

## INTRODUCTION

Autism spectrum disorder (ASD) is characterised by impaired social behaviour. It is not clear whether and to which extent this symptomatic is related to problems in general person perception. A few studies have investigated performance in biological motion perception in people with autism, but the picture is not uniform:

Moore, Hobson & Lee (1997):

Subjects: children

Task: action recognition

Results: no group differences!

Blake, Turner, Smoski, Pozdol & Stone (2003):

Subjects: 8-10 year old ASD vs. controls

Task: coherent vs. scrambled, no mask, multiple actions

Results: pronounced group difference!

Hubert et al. (2007)

Subjects: 19-22 year old ASDs vs. controls

Task: Verbally describe PLDs in terms of actions, subjective state, emotions, objects

Results: differences in the "emotions" condition, but not otherwise!

The experiments differed in terms of the age of the participants, the severity of their autism, and the task that was used to assess biological motion perception.

## In our current study, we are testing adult people with autism on two different biological motion tasks:

### Detection of BM in a mask of scrambled walkers

The only difference between displays with and without a walker is the presence of coherent shape. This task therefore assesses the ability to perceptually organize the dots into a coherent shape of the articulated figure of the walker.

### Direction from scrambled and coherent BM

Observers had to determine the facing direction of a stationary walker displayed either coherently or scrambled and masked with stationary flickering dots.

The critical condition is the one with the scrambled walkers. Here, the only cues to the direction are the local trajectories of the individual dots.

Coherent walkers were added to make the experimental block more rewarding for the observer. In this condition, both local motion and global shape provides hints to the facing direction.

## References

DG Moore, RP Hobson, A Lee (1997) Components of person perception: An investigation with autistic, non-autistic retarded and typically developing children and adolescents. *British Journal of Developmental Psychology*.  
R Blake, LM Turner, MJ Smoski, SL Pozdol, WL Stone (2003) Visual recognition of biological motion is impaired in children with autism. *Psychological Science*.  
B Hubert, B Wicker, DG Moore, E Monfardini, H Duverger, D Da Fonseca, C Deruelle (2007) Recognition of emotional and non-emotional biological motion in individuals with autistic spectrum disorders. *Journal of Autism and Developmental Disorders*.

## RESULTS

### 1. Group effects

#### No effects between ASD and control group!

### 2. Within-subjects effects

#### Detection of BM in mask of scrambled walkers

1. human, cat, or pigeon yes ( $p < 0.01$ )  
human > non-human

2. upright or inverted yes ( $p < 0.0001$ )

3. mask density: 20, 40, 80 yes ( $p < 0.0001$ )

No interactions

#### Direction from scrambled BM

1. human, cat, or pigeon no!
2. upright or inverted yes ( $p < 0.0001$ )
3. mask density: 50, 150, 450 yes ( $p < 0.0001$ )
4. coherent or scrambled yes ( $p < 0.0001$ )

Interactions: hm, hi, ci, hci

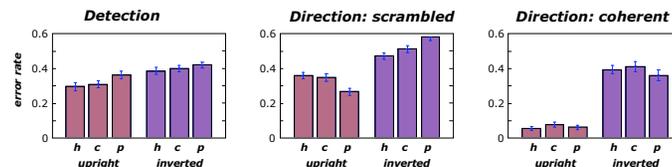


Fig. 2: Effects of orientation and of nature of the walker

### 3. Correlations: performance vs. ADOS/IQ scores

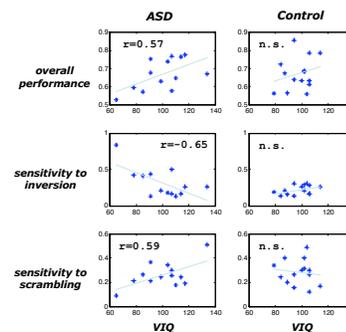


Fig. 1: Correlations between verbal IQ and different performance measures for the Direction experiment

#### Detection of BM in mask of scrambled walkers

	ADOS			IQ		
	A: com.	B: soc.	A+B	VIQ	PIQ	FSIQ
overall	-0.32	-0.32	-0.37	0.43	0.52	0.50
overall up	-0.15	-0.19	-0.20	0.47	0.47	0.49
inversion	0.41	0.29	0.39	0.39	0.14	0.28
mask	-0.06	-0.14	-0.12	0.33	0.07	0.34
human	0.21	0.46	0.42	0.50	0.47	0.50
<b>critical r values (df = 12)</b>						
				overall	0.45	0.49
				overall up	0.40	0.51
				inversion	0.17	0.42
				mask	0.08	0.37
				human	-0.05	0.23
	p	r				
	0.05	0.53				
	0.01	0.66				

#### Direction from scrambled BM

	ADOS			IQ		
	A: com.	B: soc.	A+B	VIQ	PIQ	FSIQ
overall	-0.38	-0.41	-0.46	0.57	0.62	0.70
overall up	-0.27	0.03	-0.11	-0.26	0.29	-0.04
inversion	0.14	0.36	0.32	-0.65	-0.33	-0.62
mask	0.43	0.01	0.21	0.27	-0.41	0.10
human	0.17	0.11	0.15	0.14	0.15	0.16
scramble	-0.48	-0.34	-0.46	0.59	0.18	0.51
<b>critical r values (df = 12)</b>						
				overall	0.25	0.52
				overall up	0.43	0.19
				inversion	0.45	0.19
				mask	0.06	0.32
				human	-0.52	-0.40
				scramble	-0.14	-0.07
	p	r				
	0.05	0.53				
	0.01	0.66				

## Participants

	with ASD	controls
N:	14	14
Age:	29 ± 6	31 ± 9
FSIQ:	98 ± 14	95 ± 11
ADOS:	14 ± 4.5	

## Questionnaires

Autism Diagnostic Observation Schedule (ADOS)  
• communication subscale  
• social subscale

Wechsler Intelligence Scale for Children-Revised (WISC-R; Wechsler, 1974)

- VIQ: verbal IQ
- PIQ: performance IQ
- FSIQ: full scale IQ

## METHODS

### Design & Procedure

#### Detection of BM in scrambled walker noise

Goal: Isolate global structure-from-motion  
Stimuli: Profile views of point-light walkers, masked with scrambled walkers.

Task: "Which interval contained the walker?"

- WS:
1. human, cat, or pigeon
  2. upright or inverted
  3. mask density: 20, 40, 80

BS: ASD vs. Control

#### Direction from scrambled BM

Goal: Isolate local motion processing  
Stimuli: Profile views of PLWs, with flickering dots (200 ms)

Task: "Does the walker face left or right?"

- WS:
1. human, cat, or pigeon
  2. upright or inverted
  3. mask density: 50, 150, 450
  4. coherent or scrambled

BS: ASD vs. Control

## DISCUSSION

No differences in overall performance between ASD and control subjects in both tasks!

However, for the Direction task, we find that the higher the IQ,

- the higher the overall performance
- the less effect of inversion
- the more effected scrambling.

The fact that we do not see these correlations in control subjects might be due to the smaller variance in IQ within this group.

In the future, we need to include more tasks:

- action recognition
- style recognition