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# Hearing/Seeing it approaching: Neural correlates of multisensory looming cues integration in the autistic personality

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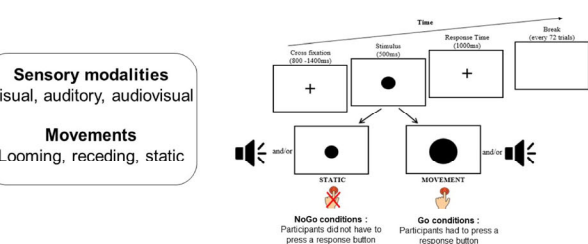
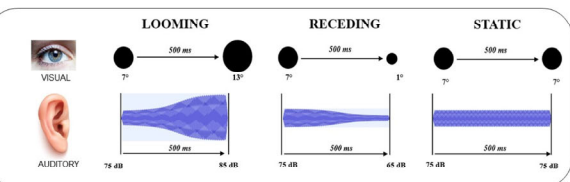
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## INTRODUCTION

As a spectrum disorder, autistic traits associated with ASD extend in the general population [1].  
Sensory specificities are a key component of ASD diagnosis [2].  
Depth movement (looming/receding) informs us about essential non-social (e.g., avoid a danger) and social information (e.g., approaching to interact).  
Multisensory (e.g., audiovisual) integration in ASD and in the autistic personality has only been studied with static stimuli [3].  
**Aim : Study the integration of audiovisual depth movement in the autistic traits spectrum using behavioral and neurophysiological measures.**

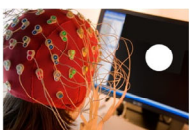
## METHOD

Participants: 37 healthy young adults (M = 23,32 yo; SD = 2,9 yo).  
Stimuli and paradigm came from the study of Cappe et al. (2009) [4]



Personality questionnaires :  
AQ [1] (Autistic Quotient) and AASP [5] (sensory profile).

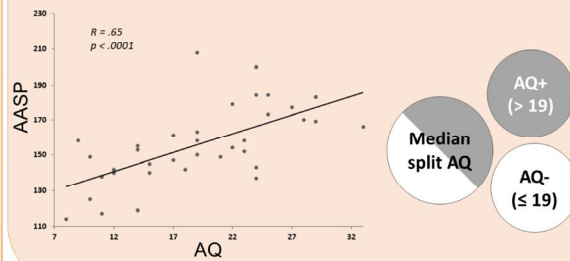
EEG material :



Biosemi system, 64 channels  
Sampling rate : 512 Hz  
Common average reference

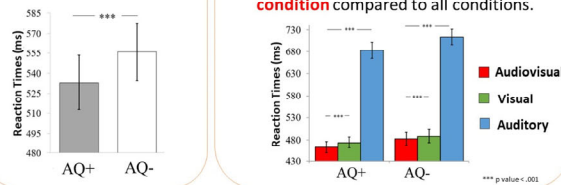
## QUESTIONNAIRES - RESULTS

Positive correlation between the autistic quotient (AQ) and the sensory profile (AASP).



## BEHAVIORAL - RESULTS

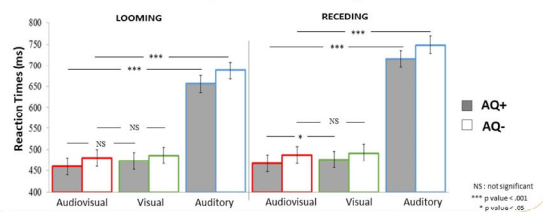
Shorter reaction times in AQ+



Multisensory benefit for both AQ groups.

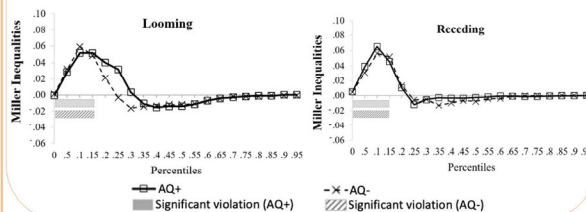
AQ+ : shorter reaction times in the audiovisual condition compared to all conditions.

