Validity and Reliability of the Auditory Consonant Trigrams Test in Multiple Sclerosis

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Introduction

• The Brief International Cognitive Assessment for MS (BICAMS) is a brief, cognitive monitoring tool developed for MS Clinics that can be administered by health care professionals who may not have neuropsychological training1,2.

• The BICAMS, however, fails to evaluate working memory; a common area of cognitive impairment in people with MS (PWMS)3.

• Auditory Consonant Trigrams (ACT) is a test of working memory under conditions of interference that only takes 5 minutes to administer.

• ACT can supplement the BICAMS assessment for a more comprehensive evaluation of cognition with little added time commitment.

Objectives

• The goals of the present study are:
  • to determine if ACT can discriminate between people with MS and healthy controls
  • to establish the psychometric properties of ACT.

Method

Subjects

• 57 individuals with a confirmed diagnosis of MS
  • 16 males, 41 females
  • 44 RRMS, 9 SPMS, 4 PPMS
  • mean age 45.44 (9.93); mean education 15.44 (2.68)
  • mean disease duration in years 10.11 (7.72)

• 51 healthy controls
  • 7 males, 44 females
  • mean age 41.92 (10.78); mean education 16.31 (2.11)

Procedure

• Participants completed ACT (9sec and 18sec delay intervals) at baseline and after a two-weeks follow-up as part of a larger battery of tests which also included the BICAMS.

Analyses

• After homogeneity of variance was established, one-way ANOVAs were performed to evaluate group differences

• Test-retest reliability was evaluated using Pearson correlational analyses

• Sensitivity of the various tests was established via the percentage of individuals scoring at or below 1.5 standard deviations below the mean

Table 1. Test-retest reliability of ACT scores at baseline and follow-up for PWMS and control groups.

<table>
<thead>
<tr>
<th>Delay</th>
<th>Control</th>
<th>MS</th>
</tr>
</thead>
<tbody>
<tr>
<td>9 sec</td>
<td>r = .258</td>
<td>.525</td>
</tr>
<tr>
<td>18 sec</td>
<td>.395</td>
<td>.559</td>
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</tbody>
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Group Differences

• The MS group performed significantly worse than the HC group on ACT 9sec and 18sec delay intervals at both baseline and follow up

  • 9sec baseline: F(1,106) = 13.21, p < .001
  • 9sec follow-up: F(1,106) = 16.60, p < .001
  • 18sec baseline: F(1,106) = 12.18, p = .001
  • 18sec follow-up: F(1,106) = 7.214, p = .008

• Figure 1 depicts performance in the ACT at baseline and follow-up

Test-retest Reliability

• In the MS sample, test-retest reliability was moderate for the ACT 9sec and 18sec intervals (Table 1)

  • 9sec: r = .52, p < .001
  • 18sec: r = .57, p < .001

Sensitivity

• Figure 2 represents the sensitivity of ACT compared to BICAMS.

  • The 9sec ACT was more sensitive to cognitive impairment than the CVLT at both baseline and follow-up.

Discussion

• The current findings demonstrate that ACT discriminated between people with MS and healthy controls

  • ACT was able to identify impairment in a large portion of the sample to a similar degree as a previously validated measure (BICAMS)

• In conclusion, given that ACT assesses working memory, while BICAMS does not, clinicians may consider supplementing evaluations in the clinic with this measure.

References


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