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Thinking in pictures in autism spectrum disorder



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BACKGROUND

Individuals with Autism Spectrum Disorder (ASD) show **abilities in tasks requiring mental imagery (e.g., mental rotation task ; Soulières et al., 2011)**. Furthermore, according to personal reports, some of them would possess a specific visual cognitive style (Grandin, 2010)

→ **Objectives:** Assess the presence of a **visual cognitive style** in autistic individuals and verify whether this visual cognitive style is related to the **sensory atypicalities** present in ASD.



METHOD

Participants

- **39 adults with ASD** (age range 18 to 62, mean = 33.5, SD = 10.6)
- **104 comparison participants** (age range 18 to 69, mean = 37.0, SD = 12.7)

Groups are matched on age ($p = .184$), education levels ($p = .089$) and gender (73.1 % of women in the control group, 71.8 % in the ASD group, $p = .878$).

Protocol

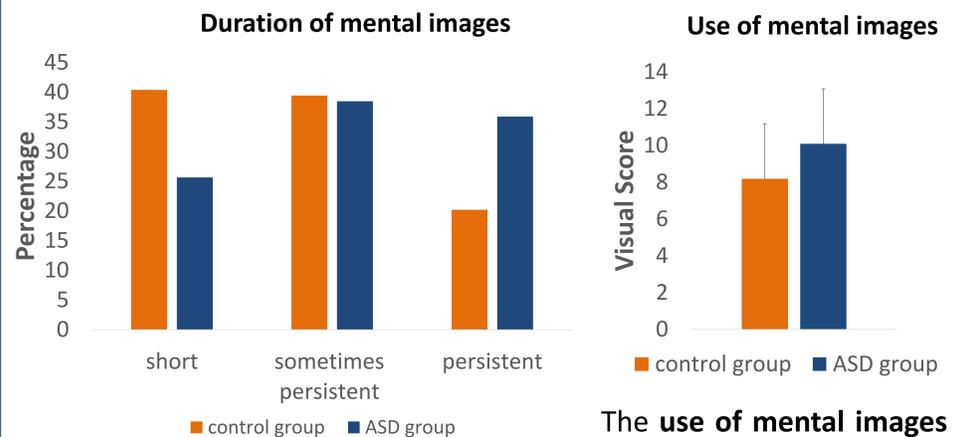
An online questionnaire containing 66 items:

- ✓ **Attention to details:** 6 items from the Autism Spectrum Quotient (AQ; Baron-Cohen et al., 2001).
- ✓ **Adolescent/Adult Sensory Profile** (AASP; Brown & Dunn, 2002): 42 items including sensory sensitivity.
- ✓ **Mental imagery quality:** 6 items concerning the colors, level of details, duration, level of abstraction, movements and manipulation of mental images.
- ✓ **Mental imagery use in daily situation:**
 - **Questionnaire :** Participants indicated whether they use images only, words only or both images and words in seven different situations: recollection, problem solving, anticipation, decision making, planning, comprehension and memorization. The **visual score** corresponds to the importance of use of mental images among these different situations.
 - **Two open questions :** "Describe what comes to your mind when you hear the name of a city you've already been to".

RESULTS

The **attention to details score** and the **sensory sensitivity score** are significantly more important in participants with ASD than in controls ($p < .005$).

Mental imagery quality and use



Mental images appear to be more **persistent** in participants with ASD than in controls ($p = .052$).

The **use of mental images is reported more frequently** in participants with ASD than in controls ($p < .001$).

Qualitative analysis

A **hierarchical descending classification** of lexical classes was performed on the open question's responses.

When describing their experiences :

⇒ **Control participants** tend to use the lexical field of **MEMORIES** "the cities will stand out more for the encounters and experiences in these cities, so the memories and sensations more than the city itself"

⇒ **Participants with ASD** tend to use the **VISUAL** lexical field "An overall plan of an emblematic place (the Capitol Square), the overall architecture and the shape of the buildings. An often impersonal point of view, a bit like a postcard's image".

Correlations

There are correlations between the **use of images, sensory sensitivity** and **attention to details** only in participants with ASD.

Matrix of correlations among visual scores and attention to detail and sensory sensitivity in autistic and non-autistics participants.

	1	2	3
Control group (n = 104)			
1. Attention to detail		.17	.45**
2. Visual score			.18
3. Sensory sensitivity			
ASD group (n = 39)			
1. Attention to detail		.35*	.67**
2. Visual score			.37*
3. Sensory sensitivity			

* .01 < p < .05

** $p < .01$

CONCLUSION

Our results support the existence of a **visual cognitive style** in ASD individuals with the frequent and persistent use of **mental images**. This visual cognitive style is related to the **sensory atypicalities** present in individuals with ASD. These results question the impact of this particular cognitive style on the daily life of these individuals, especially in terms of learning and attention.

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