



Autism and the too Fast Changing World: Globalization Difficulties in Behavior and the Brain

Orsolya Pachner
University of Pécs
pachner.orsolya@gmail.com

Abstract – Autism is a pervasive developmental disorder characterized by impaired social interaction, communication, and restricted and repetitive behavior. It is still unclear what the exact neural, genetic background, but there are so many cognitive theories to explain some characteristics of the disorder. I would like to present a theory which is primarily cognitive but there is also some hypothetic neural background. It is Gepner's and Féron's theory about autism as Temporo-Spatial Processing Disorders. In my interpretation autism is a connection problem in the behavior, cognitive processing and neural level. I discuss why it is more difficult to adapt to a globalized world where the connection is essential in daily life.

Keywords: autism, globalization, TSPD

Introduction

Autism is a developmental disorder with genetic and neural background, thus it is an appropriate candidate for cognitive research. But there are also lots of questions in practice. I gained some experience in working with children with autism in the last two years. I found it myself how difficult it is to reconcile theory with practice. In this paper I try to get closer to this aim.

Many people ask me why this developmental disorder is particular. I think autism can be a key to understand our mind. Through autism we can understand other important phenomenon, especially from cognitive field. Autism research play a prominent role in many cognitive ability: mind reading, empathy, joint attention, perception, stimuli integration and so on.

I try to approach autism from a global view. I show a theory which is synthesized the levels of explanations in autism – genetic, neural and cognitive level. And then I make some notion about the effect of globalization to this population.

Autism spectrum disorder

Autism is a pervasive developmental disorder characterized by impaired social interaction, communication, and restricted, repetitive patterns of behavior and interests.



We diagnose autism with observing behavior and interviews with parents. There are some typical symptoms, but we don't know one which is characterized in each case. This is a particular diagnostic category: there aren't objective screening questionnaires and there aren't thick boundaries between normal and autistic population. Now we talk about autism as *spectrum* disorder, one can be milder or more severe in the spectrum of every symptom. Stephen Shore used the metaphor that autism like snowflakes: *"If you've met one person with autism, you've met one person with autism."*

If a child comes to me with a suspected autism, I pay my attention to tiny little behavioral cues from the beginning of the examination. For example the eye contact, or how interact with a stranger and also with his parents. How explore the new environment, and how can he play or occupy himself alone. In the elder children it is particularly exciting how they are thinking about casual things like friendship, loneliness, future plans.

In a typical case, the child does not want to interact with me. He does not look into my eyes, avoid contact (e.g. handshake), and often protest to come with me to the examination room. If the child comes in he can explore the toys in the room. There is huge difference in the exploratory behavior compared to children with typical development. In general a child with autism is interested in unusual things like plumbing, electrical outlets, or only unusual degree of interest for usual things like cars or construction toys. If he find something that keeps him busy, it is difficult to throw him off. So it is important that we can draw his attention and convince a joint activity: be it a game or a task. It is important how accept initiative from others. And during the task performance there are also lots of cues: deviation from the subject in his speech, interpretation of instruction and attentional focus. Motivation is also a key in cooperation: some children do tasks only for reward, some hardly tolerate failure, some have a special interest to logic tasks. They have special thinking which is easily observable during conversation.

Levels of explanation

If we look the researcher's side, there can find similar diversity. In general we talk about three levels of explanations: genetic, neural and cognitive level. Waterhouse (2009) called autism as a portmanteau syndrome. There are full of various behavioral



symptoms, full of various cognitive difficulties, full of various neural differences (structural and functional too), and full of various genetic differences. I focus on the cognitive level, but I think it is important to know what the current state of knowledge in other fields is.

Genetic level: Long times ago we know from the family and twin studies that heritability of autism is high. But it is hard to find the appropriate genetic candidate in such a heterogeneous disorder. There are some candidate genes, but the highest predictive value is 1-2%. Probably the genetically influenced term is better. This allows an extended perspective where we can think about epigenetic effects; gene-environment interactions (Skuse, 2007).

Neural level: Kanner (1943) also has been supposed neural causes in autism. With the neuroimaging studies we have lots of empirical data about structural and functional differences. Most of these prefer the idea of localization and connect to the modular perspective of the cognitive system. The neural research is theory-driven in general. We can say that there was some difference in every neural area in autism according to some researchers. Including but not limited: cerebellum, frontal lobe, temporal lobe, parietal lobe, and also the subcortical structures: amygdala, basal ganglia, hippocampus etc. (Schroeder et al, 2010). There are lots of problem with the interpretation of these neural data, but now I only stress one interested fact. The most consistent empirical result is the increased brain volume which is hardly linked to the modular perspective. And there is a new opportunity in the neural research: the differences in the connection between brain areas (Herbert, 2004).

Cognitive level: It is still unclear what the exact neural, genetic background, but there are so many cognitive theories to explain some characteristics of the disorder. There are three main cognitive theories which are known for most of autism experts: the mind blindness (Baron-Cohen, 2009), the lack of central coherence (Happé and Frith, 2006), and the executive dysfunction (Ozonoff, 1991). Some empirical results supports one (or in some cases two) of theme, others not. I would not want to present these theories. I would rather describe a little-known comprehensive theory which is a good candidate to explain autism. It is Gepner's and Féron's theory (2009) about autism, called Temporo-Spatial Processing Disorders hypothesis. It is primarily cognitive but there has also some hypothetic neural and genetic background. I look how to meet this theory with the criteria for a good cognitive theory. First of all it



needs to be universal and specific. It would be good if the theory can explain all of the main symptoms of autism. It needs to be objectively measurable. And it refers to neurological and genetic background (Győri, 2006).

