

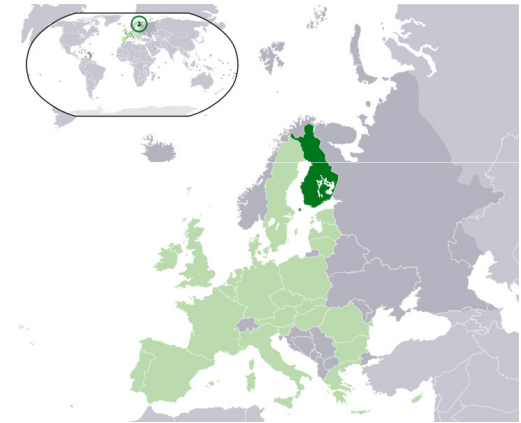
***Motor skills and physical fitness for
adolescents with Asperger syndrome***

FDUV Helsinki
Wednesday 11.11.2009

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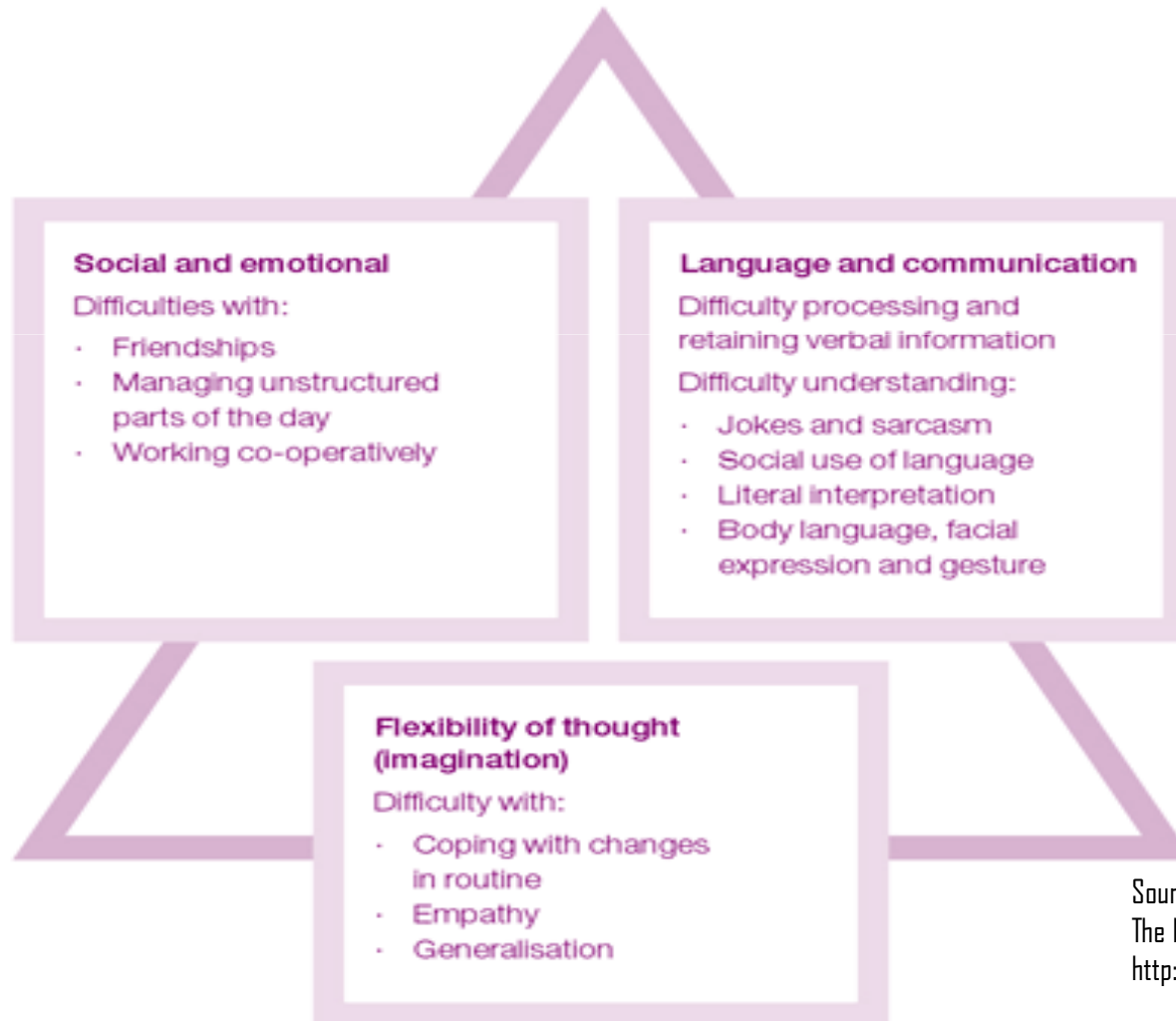
Program of the day

- 10:30-11:30 Research project: AS & PA
 - Motor skills
 - Physical fitness
 - Sensory processing
- 12:30-13:30 More practical info
 - Strengths and weaknesses
 - Teaching considerations
 - Video from outdoor education ‘expedition’



