New insights on Affinity therapy for people with ASD: an eye-tracking study

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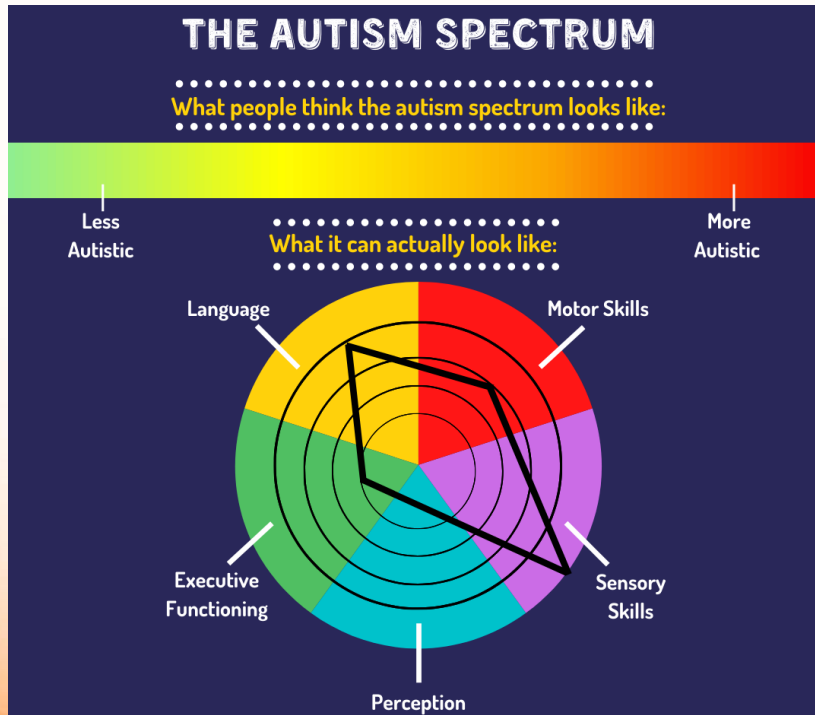Elise Etchamendy, Myriam Chérel, Research in psychopathology and psychoanalysis (RPPsy) lab

Outline

Introduction
i. What is affinity therapy?

- Autism Spectrum Disorders (ASD) cause social difficulties for people with these conditions

THE AUTISM SPECTRUM

What people think the autism spectrum looks like:

Less Autistic — More Autistic

What it can actually look like:

Language · Motor Skills · Sensory Skills · Perception · Executive Functioning

- Most of the time, they have a passion, a very strong interest in a topic or an object, which is called an affinity
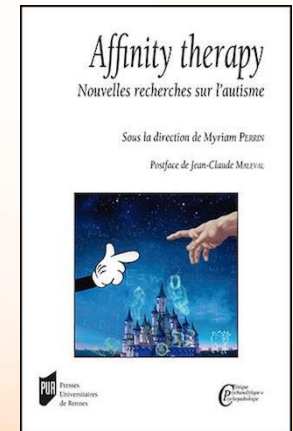
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Introduction
i. What is affinity therapy?

- The example of Ron Suskind's son Owen
    - Diagnosed with regressive autism at age 3
    - Recover the ability to speak thanks to Disney movies

- About Affinity therapy :

    - Perrin-Chérel , M. (2015), *Affinity therapy*, PUR.
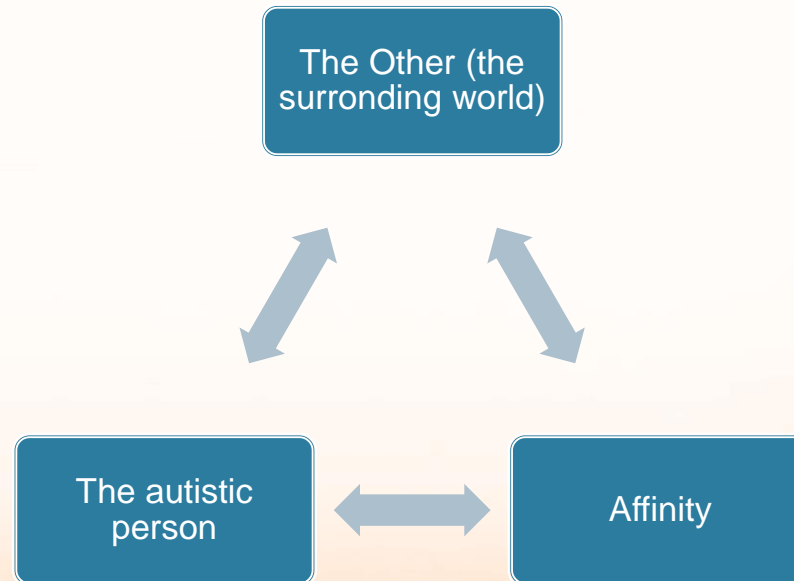   - Two international symposiums
    (2015, 2019)

