

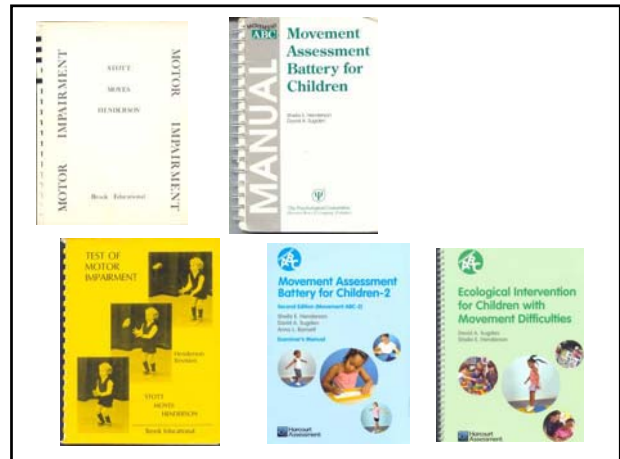
Genesis and growth of a test of 'motor dysfunction'

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Overview

- **Development of the M-ABC Package and Test**
- **Aspects of validity**
Structure of the test
Relationship with other measures

Henderson, S.E. & Stott, D.H. (1977)
Journal of Human Movement Studies



Impact of the M-ABC Test

- In Top 10 best selling tests in the UK for Pearson Assessment
- In Top 10 most widely adapted clinical tests in the world
- 6 Translations
- Wherever adapted, established as THE most widely used measure of its type
- In almost every country in Europe, used at least 10 times more frequently than the nearest competitor

Aspects of validity

- Structure & content
- Relationship with other measures
- Traditional view: "the degree to which a test measures what it is supposed to measure" (Thomas & Nelson, 1996 p. 214)
- What is the MABC designed to measure?
- "a standardised test of motor performance" p. 116 (MABC-2 Manual)
- Includes functional motor tasks, familiar to the age group tested

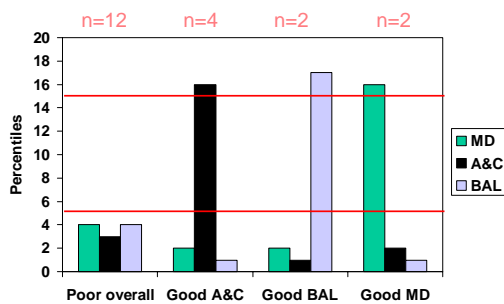
M-ABC 2

	Age Band 1 3 – 6 years	Age Band 2 7 – 10 years	Age Band 3 11 – 16 years
Manual Dexterity 1	Posting coins	Placing pegs	Turning pegs
Manual Dexterity 2	Threading Beads	Threading lace	Triangle With nuts & bolts
Manual Dexterity 3	Bicycle trail I	Bicycle trail II	Bicycle trail III
A&C: Catching	Catching bean bag	Two-hand catch	One-hand catch
A&C: Aiming	Throwing bean bag into box	Throwing bean bag into box	Throwing at wall target
Static Balance	One-leg balance	One-board balance	Two-board balance
Dynamic Balance 1	Jumping in squares	Hopping in squares	Zig-zag hopping
Dynamic Balance 2	Walking heels raised	Heel-to-toe walking	Walking backwards

Validity of the test structure

- Profiles of performance across sub-sections
- Factor analysis of test items

Sub-section scores in DCD group (n=20)



Principal component analysis: AB1 (n=431)

Items	Component 1
Coins p	-.768
Coins n	-.742
Thread beads	-.787
Drawing	-.729
Catch	.654
Throw	.607
One leg balance best	.796
One leg balance other	.745
Walk heels raised	.701
Jump on mats	.505

Eigenvalue: 5.02
% of Variance explained: 50%

Principal component analysis: AB2 (n=333)

Items	Component 1
Place pegs p	-.665
Place pegs n	-.603
Lace board	-.654
Drawing	-.571
Catch	.424
Throw	.378
Board balance best	.670
Board balance other	.575
Walk heel toe	.695
Hop best	.660
Hop other	.648

Eigenvalue: 3.99
% of Variance explained: 36%

Principal component analysis: AB3 (n=408)