Asperger syndrome

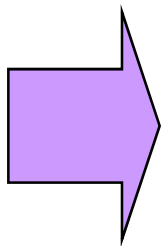
The triad of impairments



Source:
The National Autistic Society
<http://www.nas.org.uk/>

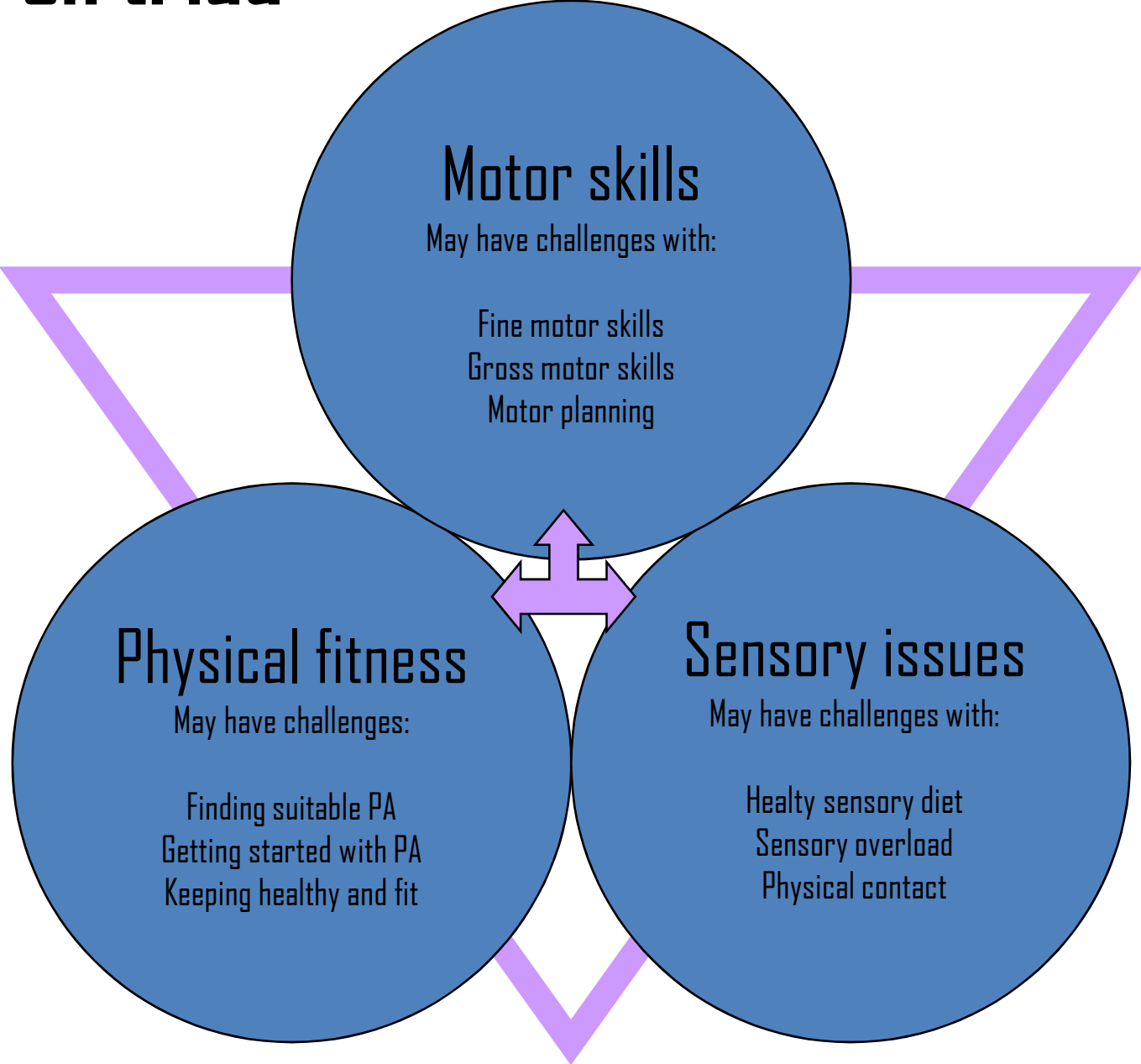
& other challenges

- In addition to the core impairments of the triad, many students with Asperger syndrome will have challenges with:
 - fine and gross motor co-ordination
 - organizational skills.
 - underlying fears and phobias
 - sensory sensitivities.



These can have a significant effect on their behavior, and their impact on daily life should not be underestimated.

Research triad



OBJECTIVES

This study attempts to answer the following questions:

- What is the sensory profile of individuals with Asperger syndrome? (Study I)
- What is the motor profile of adolescents with Asperger syndrome? (Study II)
- What is the physical fitness profile of adolescents with Asperger syndrome? (Study III)
- What is the effect of a structured PA-program on motor skills and physical fitness, as well as on social interaction skills, in adolescents with Asperger syndrome? (Study IV)
- What is the effect of a home PA-program on motor skills and physical fitness in adolescents with Asperger syndrome? (Study V)

METHODS

Participants

- 30 STUDENTS WITH AS (RANGE: 10-60)
- 30 AGE/GENDER MATCHED CONTROLS

Procedures

- Structured Physical Activity Program
- Home Physical Activity Program
- Motor assessment sessions