Introduction
i. What is affinity therapy?

- A key opening to the world, to language, to learnings

- A connecting triangle

Introduction
ii. Affinity project

- Clinical observation: ASD people and particular interest

- Scientific demonstration: an eye-tracking experiment

- Clinical objective : evaluate the relevance of affinity therapy

- A combination of psychoanalytic theory with mathematical statistics

The *AFFINITY* project commits science to serve the autism cure.

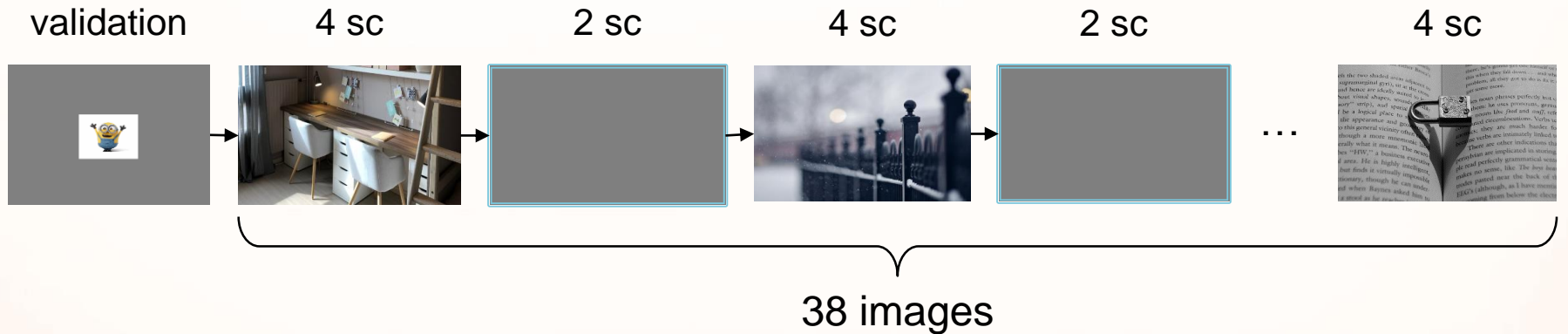# Experimental protocol
i. Course of the experiment

- Eye tracking protocol: free viewing task
  - Used eye tracker : Tobii Pro X3-120
  - Addition of a Kinect

- Recorded data:
  - Gaze position
  - Vocal interactions
  - Depth

Kinect

Experimental screen

Eye tracker

External processing unit

Control computer
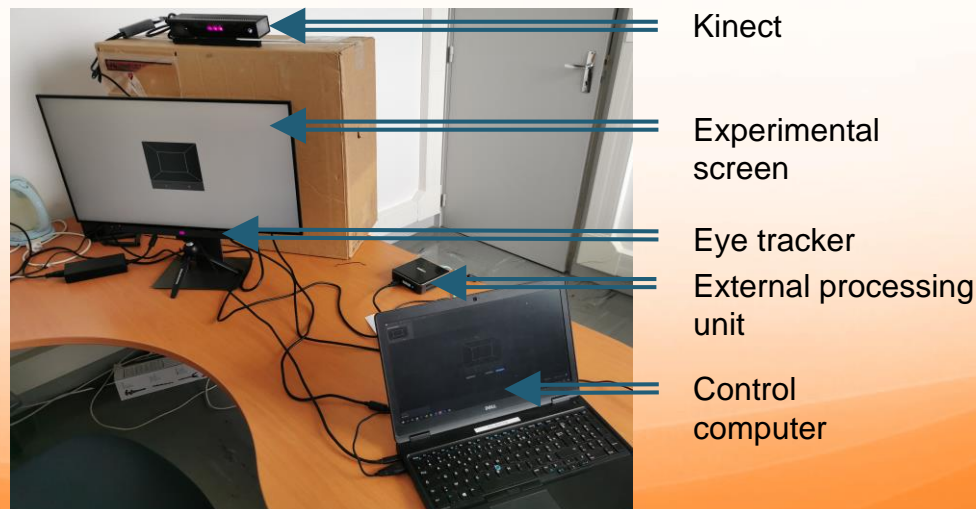
Experimental protocol
i. Course of the experiment