AQ+ : Multisensory benefit in receding condition



Race Model [6] application

Behavioral index of multisensory integration in both AQ groups



## EEG - RESULTS

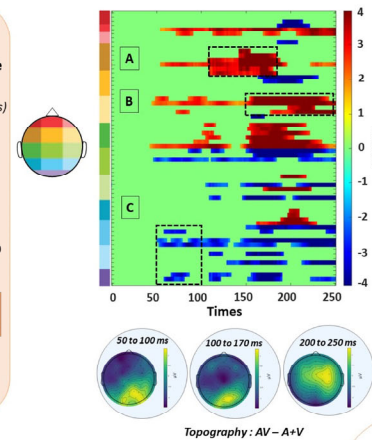
1- Additive Model [7] (AV vs. A + V) application to the overall sample  
T-tests with FDR and temporal corrections (effects > 12 ms)

2 – Definition of temporal windows and regions

3 – ANOVA computation to test movement and group effects/interactions

Mean  $\mu V$  = Modality x Movement x Group

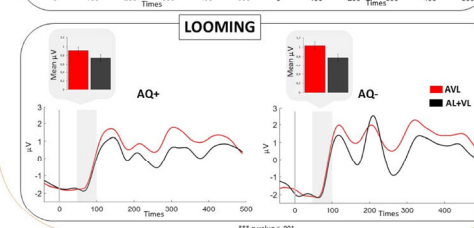
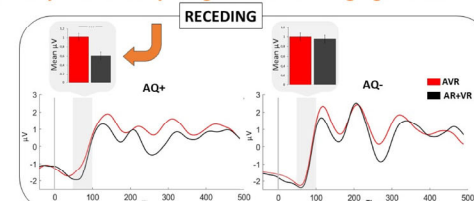
ANOVA showing significant intergroup differences



Topography : AV – A+V

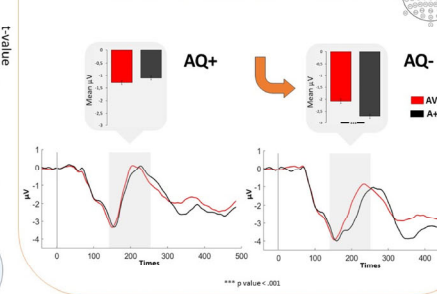
C 50 to 100 ms Parieto-occipital region

Early multisensory integration of receding signals in AQ+



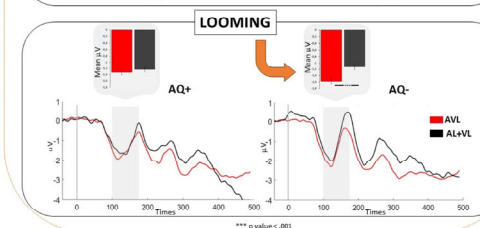
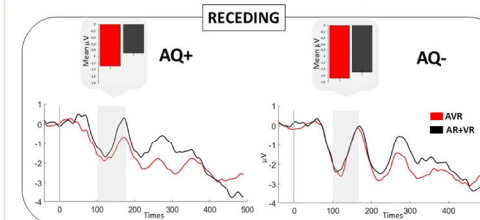
B 150 to 250 ms Fronto-central region

Multisensory integration in AQ-



A 100 to 170 ms Frontal region

Multisensory integration of looming signals in AQ-



## TAKE HOME MESSAGE

- There was a relationship between the sensory profile (AASP) and the autistic profile (AQ).
- AQ+ presented reduced detection times of depth movement.
- Integration of receding audiovisual signals in AQ+ underlied by early integrative interactions at parieto-occipital region.
- In line with the study of Cappe et al. (2012) [8] which explored EEG correlates of depth movement, AQ- presented a specific integration of audiovisual looming signals
- Only AQ- has integrated multisensory information and particularly looming signals at frontal regions
- Different temporal and spatial characteristics of multisensory integration of depth movement according to the level of autistic personality. These differences in the cortical network relate to different multisensory facilitation at the behavioral level.

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