Evidence Summary for Pediatric Rehabilitation Professionals

Outcome Measures: The Movement Assessment Battery for Children, Second Edition (MABC-2)

1. Summary

Type: Norm-referenced
Purpose: Discrimination, planning, evaluation
Population: Children with motor difficulties
Age: 3 – 16 years
Time to Complete: 20 – 40 minutes for test
Equipment Needed: MABC-2 kit, stopwatch, table, two chairs, floor space for motor items

2. Overview

The MABC-2\(^1\) (2007) is a revision of the MABC\(^2\) (1992). The primary uses of the MABC-2 are:

a. Identification of movement difficulties
b. Clinical exploration and intervention planning
c. Program evaluation
d. Research

Creation of the MABC-2 involved:

a. A revision of test content:
   i. Materials are now made of plastic which are more easily standardized and cleaned
   ii. Improving certain task items
   iii. Clarifying instructions

b. A revision of test structure:
   i. Extending assessment ages to span ages 3 to 16 years
   ii. Reduction of age bands from four to three wider bands:
      1. 3 to 6 years
      2. 7 to 10 years
      3. 11 to 16 years

The MABC consists of 8 items divided into three components:

a. Manual dexterity
b. Ball skills
c. Static and dynamic balance

Administration of the MABC-2 test involves presenting the child being tested with all 8 items in the appropriate age band.\(^1\) The MABC-2 test items should be administered in order; however, the order may be changed by the examiner if this would help maintain the child’s attention and motivation.\(^1\) The administration of each item involves a demonstration followed by an item specific number of practice attempts and formal trials. Some items also allow the examiner to discontinue further trials when a child achieves the highest score on the first trial. If an item is not completed, the examiner must indicate whether this was due to a failed attempt, refusal, or if the task was inappropriate for the child due to a physical/sensory disability.\(^1\)

When scoring items, raw scores are taken from the child’s best performance on each item. Raw scores are then converted to standard scores according to the child’s age. Standard scores for each of the test’s three components can then be calculated by summing scores from specific items and then determining...
the component standard scores and percentile scores from the appendix. Lastly, a total test score can be calculated by summing the 8 items’ standard scores (not the components’ standard scores) and then determining the total test standard score and percentile rank from the appendix.\(^1\)

Scores that are at or above the 16\(^{th}\) percentile indicate no difficulty with movement where as scores between the 6\(^{th}\) and 15\(^{th}\) percentile suggest that the child is at-risk of having a movement difficulty and should be monitored, and scores at or below the 5\(^{th}\) percentile indicate a significant movement difficulty.\(^1\)

The MABC-2 also includes a checklist for children ages 5 to 12 years.\(^1\) The checklist addresses tasks that the child encounters at home and at school and should take an adult who is familiar with the child 10 minutes to complete. The MABC-2 checklist is available to occupational therapists, physiotherapists, pediatricians and psychologists as well as teachers and speech therapists. In all instances parents can be asked for input. (This evidence summary focuses primarily on the MABC-2 test. Further information regarding the checklist can be found in the MABC-2 Examiner’s Manual.\(^1\))

The MABC has become one of the most frequently used tests in supporting a diagnosis of developmental coordination disorder (DCD).\(^1\) According to the Diagnostic and Statistical Manual of Mental Disorders (DSM IV-TR)\(^3\), a diagnosis of DCD is based on four loosely defined criteria:

a. Performance in daily activities requiring motor coordination is substantially below that expected for the person’s age and intelligence.

b. The disturbance in criterion (a) significantly interferes with academic achievement or activities of daily living.

c. The disturbance is not due to a general medical condition and does not meet the criteria for pervasive developmental disorder.

d. If mental retardation is present, the motor difficulties are in excess of those usually associated with it.

The MABC test can be used to determine criterion (a) and the accompanying checklist can assist in determining criterion (b).\(^1\)

3. **Standardization Sample**

The MABC-2 was standardized on a normative sample of 1172 children between the ages of 3 years 0 months and 16 years 11 months living in the United Kingdom.\(^1\) Stratification was based on age, gender, race/ethnicity, level of parent education, and geographical region and closely matched the proportions for each of these variables as indicated by the 2001 Census.\(^1\)

4. **Measurement Properties**

a. **Reliability**

The authors of the MABC consider the item content of each edition of the MABC to be sufficiently similar and therefore feel that studies that used the MABC are still relevant.\(^1\) This evidence summary will however focus on studies relating specifically to the MABC-2.

