

Both Hands Assessment (BoHA)

for children with bilateral cerebral palsy
18 months – 12 years

Test developers

Ann-Kristin G. Elvrum

Britt-Marie Zethræus

Lena Krumlinde Sundholm

Test/bedömningsinstrument - Klassifikationer

- Tester använder en **standardiserad procedur** för att mäta ett specifikt attribut inom en given population.
 - Tester **poängsätts på ett antal punkter** med hjälp av en poängskala eller tidsinställd prestation.
 - Särskilt **testmateriel, poängformulär** och en **detaljerad manual** tillhandahålls vanligtvis.
 - Testresultat rapporteras ofta som **summan av poäng**, vanligtvis omvandlade till olika skalpoäng.
 - Ett test bör ha förmågan att upptäcka skillnader i populationen, för att **kunna skilja på individer på både låg och hög förmågenivå**
- En klassificering är i grunden ett **en-testkomponentstest**.
 - Syftet med klassificeringar är att **gruppera** personer efter **gemensamma** egenskaper
 - detta kan vara generella klassificeringar av **övergripande** funktion (t.ex. bimanuell användning), eller **specifika** klassificeringar (t.ex. Zancholli handleds- och fingersträckning).
 - Användbarheten av en klassificering är att beskriva de **gemensamma** **egenskaperna** hos individer.

Consequences for daily activities



Tests av bimanuellt utförande



- **Assisting Hand Assessment (AHA)**

- Unilateral CP
- MACS nivå I-III

Krumlinde-Sundholm & Eliasson, 2003; Holmefur et al., 2007; 2009; 2015; Krumlinde-Sundholm et al., 2007, Louwers et al., 2016a; 2016b

- **Both Hands Assessment (BoHA)**

- Bilateral CP (spastic, ataxic and dyskinetic subtype)
- MACS levels I-III

Elvrum et al., 2018; 2021

Burgess et al., 2019; 2020; Gilmore et al., 2010; Klingels et al., 2010

BoHA

- Bilateral CP 18 månader – 12 år
- Utvecklades genom anpassning av AHA
- Mäter:
 - Hur effektivt båda händerna används i utförande av bimanuella aktiviteter
 - Storleken på en eventuell sidodskillnad mellan händerna



BoHA test situation

- Semi strukturerad leksituation, filmas
 - Small-Kids AHA, 18 mån – 5 år
 - School-Kids AHA 6 – 12 år
- Poängsätts på 16 kriterie-refererade testkomponenter
BoHA items



16 BoHA test items

- 11 Unimanual items
 - Each hand separately

Unimanual subscale

- Used to describe side differences
 - ≥ 20%: Asymmetry
 - < 20%: Symmetry

- Performance of both hands together

BoHA sum score: 11+11+5 items

- Measure of bimanual performance

	R	L
1 Initiates use		
2 Speed of Movements		
3 Reaches		
4 Quality of arm movements		
5 Quality of finger movements		
6 Grasps		
7 Stabilizes objects		
8 Varies type of grasp		
9 Releases		
10 Grip force regulation		
11 Manipulates		
Each hand separately subscore		
12 Readjusts grasp		
13 Coordinates		
14 Orients objects		
15 Proceeds		
16 Flow bimanual performance		
BoHA Sum score (27-108)		