Assessment

- M-ABC-II/EUROFIT/AASP/PARQ

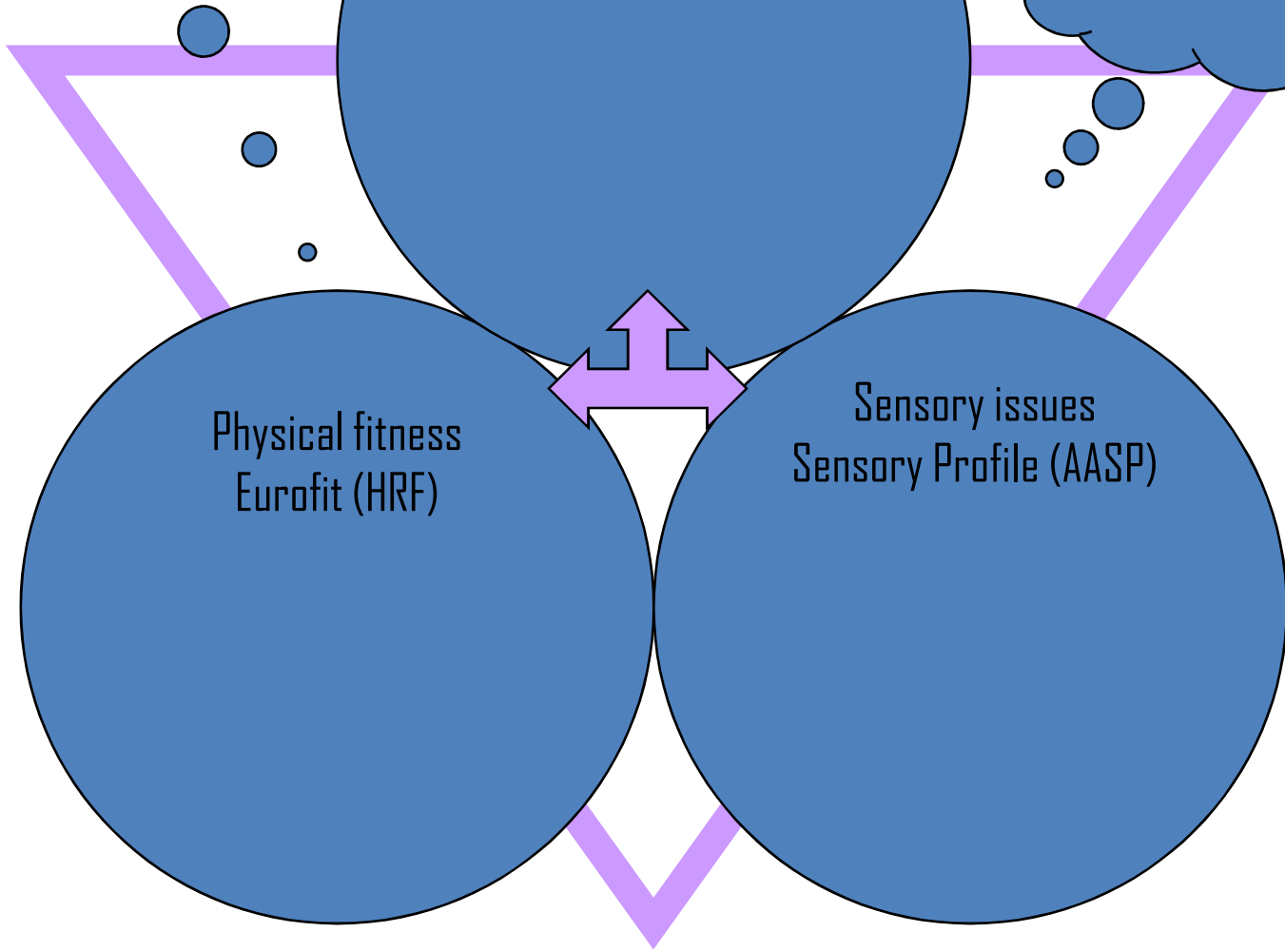
**Assessment
battery**

Motor skills
(M-ABC-II)

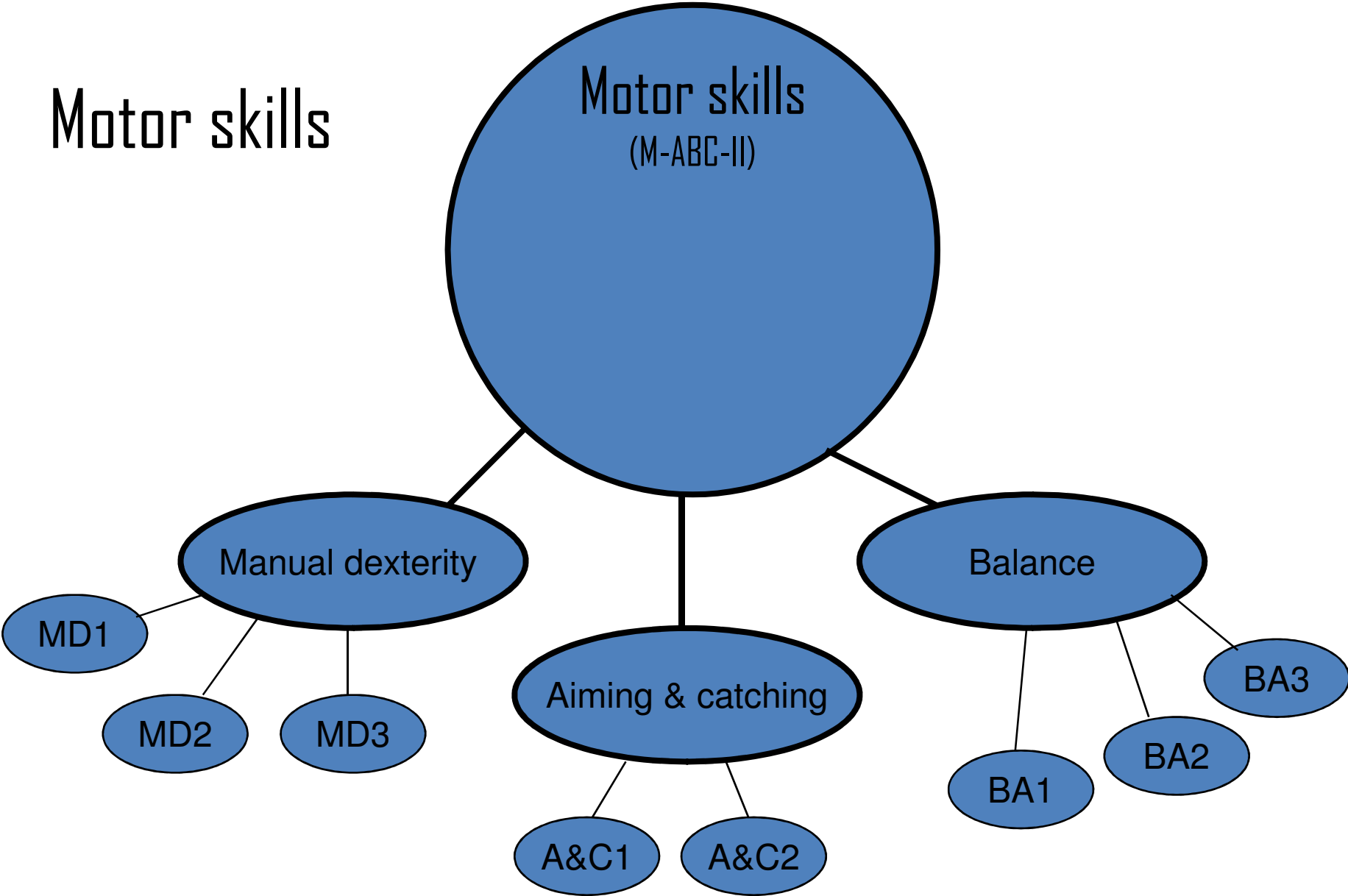
Research?
Test items
SocInPA

Physical fitness
Eurofit (HRF)

Sensory issues
Sensory Profile (AASP)



