

# Affinity: characterizing and modeling the visual behavior of ASD people in presence of their affinity

**Myriam Chérel**, Associate Professor (Section CNU 16) at the University of Rennes 2.

Email: [myriam.cherel@univ-rennes2.fr](mailto:myriam.cherel@univ-rennes2.fr)

**Lu Zhang**, Associate Professor (Section CNU 61) at INSA Rennes. Email: [lu.zhang@insa-rennes.fr](mailto:lu.zhang@insa-rennes.fr)

**Meriem Outtas**, Associate Professor (Section CNU 61) at INSA Rennes. Email: [meriem.outtas@insa-rennes.fr](mailto:meriem.outtas@insa-rennes.fr)

Two PhD students: **Elise Etchamendy** and **Julie Fournier**

Three engineers/post-docs : **Emma Bucher**, **Pauline Mann** and **Qiong Wang**

## What is Affinity Therapy?

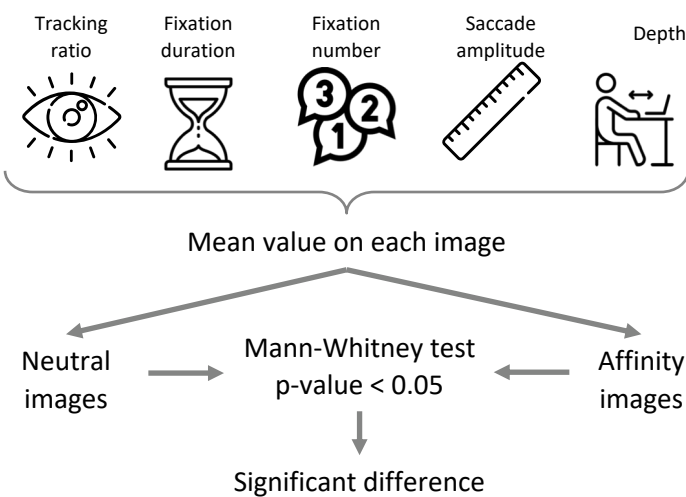
Most of people suffering from Autism Spectrum Disorders (ASD) have a specific and personal interest in a particular thing, such as a toy, a subject (e.g. traffic, plane...), an interest in cartoons or music to name a very few of them. Affinity therapy exactly relies on such particular interest from which a sustained connection between the autism's world and an exterior world can be made.

This affinity, that used to be denounced as being an "obsession" or some "momentary fad", turns out to be the main support for a treatment as an opening to the world, to socialization and to learnings.

### Research question

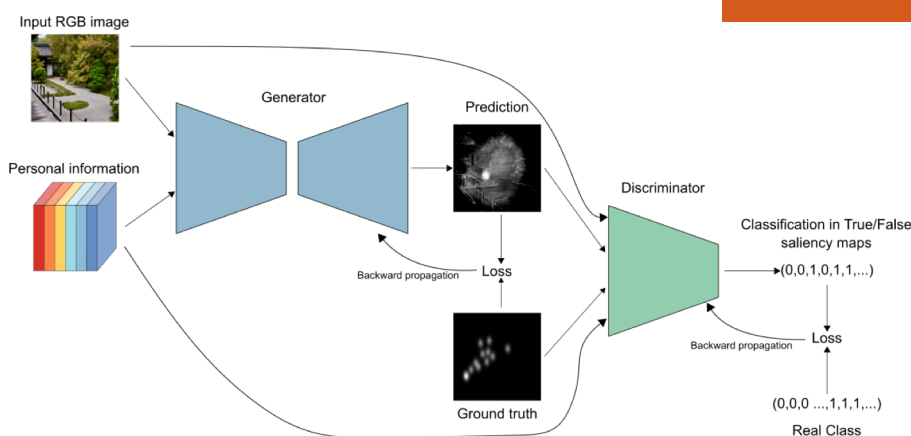
Can we provide evidence that the visual engagement of ASD people changes in presence of their visual affinity?

## Statistical analysis method

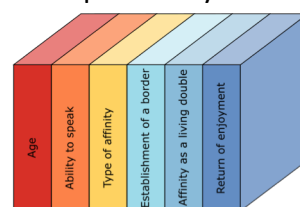


## Personalized saliency prediction

ASD individuals exhibit very atypical and heterogenous gaze patterns. It requires to adapt common saliency prediction methods to adopt a personalized approach based on each individual's autistic traits. Here is our proposed model PASGAN:



The personal information used is the different groups assigned to the subjects for each of the autistic criteria studied previously.



## Experimental protocol

1. Two weeks of immersion in institutions that welcome ASD subjects, for investigating the pattern of thoughts of each autistic mind which develops from a key that is said "affinity" or also, in psychoanalytic terms, "autistic border":

- Joining and participating to their daily life;
- Identifying subjects who might be part of the study with their affinities and collecting clinical data necessary to the experiment.

2. Two weeks of eye tracking experiments and digital activity to collect the data necessary to our study while providing an interesting and fun activity for patients.

For the eye tracking experiment, we added a Kinect to the eye tracker to record the body movements as a depth video and the voice in addition to gaze data.



## Results of statistical analysis

The significant differences in visual behavior show 2 different gaze behavior when ASD people look at their affinity: **increased attention** and **anxiety**. The adopted behaviors depends on the **autistic features** of individuals.

	Increased visual attention for affinity	
	No	Yes
Anxiety	Hetero-aggressive Not numerical affinity 6-12 and 26+ years old No identification to affinity Outline of a border No use of a partner	Undirected return of enjoyment Access to speech 19-25 years old Numerical affinity Border widening Use of a partner
	Unability to speak	Self-mutilation 13-18 years old Precarious border Affinity as a living double

## Results for saliency prediction

Label insertion position	CC ↑	NSS ↑	AUC ↑	KL-div ↓
2	0.085	0.52	0.34	7.95
5	0.058	0.35	0.29	8.64

Due to the lack of data (1026 saliency maps) the performance of our model is not sufficient to predict the personal saliency of ASD individuals according to their specific traits.