Samma blankett används för alla barn med bilateral CP

FINE MOTOR ADJUSTMENT	GRA	Varies type of grasp	3			3		
			2			2		
			1					
	9	Releases	4					
			3			3		
			2		2			
	10	Regulates grip force	4					
			3					
			2		2	2		
	11	Manipulates	4					
			3					
			2					
			Each hand separately sub (range 11-44)					
COORDINATION	ND hand	Varies type of grasp	Bimanual tasks are mostly not performed independently and successfully due to the child's impairment; or tasks that require bimanual ability are mostly not performed.				1	
			Efficiently varies the type of grasps depending on the nature of the tasks and the shape and size of the objects, has a wide variety of grasps and uses isolated finger movements.				4	
			Uses most grasp types, but the grasps may sometimes look slightly awkward.				3	
	ND hand	Manipulates	Uses few types of grasps, does not dissociate finger movements. Has stereotyped grasps, awkward grasps, or lacks the ability to use certain grasps.				2	2
			Uses the same (one) grasp consistently, the grasp pattern is stereotyped, and the positioning of the objects in the hand is quite random; or most often does not use grasp.				1	
			Uses in-hand manipulation to move a number of objects in the hand gracefully, easily and effectively, without assistance from the other hand or from other surfaces.				4	
	12	Readjusts grasp	Uses in-hand manipulation to move one or two objects in the hand easily, other objects are moved in the hand with slow or slightly clumsy movements, or with the help of the preferred hand or an external surface				3	
			Moves objects in the assessed hand with the help of the other hand or an external surface; or in-hand manipulation is performed slow and clumsy only on a single occasion.				2	
			Does not change the position of the objects in the assessed hand.				1	1
	13	Coordinates	Name: _____				Sum score (27-108) 65	
			Date: 1900-01-00				BoHA-units (0-100) 51	
Insert Result; BoHA-A right dom			Result; BoHA					
			Postural control in sitting					
			No posture problems. Does not need to take support by leaning against the table or on the arms and does not use seating modifications.				1	
			Sometimes takes support by leaning on one or both arms to obtain postural control or; is sometimes "wobbly" but adjusts sitting posture without obviously affecting performance, or; use trunk support by leaning against the table, or is provided with pelvic support.				3	3
			Most often uses one or both arms for support to obtain postural control which complicates and slows down performance, or; uses extensive external trunk support to achieve and maintain sitting position, such as thoracic support.				2	
			Poor postural control in sitting severely affects bimanual performance despite use of seating modifications, or; is most often unable to perform bimanual tasks independently because one or both arms are needed to obtain postural control in sitting.				1	

