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The relation between cognitive theories of autism and the results of an emotion recognition research

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Abstract - Autism, which is a pervasive developmental disorder, is being examined more frequently in different disciplines. Cognitive psychology offers more and more explanative theories, but none of them explains the whole syndrome. Therefore most scientists believe that autism is caused by separate but correlative diseases. Through our research (Angyal and Pachner, 2011) we will demonstrate the kind of relations that can be found between our results and two admitted theories – (1) the weak central coherence and (2) Baron-Cohen's theory. In the research we compared the skill of recognizing basic emotions in the case of individuals with autism, individuals with moderate mental retardation and typical young adults. Besides using photos of facial expressions like in earlier studies (Faces-test, Baron-Cohen, Wheelwrigt and Jolliffe, 1997) we also applied dynamic stimulus materials such as vocal recordings (Belin, Fillion-Bilodeau and Gosselin, 2008), videos (Simon, Craig, Gosselin, Belin and Rainville, 2008) and by displaying two different types of stimulus we examined the integration between two modalities. Our results did not confirm any of the two hypotheses; therefore we agree with those alternative theories that originate the different features of autism from a domain-general problem rather than from several separate deficits, for example the Gepner and Féron's temporo-spatial processing disorders hypothesis.

The weak central coherence theory

(Happé and Frith, 2006)
This theory suggests that autism is characterized by weak or absent drive for global coherence. Individuals with autism perform better in tasks which need detail-focused processing than tasks which require global cognitive processes.
In the case of emotion recognition the researchers found evidence that the individuals with autism use only some detail to identify the emotions.
And this theory also predicted that the modality integration would be weaker in autism, because they have difficulties in processing complex stimuli.

Our results did not support the weak central coherence theory nor disprove it clearly.
The conflicting outcome is that the autism group show better performance in the emotion recognition from the whole face than from details.
But it is possible that the individuals with autism decide on the basis of other details which is disappeared in the region photos.

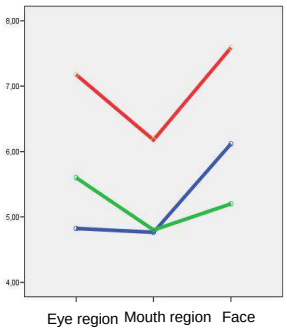
In the second part of the research we also obtain an opposite result with Happé and Frith's theory. The autism group achieve better performance in the simultaneous condition despite this was a more complex task. In accordance with the theory shouldn't be a performance improvement in the audio-visual subtask.

Individuals with Autism (n=17; mean age 22)
Individuals with moderate intellectual disability (n=10; mean age 19)
Typical young adults (n=17; mean age 22)

Our emotion recognition research

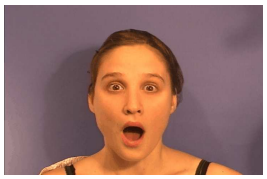
1. Static photos of facial expressions (Faces-test, Baron-Cohen at al., 1997)

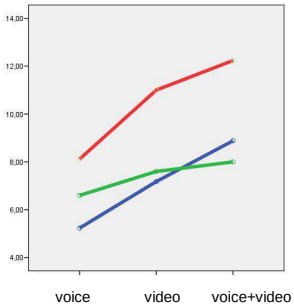
Face-details (F(2;82)=10,102 , p < 0,01)
Groups (F (2,41)=15,79 , p<0,01)
Face-details*groups (F (4;82)=2,487, p=0,05)



2. Dynamic stimulus
- Vocal recordings (Belin at al., 2008)
- Videos (Simon at al, 2008)
- Vocal recordings + videos simultaneously (~ Collignon at al., 2008)

Groups (F(2;41)=23,715, p<0,01)
Subtasks (F(2;82)=34,451 , p<0,01)
Groups*subtaks (F(4;82)=6,931 , p>0,05)





Baron-Cohen's mind blindness theory

This theory states that individuals with autism fail to attribute mental states to themselves and others. Therefore individuals with autism have difficulties in false-belief tasks, deficits in joint attention and problems according to understand emotions.
Baron-Cohen's research group did numerous examination about emotion recognition ability of autistic people. So we can compared our result with their's.

Our results partly match with Baron-Cohen's. The autism group is worse in the emotion recognition from the eye region than from the whole face.

But they suggest that the individuals with high functioning autism didn't differ from individuals with typical development in basic emotion recognition.
We examine a heterogeneous autism group based on IQ, so we chose another control group with intellectual disability.
In Fig.1. one can observe that the performance pattern of the autism group differ from the others. So it's possible that autism causes a difference in basic emotion recognition, the intellectual disability is not the only cause.

According to Baron-Cohen a modality independent emotion detector is in his empathy model. Therefore, the difference between subtasks is unexpected.

However our result are similar to Collignon's (2008). And the pattern of performance is analogous between the autism and the typical group. Thus complementing Baron-Cohen's emotion detector concept – where seems to be a delay in autism -, the results are well explained.

Box 1. An alternative: Temporo-spatial processing disorders hypothesis

(Gepner and Féron, 2009)
This theory suggest that temporo-spatial processing disorders are in the background of autism. As a consequence there is difficulties in processing multi-sensory dynamic stimuli online, associating them into meaningful and coherent patterns and producing real-time sensory-motor adjustments and motor outputs. Simply said the world changing too fast for the individuals with autism.
The main advantage of the theory is that summerizes every level of research: clinical observation, cognitive differencies, neurology results and genetic findings. They also pay attention for the connection between these research fields and the clinical implications.

Discussion

We get unexpected results in the point of view of the WCC theory. The data fits better to Baron-Cohen's theory, but it's limited because of the different subjects.
Our results are difficult to compare with these theories (in particular Baron-Cohen's) because we did not examine high functioning individuals with autism. But we think that this aspect is important according to autism research, so in the future it would remain useful involving individuals with autism who also have intellectual disabilities.
However our results are not completely opposed to these cognitive theories we suggest you to include the alternative hypothesis, because those can explain the ambiguous research data. And perhaps with a more complex view (like Gepner and Féron's TSPD hypothesis → Box 1.) we can see the whole picture of autism more clearly.

Reference

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