2 points calibration
+ 4 points validation

| | 4 sc | 2 sc | 4 sc | 2 sc | 4 sc |

38 images

- Total duration of the experiment : 3 minutes and 34 seconds without calibration

Experimental protocol
ii. Dataset

- Neutral dataset
  - 28 images
  - Seen by all viewers

- Affinity dataset
  - 10 images
  - Specific to each viewer
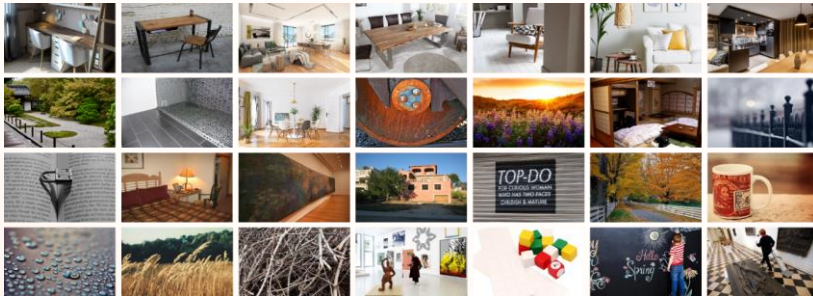
- Images resolution : 1920*1080

Experimental protocol
ii. Dataset

- Neutral dataset
  - 28 images
  - Seen by all viewers

- Affinity dataset
  - 10 images
  - Specific to each viewer

- Images organization

Experimental protocol
iii. Participants

MEI number	Number of subjects	Mean age	[M;F]
1	15	16,1+/-3,2	[13;2]
2	16	36,25+/-10,25	[12;4]
3	13	11,15+/-3,54	[12;1]

- ASD diagnose confirmed by a psychologist

Experimental protocol
iv. Analyzed metrics

- Fixations and saccades identified with the default Tobii Pro software

- We analyze
  - The tracking ratio
  - The fixations number and duration
  - The saccades amplitude

- Metrics computed over all observation time and early, middle and late periods
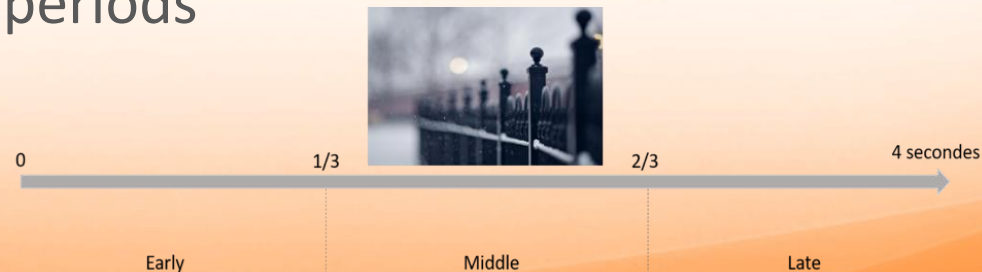
Results

- Statistically significant differences detected with Mann-Whitney test
  - Threshold: p-value < 0.05

- Data post-processing:
  - Filtration of stimuli if the tracking ratio is lower than 50%