Item difficulty hierarchies

Hard



Easy

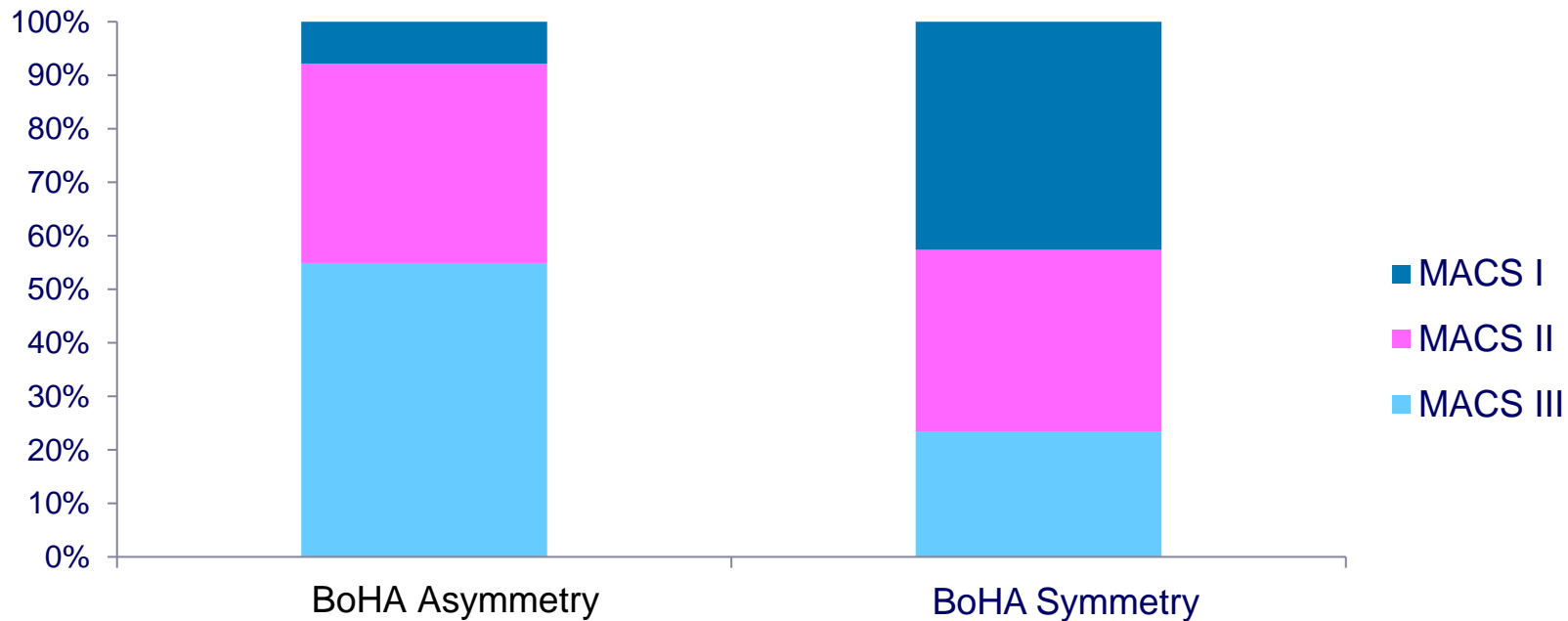
BoHA-Asymmetry

- ND Manipulates
- ND Varies type of grasp
- B Flow
- ND Grip force regulation
- B Readjusts grasp
- ND Reaches
- ND Grasps
- B Coordinates
- ND Quality of finger movem
- ND Releases
- B Proceeds
- ND Quality of arm movem
- ND Stabilizes objects
- B Orients objects
- ND Initiates use
- ND Speed of Movements
- D Manipulates
- D Grip force regulation
- D Varies type of grasp
- D Quality of finger movem
- D Speed of Movements
- D Stabilizes objects
- D Grasps
- D Quality of arm movem
- D Releases
- D Reaches
- D Initiates us