Motor skills



Motor skills

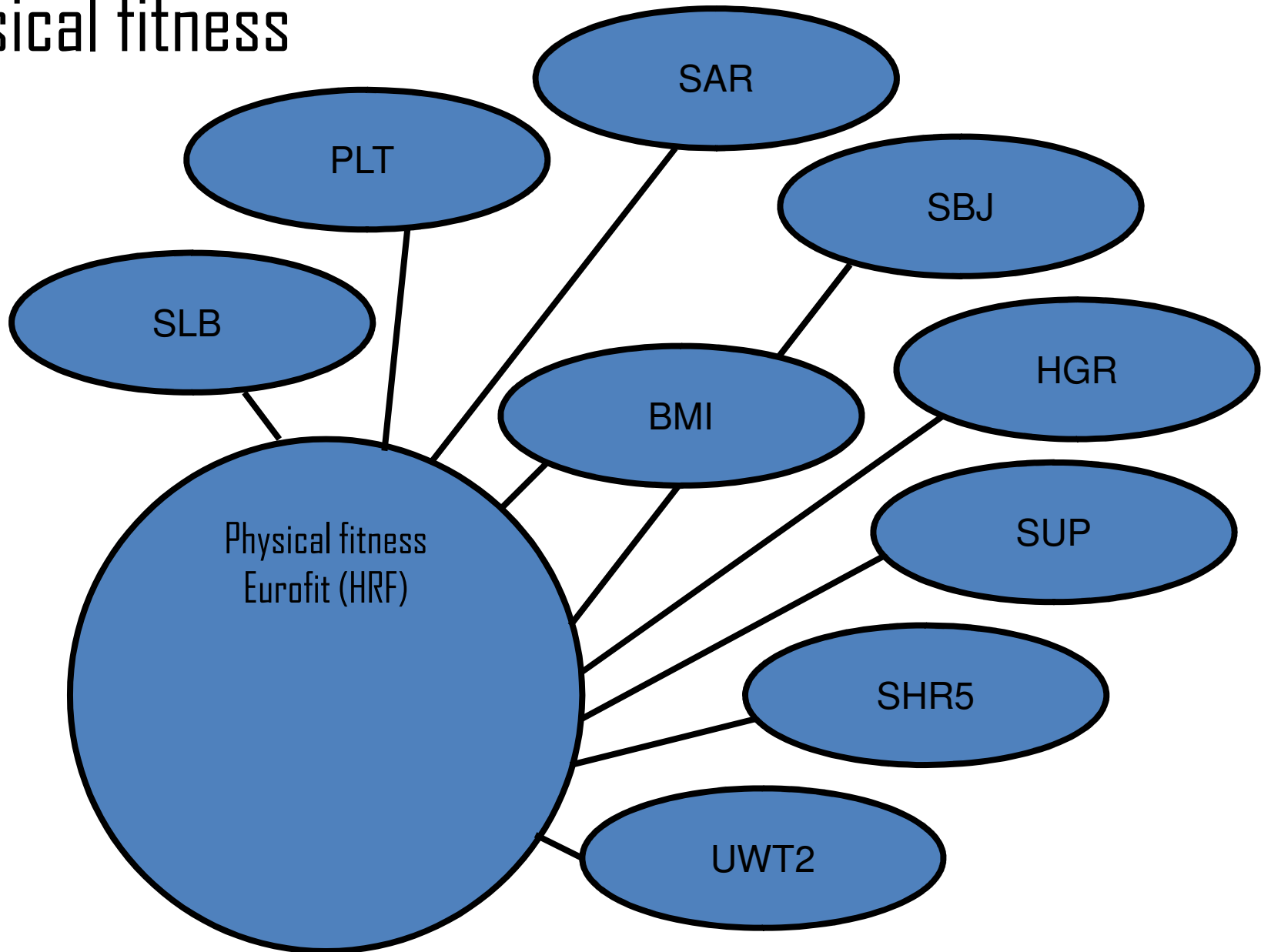
Summary of items of M-ABC & M-ABC-II

Table 2c: Brief summary of changes made to AB4 – now labelled AB3, covering ages 11 to 16

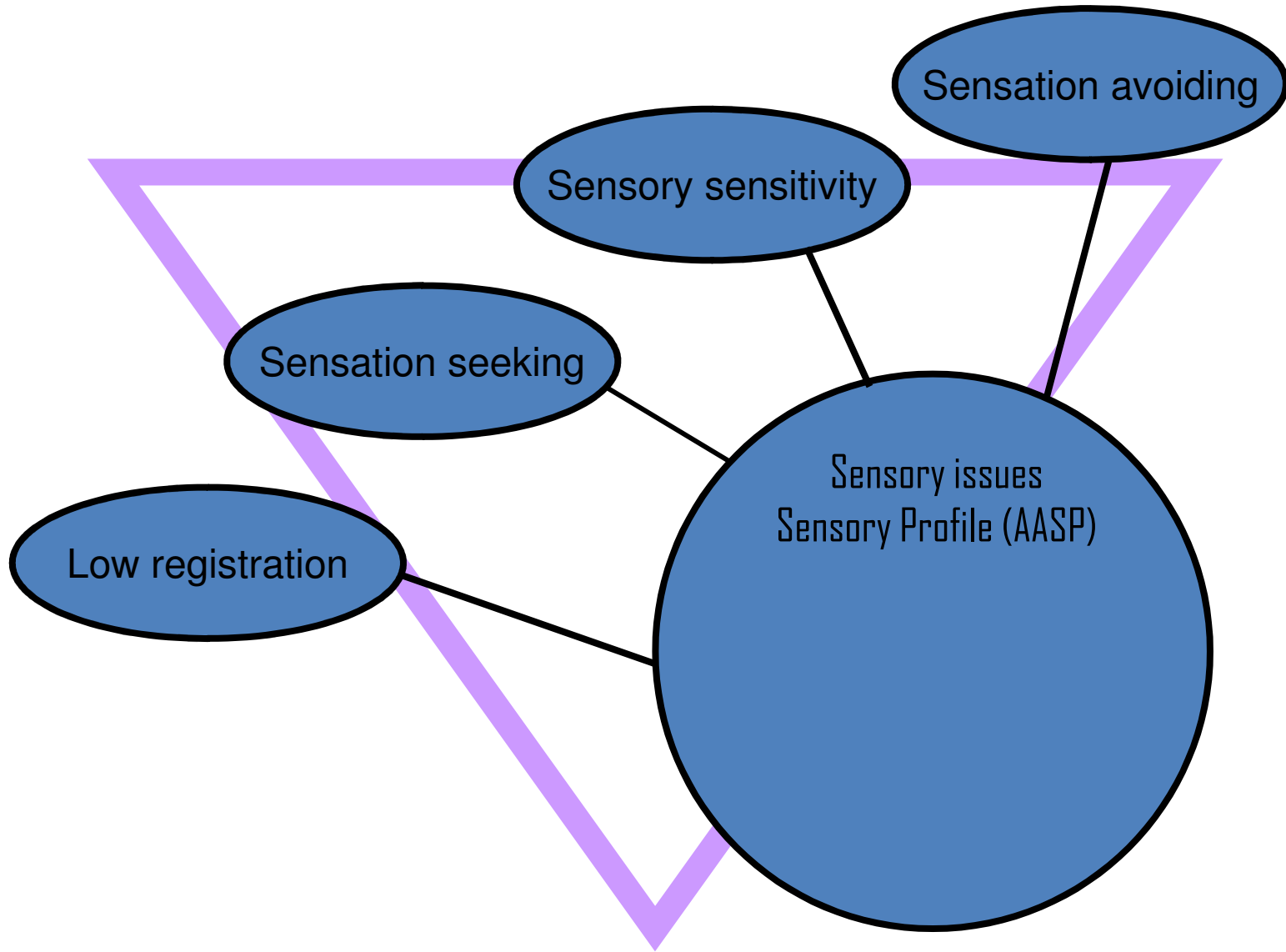
Task	Movement ABC	Movement ABC-2
<i>Manual Dexterity 1</i>	Turning Pegs	Turning Pegs
<i>Manual Dexterity 2</i>	Cutting-Out Elephant	Triangle with Nuts and Bolts [^]
<i>Manual Dexterity 3</i>	Flower Trail	Drawing Trail 3 [*]
<i>Aiming & Catching 1</i>	One-Hand Catch	Catching with One Hand
<i>Aiming & Catching 2</i>	Throwing at Wall Target	Throwing at Wall Target
<i>Balance 1</i>	Two-Board Balance	Two-Board Balance
<i>Balance 2</i>	Walking Backwards	Walking Toe-to Heel Backwards
<i>Balance 3</i>	Jumping and Clapping	Zig-Zag Hopping [^]