Results
i. With filtration of the tracking ratio
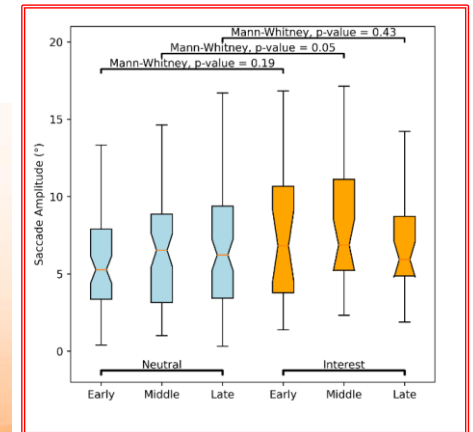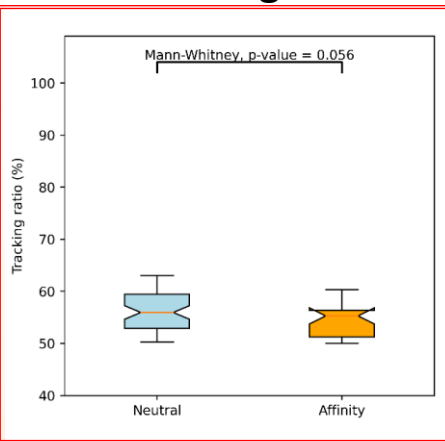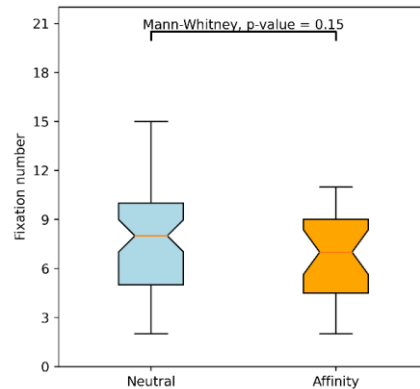
- MEI 1

Tracking ratio	Fixation number	Fixation duration	Saccade amplitude
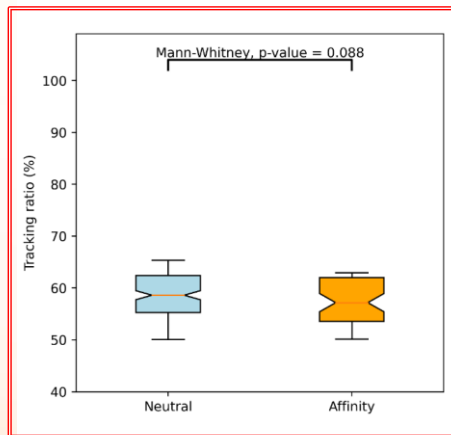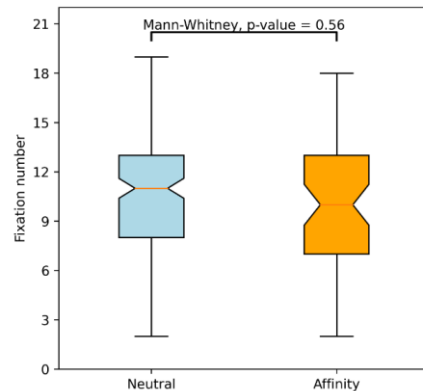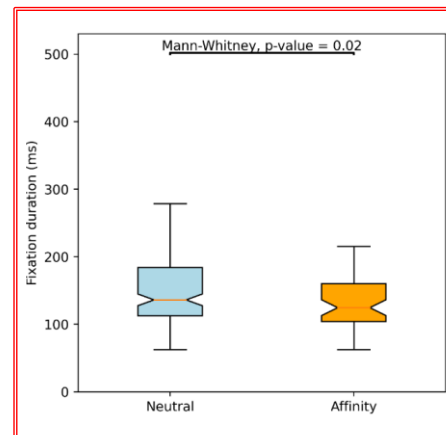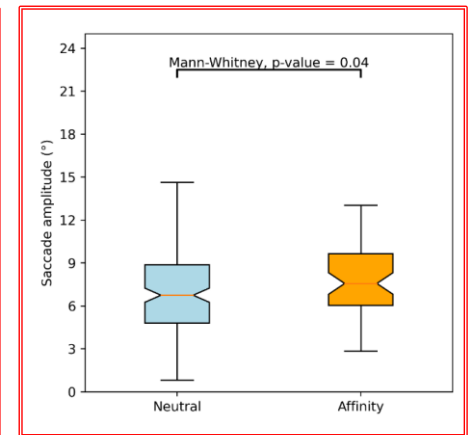
- Tracking ratio lower on affinities