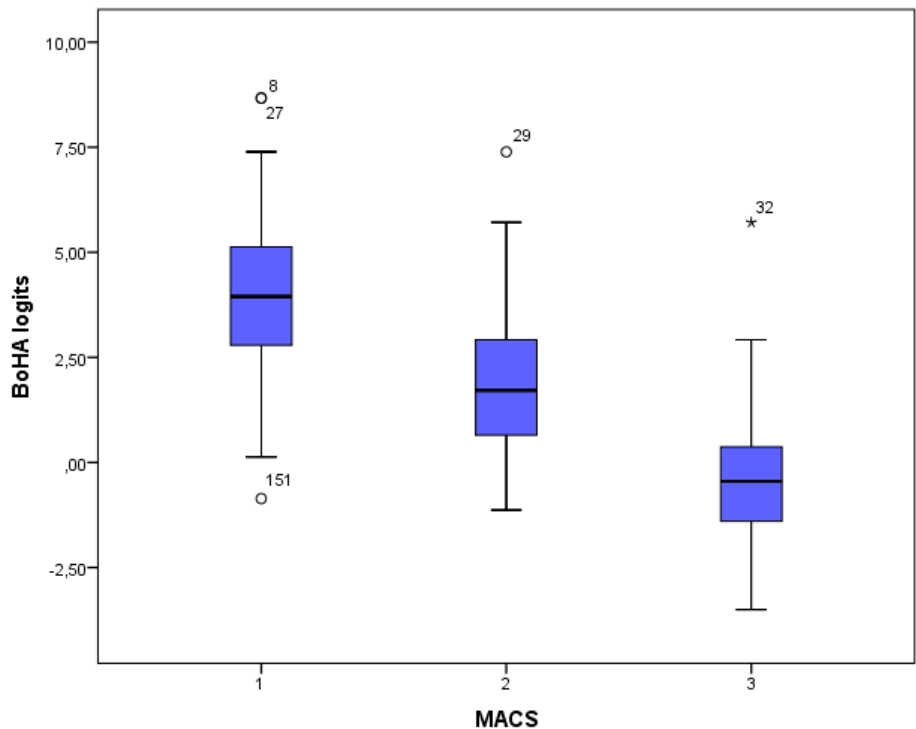
BoHA-Symmetry

- ND Manipulates
- ND Grip force regulation
- D Manipulates
- D Grip force regulation
- B Proceeds
- B Flow
- B Coordinates
- ND Stabilizes objects
- ND Quality of finger movem
- ND Varies type of grasp
- B Readjusts grasp
- D Quality of finger movem
- B Orients objects
- ND Quality of arm movem
- ND Grasps
- D Stabilizes objects
- D Varies type of grasp
- D Quality of arm movem
- ND Speed of Movements
- D Speed of Movements
- ND Releases
- D Grasps
- ND Reaches
- D Releases
- ND Initiates use
- D Reaches
- D Initiates use