[^] New items
^{*} Altered item: Shape of trail has changed

Physical fitness



Sensory issues



RESULTS

Results

Motor skills

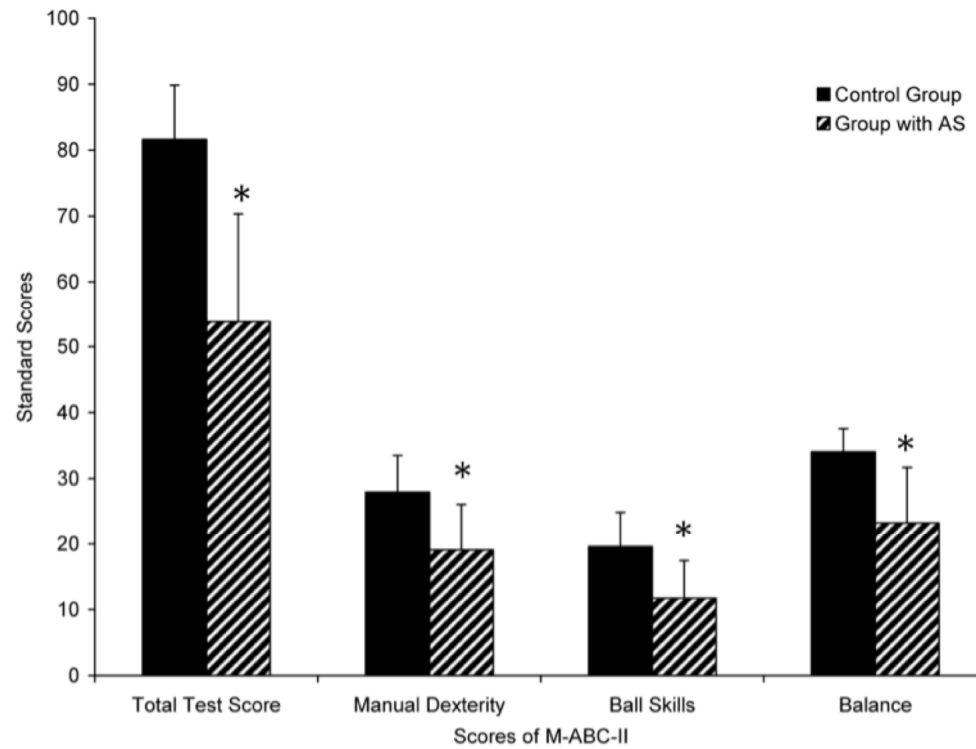


Figure 1. Mean component- and total test scores (+SD) of the M-ABC-II for both group with AS (N = 30) and control group (N = 30).

Results

Motor skills

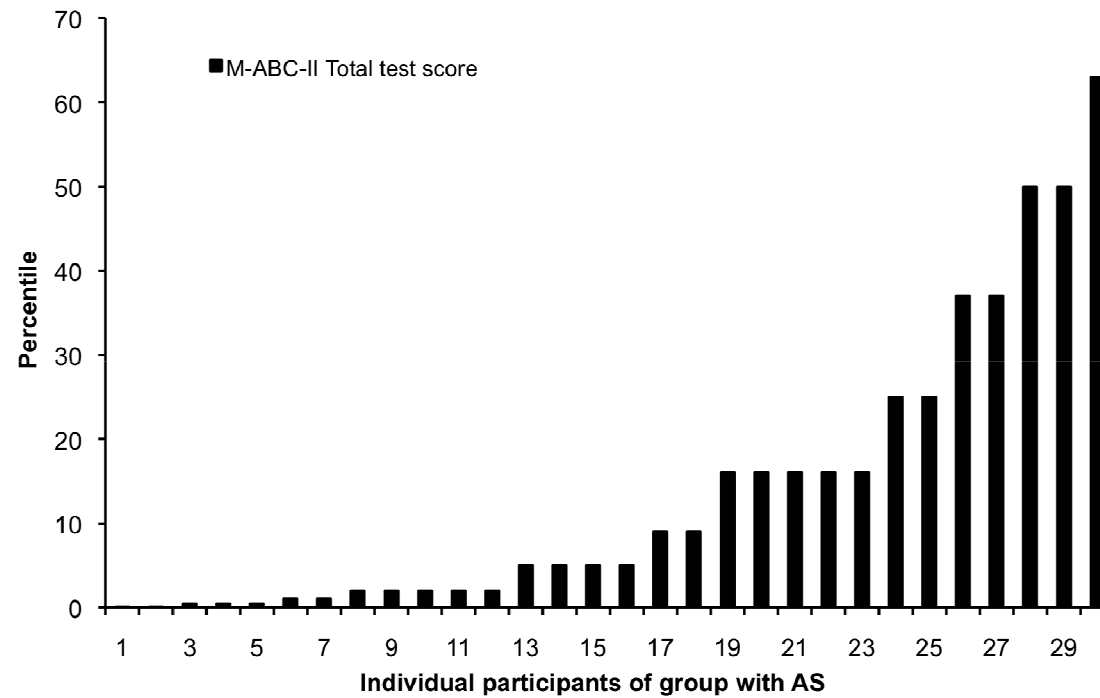


Figure 2. Percentile equivalents for M-ABC-II total test score for group with AS (N = 30).