Test-retest reliability of the MABC-2 was examined by having 60 children (20 from each age band) complete the MABC-2 twice at 1 to 2 week intervals. Correlation scores range from 0.73 to
0.84 for component scores and are equal to 0.80 for test total score. Three additional studies have looked at inter-rater and test-retest reliability of certain items of the MABC-2 (those retained from the MABC). Two of these studies are unpublished. Preliminary results from 20 children indicate good test-reliability for manual dexterity items in 3 and 4 year olds (0.86 to 0.91) but poor to moderate reliability for the aiming and catching tasks (0.48 and 0.68). No data is given for the balance items.

Inter-rater and test-retest reliability were examined by comparing scores in 31 teenagers. Inter-rater reliability for items retained from the MABC (7 items on the MABC-2) range from 0.92 to 1.0 and test-retest reliability results range from 0.62 to 0.92 with the exception of “walking backwards” whose results were difficult to analyse due to perfect scores on repeat assessment.

A third study looked at 11 possible MABC-2 items with adults between 18 and 28 years of age and was used to assist in the selection of items for the revised MABC-2.

Standard error of measurement and confidence intervals for the MABC-2 were also calculated.

b. Validity

A great deal of research is available regarding the validity of the original MABC. Much less research is currently available regarding the MABC-2 of which most is unpublished. Content validity of the MABC-2 was established by having items reviewed by an expert panel. These individuals unanimously agreed that the content of the revised edition adequately represented the motor domain. The authors of the MABC-2 also claim that the test has face validity, although this appears to be based on opinions shared by professionals regarding the first edition of the MABC and not the revised version.

Correlations between subtests were examined. Correlations between test components ranged between .25 and .36, meeting the authors’ expectations of having relatively low correlations between test items as the items included in the test were not meant to overlap in area of ability examined. Correlations between the test components and the total test score ranged between .65 and .73, a moderate to good correlation.

Criterion-related validity has been examined in three different small unpublished studies. First, correlations between two fine motor items of the MABC-2 (posting coins and drawing a trail using the preferred hand) and the Draw-a-Man test were examined in a sample of 31 Cypriot children between the ages of 3 and 6 years. Results indicate a correlation of .66 for each of the two items. In addition, total scores for these 31 children were compared to age and gender matched peers from the normative data. No significant differences were found between scores from children of both countries.

Results on the MABC and MABC-2 have been compared in a group of 15 children between 6 and 11 years of age with movement difficulties. Of these children, all 15 scored below the 5th percentile on the MABC. When assessed using the MABC-2, 9 scored below the 5th percentile, 3 scored between the 5th and the 15th percentile, and one scored above the 15th percentile on the MABC-2.

Lastly, an ongoing study is examining perceptual and motor difficulties in children with Asperger syndrome. When the MABC-2 was used with 25 boys between the ages of 11 and 15 years with a diagnosis of Asperger’s, 15 of the boys’ scores placed them below the 15th percentile and four boys’ scores
were exactly at the 16th percentile (or two standard deviations below the mean). These results are consistent with other studies who have found that children with Asperger’s have movement difficulties.

5. Further Considerations

Due to the MABC-2 being only recently available, the only literature available regarding its use or psychometric properties is found in the test’s manual or in limited, and mostly unpublished, studies, many of which only examined items retained from the original MABC. With time, further information regarding this edition’s strengths and limitations should become available through peer-reviewed publications.

References


This evidence summary is one part of a series on pediatric rehabilitation outcomes measures. Other summaries in this series include:

- Outcome Measures: A Primer
- Outcome Measures: The Alberta Infant Motor Scale (AIMS)
- Outcome Measures: The Bruininks-Oseretksy Test of Motor Proficiency, Second Edition (BOT-2)
- Outcome Measures: The Denver Visual-Perceptual Test (DVPT)
- Outcome Measures: The Gross Motor Function Measure (GMFM)
- Outcome Measures: The Sensory Profile (SP)