- Shorter fixations

- Longer saccades

Results
i. With filtration of the tracking ratio

- MEI 2
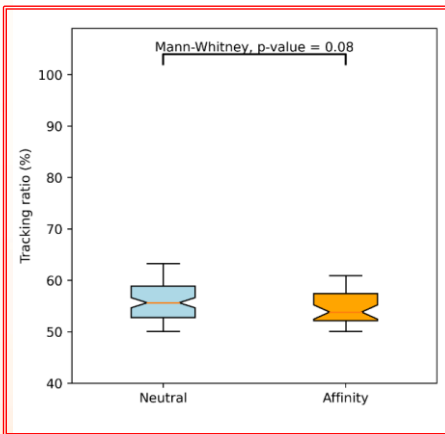
Saccade amplitude
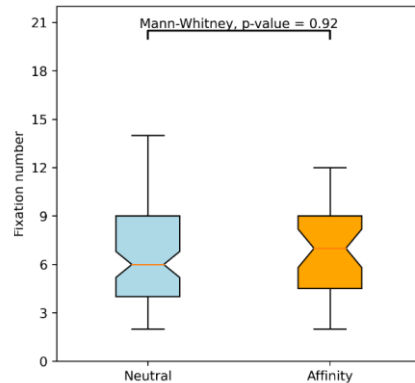
Tracking ratio
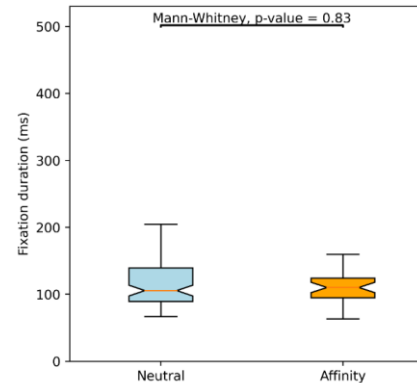
Fixation number
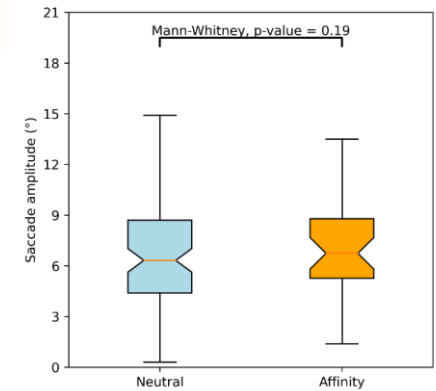
Fixation duration

- Tracking ratio lower on affinities

- Longer saccades, but significantly only for the middle period

15

Results
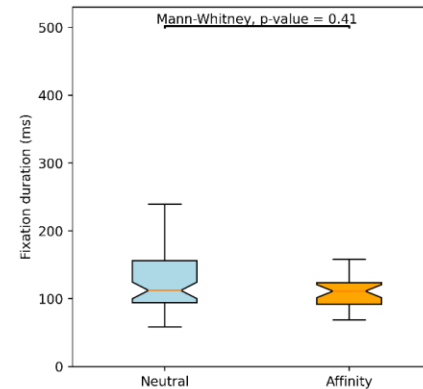
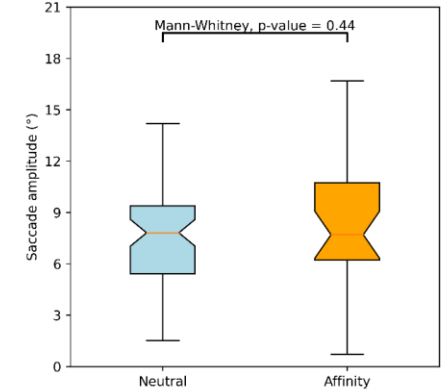## i. With filtration of the tracking ratio

