
1.) Academic Performance Rating Scale (APRS) (DuPaul, 1991)
- Parent report (PRS) and Teacher (TRS)
- Executive Function (EF) subscale

Academic Achievement
1.) Kaufman Test of Educational Achievement-2/3 (KTEA-2/3) (Kaufman & Kaufman, 2004/2014)
- Academic Skills Battery
- Composite Score

Results

Figure 1. Intercorrelations among executive functioning measures and academic outcomes.

EF Ratings
- Academic Functioning
- Academic Achievement

EF Performance
- Phonological WM
- Stop-Signal (IC)
- Visuospatial WM

Academic Ratings
- APRS
- BASC-2
- KTEA-2/3

Table 1. Descriptive statistics (N = 53).

<table>
<thead>
<tr>
<th>Variables</th>
<th>M</th>
<th>SD</th>
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</thead>
<tbody>
<tr>
<td>BASC-2 (PRS)</td>
<td>66.83</td>
<td>11.14</td>
</tr>
<tr>
<td>Teacher report (TRS)</td>
<td>56.81</td>
<td>10.20</td>
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<tr>
<td>Inhibitory Control (ms)</td>
<td>267.69</td>
<td>62.03</td>
</tr>
<tr>
<td>Working Memory (stimuli correct/miss)</td>
<td>3.21</td>
<td>0.73</td>
</tr>
<tr>
<td>VS</td>
<td>2.57</td>
<td>0.84</td>
</tr>
<tr>
<td>Academic Achievement (standard score)</td>
<td>106.94</td>
<td>15.74</td>
</tr>
</tbody>
</table>

EF Measures

EF Rating Scales
1.) Behavior Assessment System for Children-2 (BASC-2) (Reynolds & Kamphaus, 2004)
- Parent report (PRS) and Teacher (TRS)
- 2 scores computed by averaging measurement of EF rating scales

EF Performance Tests
1.) Stop-Signal (Schachar et al., 2000; Alderson et al., 2007)
- Child inhibitory control

2.) Rapport phonological and visuospatial working memory tests (Rapport et al., 2008)
- Child working memory - Visuospatial (VS) & Phonological (PH)

EF Measures & Academic Measures

Non-significant relations between EF Ratings and EF Performance
Non-significant relation between EF Ratings and Academic Performance
Non-significant relation between Academic Ratings and EF Performance
Strong association between Academic Ratings and Academic Performance

Discussion

EF Measures
- Non-significant relations between EF Ratings and EF Performance
- Strong association between Academic Ratings and Academic Performance

Academic Measures
- Strong association between Academic Ratings and Academic Performance
- EF Performance strongly correlated with both Academic Performance and Academic Ratings
- Non-significant correlation between EF Ratings and Academic Ratings
- Non-significant relation between EF Ratings and Academic Performance

Conclusion

Implications
- Findings contradict claims that EF rating scales reflect ecologically valid assessments of “real world” functioning
- Suggests limited ability of EF rating scales to predict EF abilities or academic outcomes in children with ADHD and related difficulties

Limitations & Future Directions
- Cross-sectional study
- Need longitudinal studies
- No between-group comparison
- Scales may predict differently for different groups

Notes:
- Significant path shown in bold
  - *p < .05
  - **p < .01