Results

Motor skills

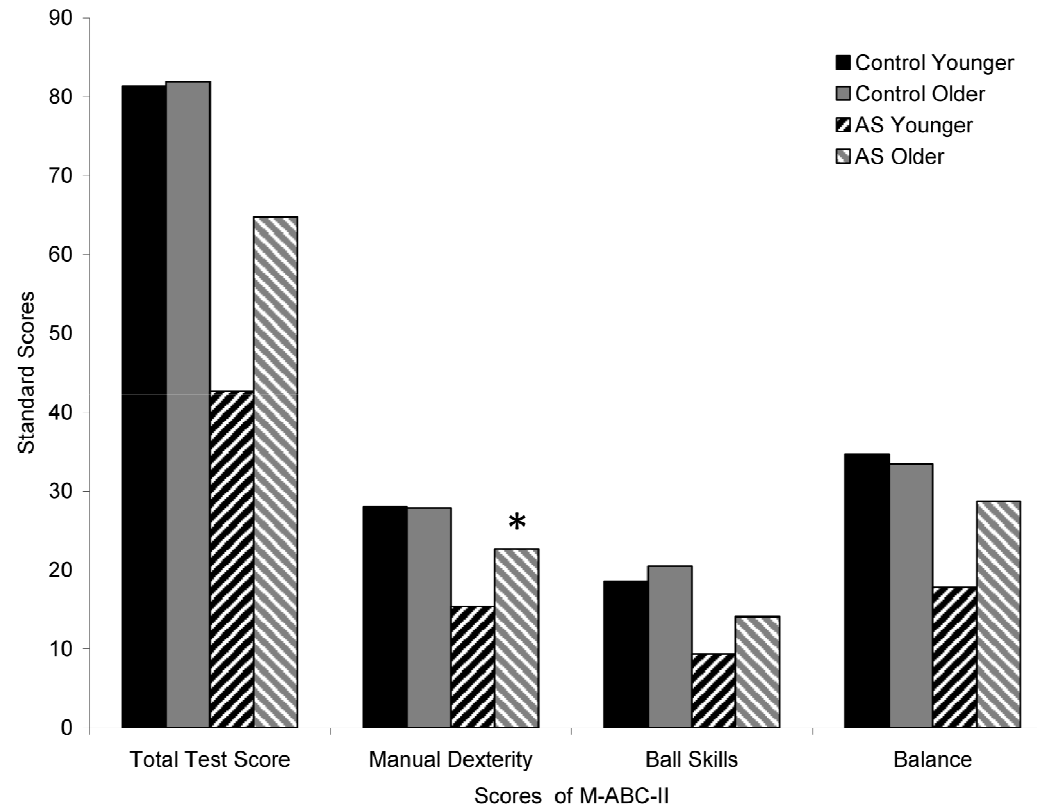


Figure 3. Mean component- and total test scores of the M-ABC-II for both younger (n = 15) and older group (n = 15) within the group with AS and the control group.

Preliminary results

Physical fitness

	Adolescents with AS (N=30)		Adolescents without AS (N=30)	
	M±SD	Min-Max	M±SD	Min-Max
Age	17.2±1.2	15-21	16.9±0.8	16-19
Height (cm)	173.1±7.3	158-191	171.5±8.1	155-188
Weight (kg)	63.7±14.8	47-122	62.7±9.0	47-84
BMI (kg/m ²)	21.3±4.8	16-39	21.0±2.0	18-26

Table 1
Demographic data of adolescents with and without Asperger syndrome (AS)

Preliminary results

Physical fitness

	Adolescents with AS			Adolescents without AS		
	Males (N=21)	Females (N=9)	Total (N=30)	Males (N=21)	Females (N=9)	Total (N=30)
R (cm)	22.7±11.3	26.6±11.7	23.87±11.4	34.3±11.5	37.7±9.8	35.3±10.9**
R (kg)	31.9±13.7	23.4±6.3	29.37±12.5	45.2±16.7	24.0±3.8	38.9±17.2*
P (#/30 s)	12.8±5.1	10.0±7.0	12.0±5.8	24.7±6.5	19.3±3	23.1±6.2**
B (#/30 s)	6.0±5.5	6.8±5.5	6.2±5.4	1.7±1.1	1.3±0.7	1.6±1.0**
Γ (0.1s)	166.5±65.0	174.2±42.1	168.8±58.5	106.8±9.8	125.6±13.2	112.4±13.8**
J (cm)	145.7±35.6	123.0±19.8	138.9±33.0	218.8±30.2	147.0±16.3	197.3±42.7**
R5 (0.1 s)	248.7±38.1	246.0±25.9	247.9±34.5	189.0±13.2	202.9±10.5	193.2±13.9**
/T2 (s)	1079±175	1079±175	1129±185	967±80	992±58	975.1±74.2**
end (bpm)	129.7±26.7	124.2±20.1	128.1±24.7	147.7±17.6	166.0±17.5	153.2±19.3**

Table 2

Descriptive data on and comparison of physical fitness profiles of adolescents with and without Asperger syndrome

Preliminary results

Physical fitness

	Adolescents with Asperger syndrome (N=30)		Adolescents without AS (N=30)	
	M±SD	Min-Max	M±SD	Min-Max
SSS1	112.9±119.8	0-406	331.1±243.4**	0-729
SSS2	22.0±45.6	0-185	80.0±126.6*	0-522
SSST	120.5±123.4	0-426	411.1±310.8**	0-1044
PEL	255.0±78.1	100-400	328.3±80.1**	175-475

Table 3

Descriptive data on and comparison of physical activity levels of adolescents with and without Asperger syndrome