- MEI 3

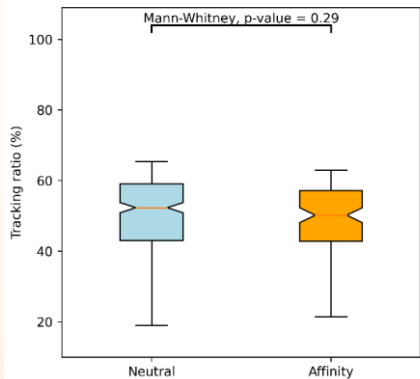Tracking ratio | Fixation number | Fixation duration | Saccade amplitude
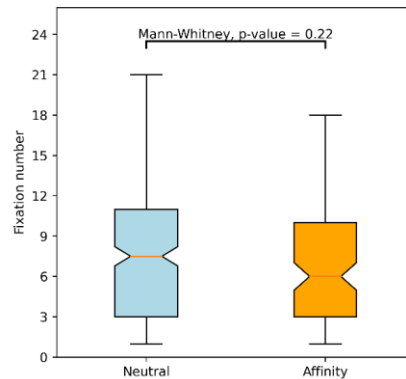
- Tracking ratio lower on affinities
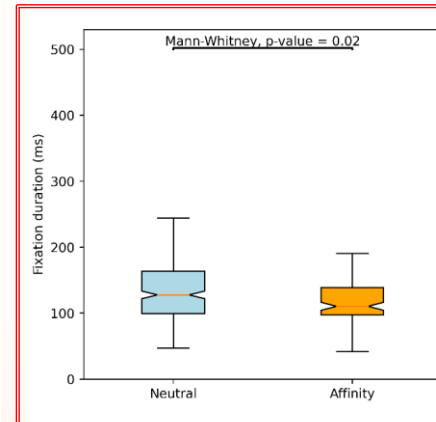
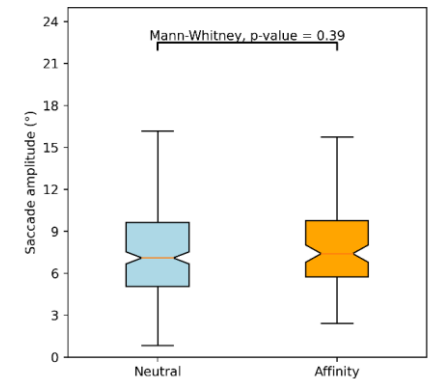# Results
i. With no filtration

- MEI 1

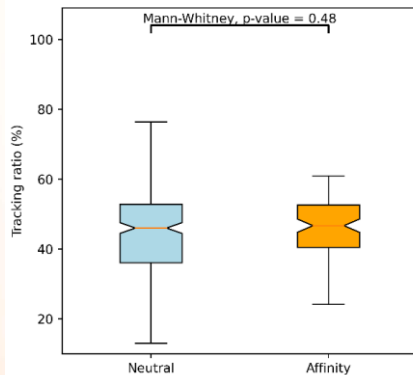| Tracking ratio	Fixation number	Fixation duration	Saccade amplitude