The Temporo-Spatial Processing Disorder hypothesis

The TSPD hypothesis (Gepner and Féron, 2009) emerged from observations indicating that ASD patients have difficulties in perceiving and integrating environmental dynamic multi-sensory stimuli online and producing real-time outputs, reactions.

TSPD hypothesis states that the environmental world is changing too fast to be processed on time, and therefore also predicts that some ASD individuals would exhibit a slowed processing speed in motor, perceptual and cognitive acts.

ASD individuals would tend to avoid rapid visual, auditory or proprioceptive flows, considered as aversive stimuli. Moreover, they would inadequately perceive and respond to rapid physical and human movements. This can be link to social symptoms.

The theory implies some adequate compensation strategies: Slowed processing speed or focused processing (prefer local than global processing). Really these strategies characterize the behavior of people with autism.

TSPDs of multi-sensory stimuli may account for numerous clinical and neuropsychological findings in ASD: all main symptoms and lots of cognitive deficiencies, for example the previously mentioned three main cognitive difficulties. I think it is important that this theory is not against to the earlier explanations rather present a possible underlying reason for them.

This theory tries to explain every symptom. It is also measurable objectively: processing speed is a quite good candidate for this. And it includes some neurological background: those findings in neuroimaging which state that autistic mind differs in the connectivity between cortical areas could be link to the TSPD hypothesis, and also the difference in neural synchronization.

In conclusion there is a theory which tries to explain every level of autism research, integrate the previous results, and suggests some practical issues too. Now just



waiting for some evidence that it can explain the diversity and it is typical only in autism.

Globalization effect to autism

In my interpretation autism is a connection problem in the behavior, cognitive processing and neural level. I discuss why it is more difficult to adapt to a globalized world where the connection is essential in daily life.

People with autism have lack of global thinking (Happé and Frith, 2006). It is difficult to see correlations for them. Sometimes they lost in the details, therefore miss out important things. For example it is possible they learn something literally, but perhaps they can't transfer their knowledge to another area. Today, this is exactly what is needed most.

Oversensitivity (Kern et. all, 2006) is another feature which makes it difficult everyday life. All kind of senses can be affected. Most of people with autism have some hypersensitivity in the auditory modality. They are disturbed with too much loud noise. If you think about how much information flows to us in a general moment, it is not surprising that ASD people sometimes are shocked.

The difficulties of connecting to others are fundamental. For people with autism it is complicated integration to community. Especially to contemporary community, for example in kindergarten groups, school classes. But in adulthood it is also a challenge to integration into a workplace, or such a simple thing like buy something in a store.

The other major problem is the inflexibility. Everyone knows the frustrating feeling when something comes suddenly and he must to change the planned agenda. For some people with autism any unexpected event is horrible. From the TSPD hypothesis we can conclude that in such an unexpected event there is too much new information simultaneously.

It is a difficult question that the technological improvements help or not individuals with autism in communication. We can experience that in online communication with letters and emoticons the real message (our thoughts and intentions) has often alterations. But on the other hand, there are lots of applications for mobile phones which can coordinate autistic people in daily situations. Probably the online



communication is easier for autistic people. The information come from only one modality and the flow of information has controllable speed.

Perhaps with some technological developments people with ASD can improve some compensation strategies. For example I know a boy with autism, who cannot learn easily his mother language, Hungarian. Until now his speech is difficult to understand. But he learned English with the use of the internet. His English getting better, and now he can express him better in English than in Hungarian. Perhaps Hungarian is too hard for him (e.g. there are more ambiguity), and the technology allowed him another possible way to communicate.

Finally I would like to outline some possible answers to a difficult question: Does increase the number of children with autism because of globalization?

Obviously there is no direct connection between globalization and autism. But the TSPD hypothesis suggests that the too fast changing world can cause lots of difficulties, symptoms in autism. It is undeniable that a globalized world is more changeable and unpredictable. The flexible adaption is one of the most required skills in such an environment. I think with the same level heritability more autistic symptoms appear in this changeable environment. There are more social and communication challenges, therefore it is more pronounced if someone has social and communication disorders.

The other aspect is the informational spread. Because of the connection between scientific research groups, we know more information about autism. Between professionals there is more knowledge. The theme of autism receives more attention in the higher education. For example in Hungary there is an autism specialization in master's degree in special education.

Through mass media some research evidence are available for people too. Lots of parents have access to information about autism. It is good because of detection of the first symptoms. But unfortunately not all of information from media is reliable. Professionals have responsibility for recognize and share the valid and current knowledge about autism.

I strive for this in my work. I consider it important to link practical and research work together. A theory will be good if there are some evidence for that, and have some



suggests to the daily practice site of the problem. But so far there are little evidences. Until then we have to use our present knowledge about autism to help ASD people in adaptation to our changeable world.

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