Preliminary results

Sensory processing

Neurological threshold continuum	Behavioral response/ Self-regulation strategies	
	PASSIVE	ACTIVE
HIGH (habituation)	<p>LOW REGISTRATION</p> <p>Need high intensity of sensory stimuli to be able to react and tend to be more flexible in distracting environment</p>	<p>SENSATION SEEKING</p> <p>Constantly create additional sensory stimuli and may find low-stimulus environments intolerable</p>
LOW (sensitization)	<p>SENSORY SENSITIVITY</p> <p>Easily to be distracted by sensory stimuli and discomfort caused by intense stimuli</p>	<p>SENSATION AVOIDING</p> <p>Engage in sensory avoiding behaviors to limit sensory stimuli and tolerate well being alone</p>

Table 1

Relationships between behavioral response and neurological thresholds according to Dunn's Model of Sensory Processing

Preliminary results

Sensory processing

	Low registration	Sensation seeking	Sensory sensitivity	Sensation avoiding
Group with AS (N = 45)	.770	.664	.836	.809
Control group (N = 45)	.809	.808	.828	.830

Table 2

Cronbach's alpha for the different quadrants of the AASP for both index and control group

Preliminary results

Sensory processing

	Group with AS	Control group	F (1,87)	Exact p	ES	Power
Low registration	35.11 ± 8.28 (19-58)	30.71 ± 8.33 (17-60)	6.24	.014*	.07	.70
Sensation seeking	40.73 ± 7.40 (15-55)	45.29 ± 9.26 (23-67)	6.85	.010**	.07	.74
Sensory sensitivity	35.64 ± 10.51 (17-58)	31.84 ± 8.19 (18-54)	3.87	.052	.04	.50
Sensation avoiding	39.13 ± 9.82 (22-62)	32.33 ± 7.81 (20-60)	13.13	.000**	.13	.95

Table 3

Descriptive data for the quadrants of the AASP and comparison between groups

Preliminary results

Sensory processing

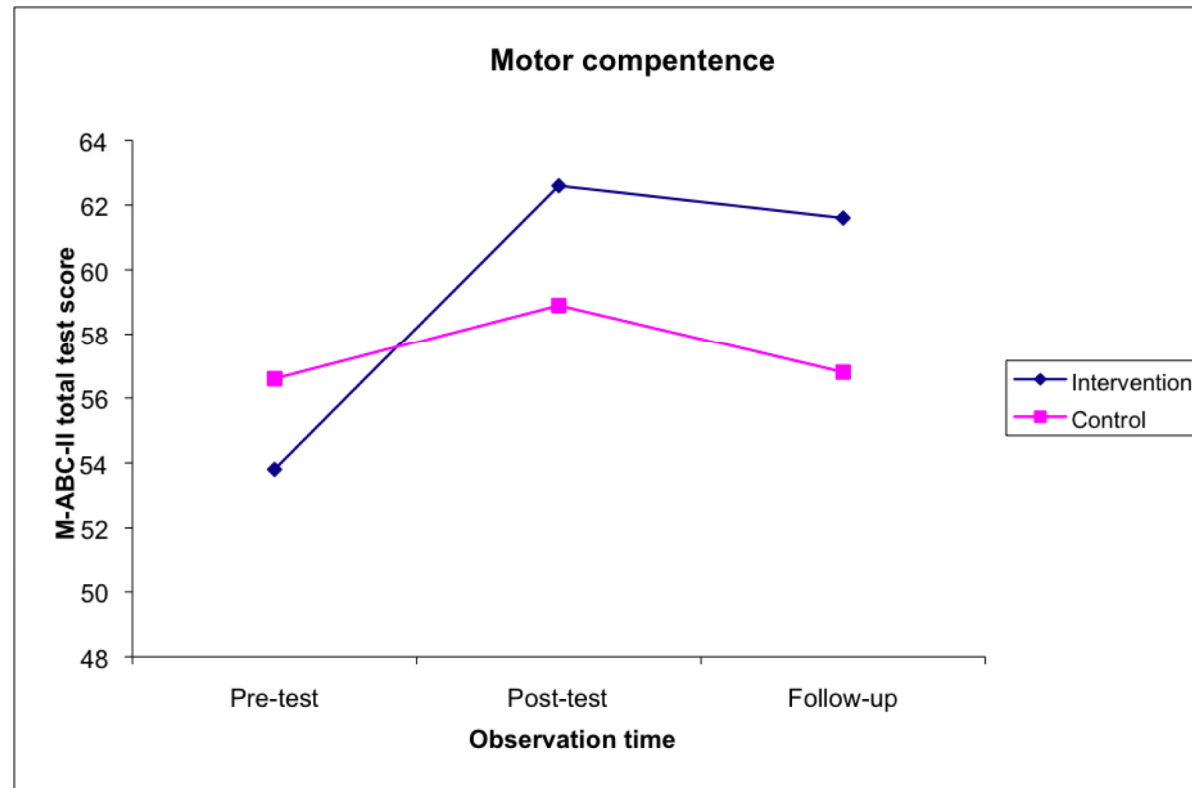
Participant	Low registration	Sensation seeking	Sensory sensitivity	Sensation avoiding	% of quadrants
1	■		■	■	75%
5				■	25%
6				■	25%
7				■	25%
11				■	25%
12				■	25%
15		■			25%
18		■			25%
20				■	25%
23			■	■	50%
26			■	■	50%
27	■		■	■	75%
28			■	■	50%
29	■		■	■	75%
34	■		■	■	75%
36			■	■	50%
41				■	25%
42	■		■	■	75%
43				■	25%
44			■	■	50%
45	■				25%
Number of outliers (%)	6/45 13.3%	2/45 4.4%	10/45 22.2%	18/45 40.0%	

Table 4

Multiple case series analysis illustrating the number of atypical score in the group with Asperger syndrome for each quadrant of the AASP