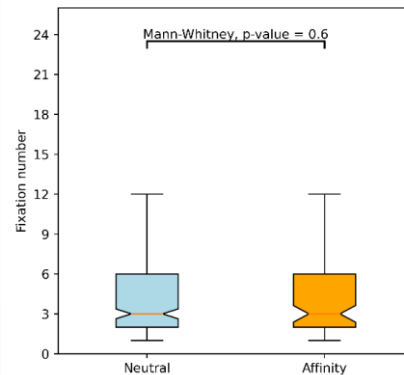

- Shorter fixations

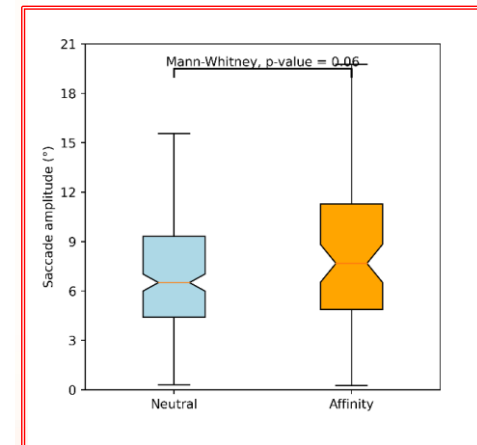# Results
i. With no filtration

- MEI 2
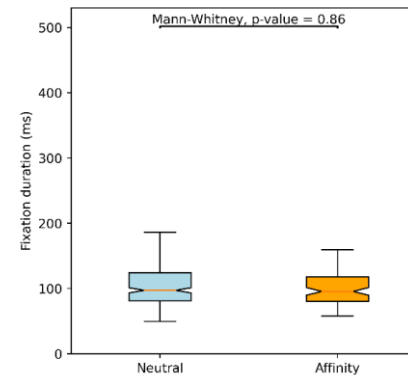
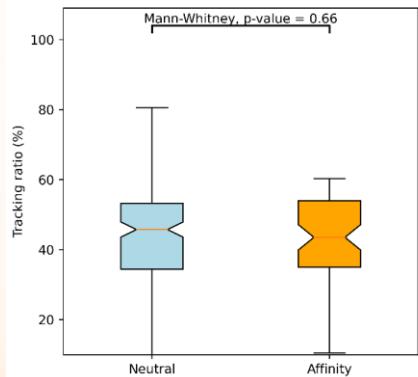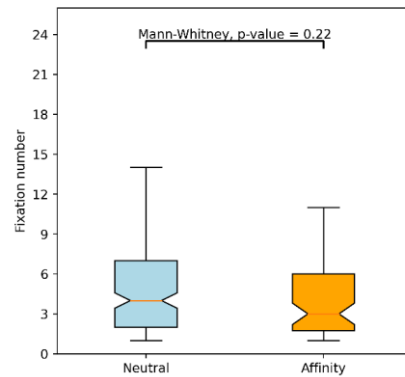| Tracking ratio	Fixation number	Fixation duration	Saccade amplitude

- Longer saccades

Results

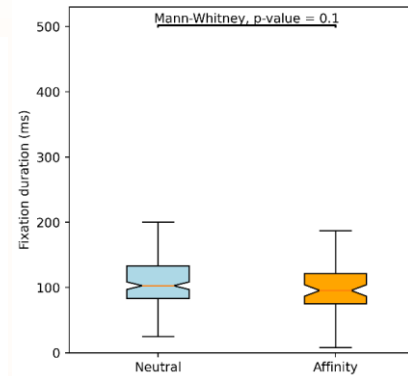## i. With no filtration

- MEI 3
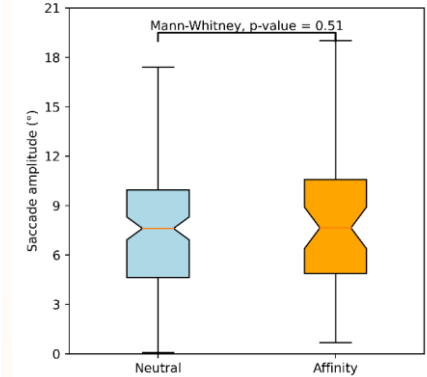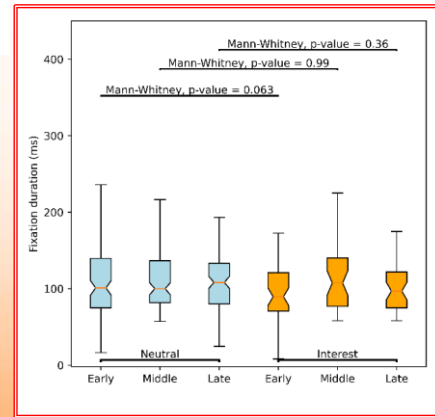
Tracking ratio

Fixation number

Fixation duration

Saccade amplitude

- Shorter fixations, but significantly only for the early period

Results

- With a tracking ratio > 50%

Institution	Tracking ratio	Fixations number	Fixations duration	Saccades amplitude
1	X		X	X
2	X			middle
3	X			

- With no filtration of data

Institution	Tracking ratio	Fixations number	Fixations duration	Saccades amplitude
1			X	
2				X
3			early	

Conclusion

- Significant differences in the visual behavior of ASD people in front of their affinity

- Need to further investigate the impact of the tracking ratio filtration

- Analyze the depth data to see if there are body reactions.

Thank you!