Items	Component 1	Component 2	Component 3
Turn pegs p	.865		
Turn pegs n	.834		
Nuts & bolts	.604		
Drawing	.573		
Catch best		.895	
Catch other		.914	
Throw		.632	
Two board balance			.584
Walk backwards			.488
Hop best			.734
Hop other			.765

Comparison with other measures

- MABC-2 Checklist (Henderson, Sugden & Barnett, 2007)
- Bruininks-Oseretsky Test of Motor Proficiency – 2nd Edition (BOT-2; Bruininks & Bruininks, 2005)

Comparison with MABC-2 Checklist

- Checklist completed by teacher
- Section A: Moving in a static/predictable environment
- Section B: Moving in a dynamic/unpredictable environment
- Total score - Percentiles - 'Traffic light' system
Red (below 5th), Amber (5-15th), Green (above 15th)
- Data from normative sample aged 5-12 years, n=387
- Correlations with Total MABC-2 Test score: -.55**

MABC-2 Test and MABC-2 Checklist

		MABC-2 Test percentile			
		<5th	5-15th	>15th	Total
MABC-2 Checklist percentile	<5th	2	9	26	37
	5-15th	4	2	29	35
	>15th	4	13	298	315
	Total	10	24	353	387

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Percentage agreement: 78%

Comparison with BOT-2

- Masako Sparrowhawk (UG project)
- BOT-2 (Bruininks & Bruininks, 2005) short form
- 8 sub-tests, single set of items for all ages 4-21,
- US norms
- Scoring: Point & standard scores for items, percentiles
- 40 nursery children 4-5 years (21 boys, 19 girls)
- Age Band 1 of M-ABC-2, 8 items
- MABC-2 always administered first
- Time between testing: 1-3 weeks

Test items

MABC-2	BOT-2
Posting coins	Transferring pennies
Threading beads	Folding paper
Drawing trail	Drawing line through path Copying a square/star
Catching bean bag	Dropping & catching tennis ball Dribbling tennis ball
Throwing bean bag	
One-leg balance	Standing on one leg on beam
Walking heels raised	Walking along line, hands on hips
Jumping on mats	Jumping in place
	Tapping feet & fingers Knee push ups, Sit-ups

Refusal rates for test items

MABC-2	BOTMP-2
Posting coins	Transferring pennies
Threading beads	1 Folding paper
Drawing trail	Drawing line through path Copying a square/star
Catching bean bag	Dropping & catching tennis ball Dribbling tennis ball
Throwing bean bag	1
One-leg balance	3 Standing on one leg on beam
Walking heels raised	1 Walking along line, hands on hips
Jumping on mats	1 Jumping in place
	Tapping feet & fingers
	Knee push ups
	Sit ups
	One-leg stationary hop

Results from MABC-2 and BOT-2 ($r=0.83^{**}$)

MABC-2 percentile	BOT-2 percentile				Total
	<5	0	16-75	>75	
<5	4	0	0	0	4
5-15	0	0	0	0	0
16-75	0	0	16	6	22
>75	0	0	0	4	4
Total	4	0	16	10	30

Percentage agreement:80%; Kappa: 0.63

Summary

- Some support for structure of MABC-2 sub-sections in older children
- Further examination needed of clinical groups
- Good relationship with other tests of motor performance
- Comparisons highlight:
 - importance of using appropriate teachers as observers
 - importance of age-appropriate items which are meaningful and engaging to the child

Contemporary view of validity

- Traditional view: “the degree to which a test measures what it is supposed to measure” (Thomas & Nelson, 1996)
- Contemporary view: “the degree to which evidence and theory support the interpretations of test scores...” (Standards for Educational & Psychological Testing, 1999)
- We need to ensure “the appropriateness of an inference or decision made from measurement” Yun & Ulrich (2002)

Future work

- Examine the structure of the test in typically developing children and in children with movement difficulties
- Examine the nature of agreements and disagreements with other assessments
- Provide users with information to help them draw appropriate inferences from test results

Movement ABC-3?

- Use of observational checklists
 - Provides valuable description of how tasks are performed
 - Examine the reliability and validity of these structured observations
- Use of dynamic assessment
 - Encourages adaptation of tasks to explore child’s capabilities
 - Examine possibility of formally recording the adaptations made and responses to these (Ecological Task Analysis, Burton & Davis, 1996)

Thank you