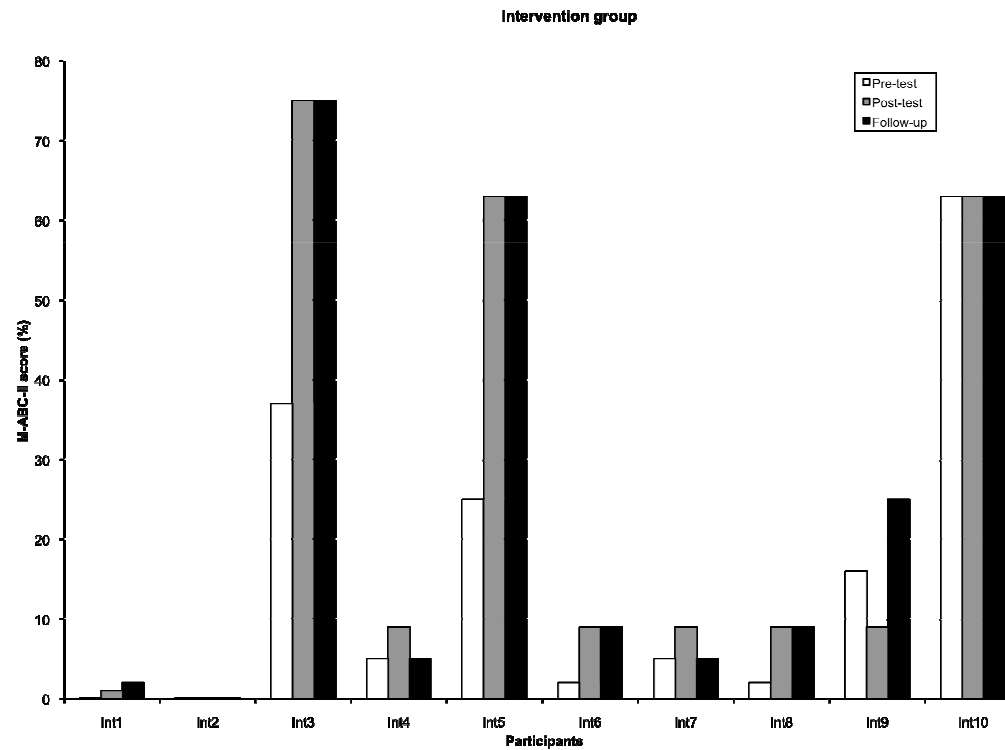
Preliminary results

Intervention study



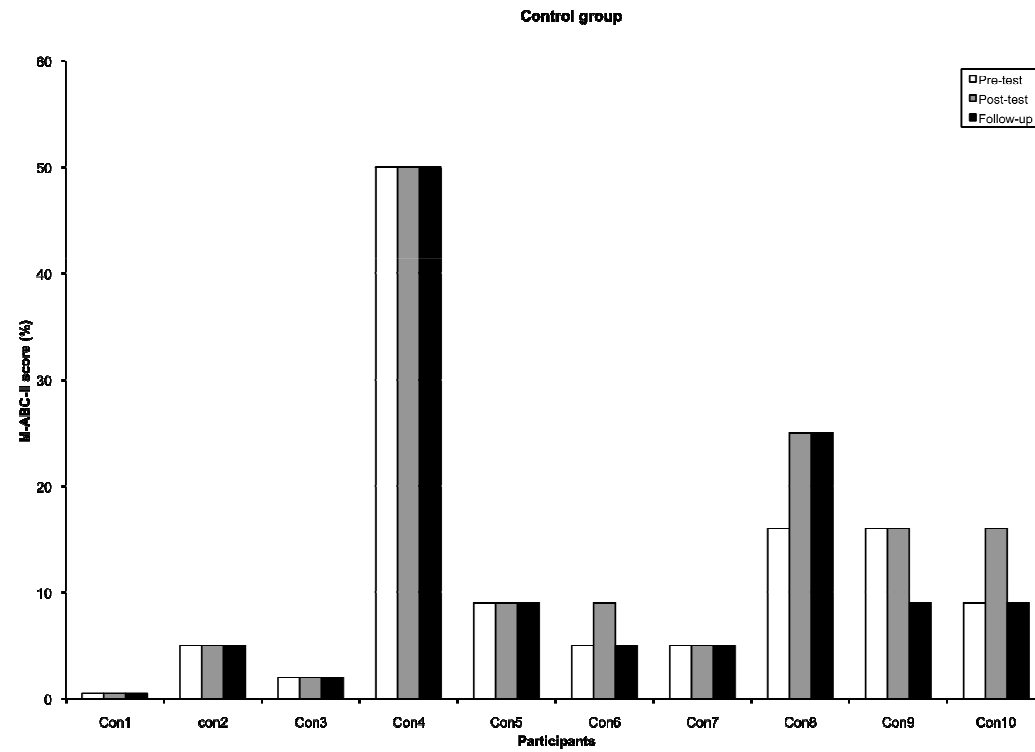
Preliminary results

Intervention study



Preliminary results

Intervention study



From research to practice

- Closing the gap
- Increase understanding... strengths

Learning Characteristics

- Strengths
 - Visual learners
 - Strong long term memory
 - Honest
 - Perfectionists
- * One-third of people with autism live and work fairly independently by adulthood!

Learning Characteristics (cont.)

- Weaknesses
 - Weak auditory learners
 - Unable to screen out irrelevant information
 - Frequently engage in self-injurious behaviors
 - Inability to initiate or sustain conversations with others
 - Literal understanding of language

Critical Goals

- To tolerate people and value interactions
- To communicate intentionally and effectively
- To learn the meaning and purpose of words
- To tolerate change and accept new experiences
- To be independent of constant verbal direction
- To self-monitor and manage stress
- Active participation-motivation

Teaching Considerations

- Know the person – each person with autism is very different in regards to “general” characteristics
- Be aware of sensory preferences of information and appropriate sensory diet
- Start with one to one instruction, proceed to dual activities, small groups, and large groups (some individuals may never function well in large groups)
- Start with structure and routine, then proceed to teaching toward transitions and less structure
- Minimize external stimuli, progress to focusing on relevant stimuli
- Use prompts (visual/tactile/auditory) that could lead to a correct response

Teaching Considerations

- Minimize cues and use clear and understandable language
- Be aware that they may focus on just one cue within the environment, which might not be the most important one to us
- Exercise at moderate intensity and make activities enjoyable and non-competitive (new games)
- Allow time to become familiar with the physical and social environment
- Promote eye contact to develop this important social skill
- When appropriate give choices, which could reduce challenging behaviors
- Use relaxation training to reduce stress and anxiety in individuals with autism (e.g. 1 to 1 base or small groups for 15 min)

Expedition Lapland

video

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Bedankt voor jullie aandacht

Kiitos! Tack!

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