Distribution av MACS-nivå

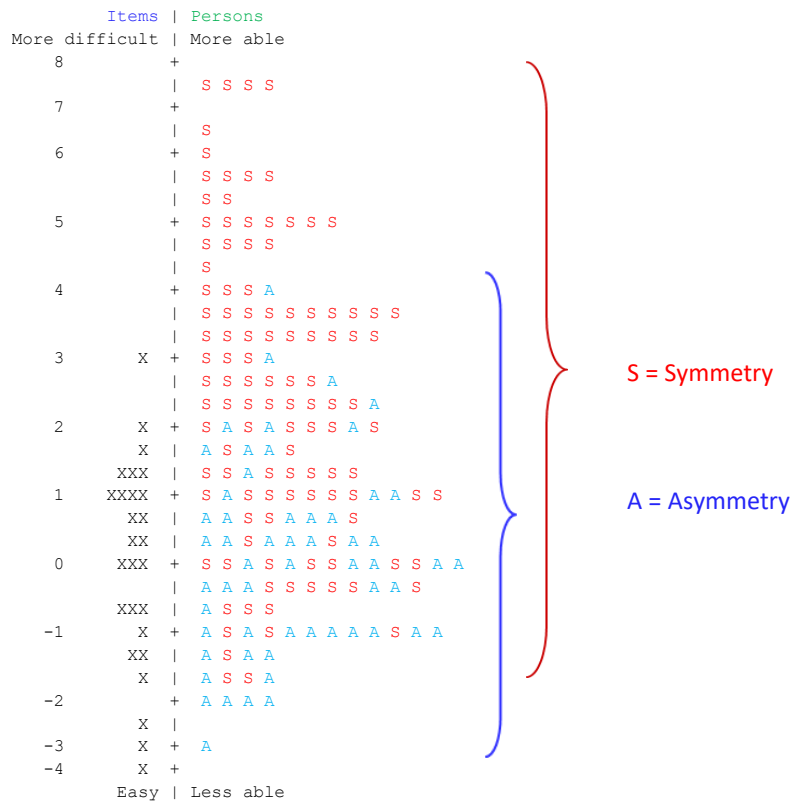


Korrelation mellan BoHA och MACS

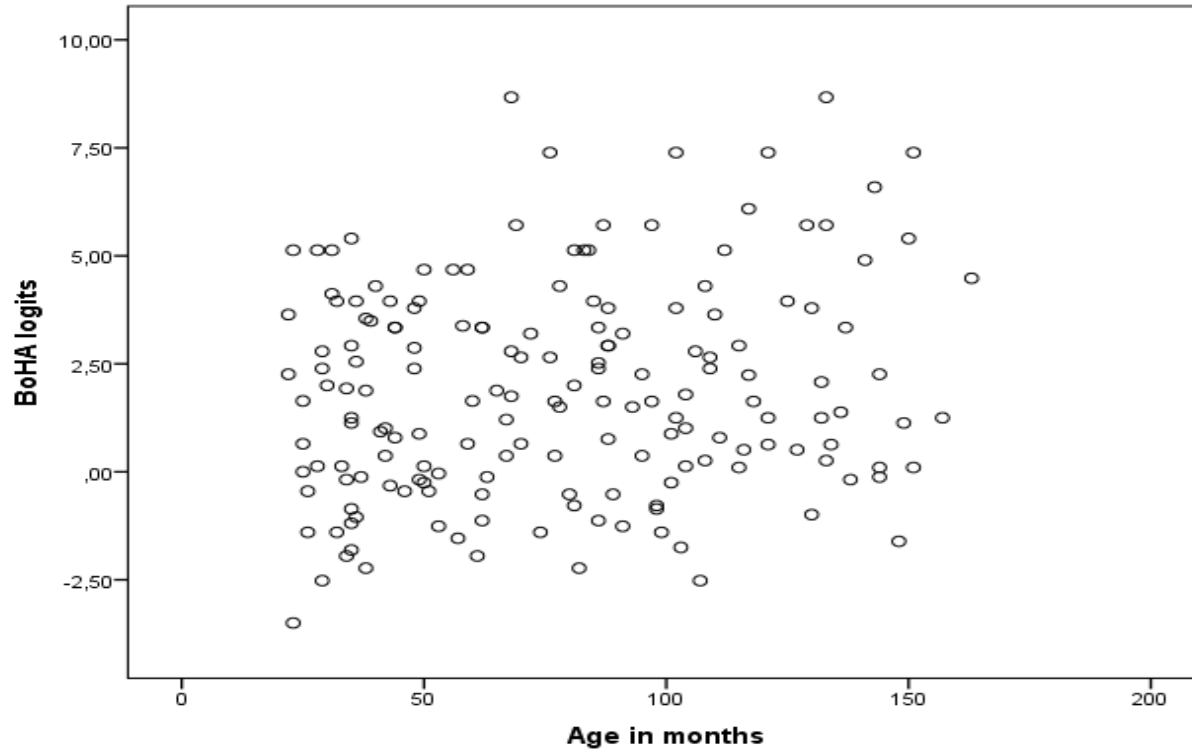


$r_s = 0.74$

Targeting



Correlation between BoHA measures and age



$r = 0.17$

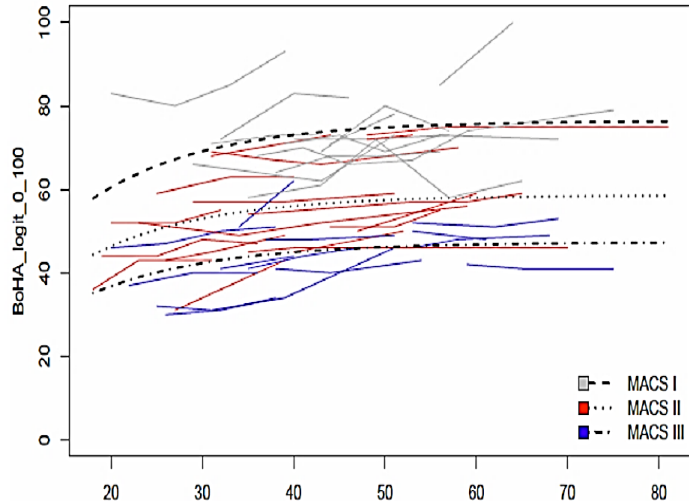
BoHA used in research

Evidence-based interventions



Novak 2014; Figueiredo et al, 2020

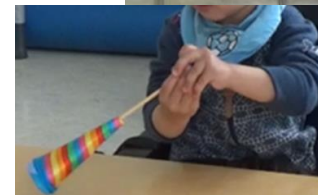
Longitudinal development



Klevberg et al, 2016

Klinisk nytta av BoHA?

- ❑ BoHA har potential att bli ett användbart verktyg för att beskriva och utvärdera bimanuellt utförande hos barn med bilateral CP, MACS nivå I-III
- ❑ BoHA kan vägleda terapeuter i att fatta individuella kliniska beslut, att följa ett barns förändring över tid och att utvärdera interventionernas effektivitet.



Tack för uppmärksamheten!

Ann-Kristin

Britt-Marie

Lena

E-post: ann-kristin.elvrum@ntnu.no

Brianhoare@cpteaching.com

<http://www.cpteaching.com>

