

## Medical Imaging Investigations in Young Children with Autism Spectrum Disorder, without the Use of Sedation

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**Abstract:** There have been several cases of children with autism spectrum disorder investigated at the department of Radiology, at St. John Hospital for Children, for four type of imaging methods: radiography, ecography, CT and MRI. I conducted a study of 45 children, who came during a year for these four types of imagining investigations. The duration of the investigation determined their reaction, half of them cooperated well with the doctors when radiographies, CTs and ecographies needed to be carried out, where the investigation didn't take more than ten minutes. Concerning the MRI investigation, that take up to one hour, half of the children, 50% needed to be sedated with melatonin, while 30% required general anaesthesia, 20% managed to comply while the parents sang to them, or they stood awake a night before the investigation and they were tired.

**Keywords:** children; autism spectrum disorder; imaging; hospital

### 1. Introduction

*“The word autism comes from the Greek word autos, which means self”.*

Even though autism seems like a fairly new diagnosis, some of the earliest published descriptions of behaviors that resemble autism date back to the eighteenth century. It wasn't until 1911 that Swiss psychiatrist Eugen Bleuler coined the term *autism* in his work with schizophrenic patients. He observed that his patients were isolated from the outside world and extremely self-absorbed. Dr. Leo Kanner and Dr. Hans Asperger are considered the pioneers in the field of autism as we know it today. In the early 1940s, unbeknownst to each other, both men conducted research in which

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they described children as autistic—not in reference to schizophrenics, but to what we now know as the more classic definition of the word.

Kanner conducted his research on children in the United States, Asperger in Austria. It's a remarkable coincidence that these studies happened to occur at the same time in different parts of the world, and that both researchers used the word *autistic* to describe the children in their studies.

Kanner's definition of autism was referred to as *early infantile autism* or *childhood autism*" (Exkron, 2005, p. 34).

As the name implies, ASDs are spectrum disorders, ranging from mild to severe. A child on the severe end of the spectrum may be unable to speak and also have mental retardation. A child on the mild end of the spectrum may be able to function in a regular classroom and even reach the point where he or she no longer meets the criteria for autism. No two children with ASDs are alike, even if they have the same diagnosis. One child with an ASD may be nonverbal and have a low IQ. Another child with the exact same diagnosis may have an above-average IQ. A third child may be verbally and intellectually precocious. The terms *high-functioning* and *low-functioning* are sometimes used to describe where a child is on the autism spectrum. You can't tell that a child has an ASD simply by looking at a picture of him or her. A two-year-old with an ASD can be the same height and weight and be just as adorable as a "typical" two-year-old. ("Normal" is not used in this book because it is a relative term, and one that is not widely accepted in the ASD world.

The Autism Network International introduced a new term, *neurologically typical* or NT, to describe people without ASDs, which has been shortened to *typical* as the acceptable term in many publications). What distinguishes a child with an ASD from a typical peer is what you can't see: the brain. This is why ASDs are known as invisible disabilities.

Because there is no medical test for an ASD, a child is diagnosed based on either the absence or presence of certain behaviors and skills. For example, if a child is still not speaking by the age of three, that is considered the absence of an age-appropriate behavior. If a three-year-old child engages in odd or idiosyncratic behavior, such as excessive hand flapping, grimacing, or aimlessly running back and forth across a room that may be an indication of a developmental disorder.

*What are Early Signs of ASDs?*

Most parents notice that something is not right with their children when the children are two or three years old. In some cases, parents pick up signs even earlier, when their children are in infancy. They may notice that their babies don't look at them or seem to recognize familiar faces. Perhaps their babies don't cry when they leave the room, exhibit anxiety around strangers, make babbling sounds, imitate gestures such as clapping and pointing, or enjoy playing games like peekaboo—all signs of a typically developing infant.

There's no single personality type that represents the model of an ASD baby. Some parents of children with ASDs look back and describe their children as having been angels when they were babies, hardly making a peep and demanding very little attention. Others describe their children as screamers. Still others describe their babies' behavior as typical—nothing out of the ordinary. According to the National Institute of Mental Health (NIMH), some possible early indicators of ASDs include the following:

- does not babble, point, or make meaningful gestures by one year of age;
- does not speak one word by sixteen months;
- does not combine two words by two years of age;
- does not respond to his or her name;
- loses language or social skills;
- avoids eye contact;
- doesn't seem to know how to play with toys;
- excessively lines up toys or other objects;
- is attached to one particular toy or object;
- doesn't smile;
- at times seems to be hearing impaired.

The Diagnostic and Statistical Manual, Fourth edition, Text Revision (DSM- IV-TR) is the official manual used by physicians and mental health professionals for diagnosing children on the autism spectrum. (While parents may obtain copies of this manual, it's not necessary. The information that you'll need from the DSM- IV-TR is listed in Appendix B). The DSM-IV-TR presents these five subcategories of diagnoses.

Autistic Disorder –Asperger's Disorder –Childhood Disintegrative Disorder (CDD)  
–Rett's Disorder –Pervasive Developmental Disorder-Not Otherwise Specified

(PDD NOS) These five disorders are listed under the heading *PDD* or *Pervasive Developmental Disorders*, which is the classic umbrella term for autism spectrum disorders that was first used in the 1980s. The term *pervasive* indicates that a child's overall behavior and development is affected. The term *developmental disorder* indicates that there is a disordered or disorganized way in which a child is developing.

At the time of diagnosis, you may hear both the terms *PDD* and *ASDs*. Don't be confused by these terms, as they are often used interchangeably. The term *ASDs* is used in this book because it is more current. Each of the five disorders has its own set of criteria, and yet all of them fall under the heading of *PDD*. All of them share a common "triad of symptoms." No matter which diagnosis a child receives on the autism spectrum, a child with an *ASD* displays examples of the following behaviors to some degree before the age of three:

1. **Qualitative Impairment in Social Interaction** *What this means:* While typical children show an intense interest in other children, children with *ASDs* often show an intense interest in objects. Compared with typical children who play together at the playground, children with *ASDs* will be noticeably solitary and detached, often engaged in repetitive, odd behaviors. Toddlers with *ASDs* don't use body language to indicate what they want; they don't point or reach their arms up to indicate they want to be picked up. Nor do they share what they're doing—you won't hear "Watch me!" from a child with an *ASD*. Other signs of social impairment include little to no eye contact, flat or unemotional facial expressions, and no real sense of empathy toward others. "*Most children come into the world set up to be experts on people,*" states Dr. Fred Volkmar, Director of the *PDD* at the Yale Child Study Center, "*but children with autism don't have this. They're set up to be experts on things, their inanimate environment.*"

2. **Qualitative Impairments in Communication** *What this Means:* Children with *ASDs* may have no speech, delayed speech, or idiosyncratic or repetitive speech. It has been estimated that 40 percent or more of children with *ASDs* do not speak at all. Those who can speak may be unable to initiate or hold a two-way conversation. Another sign of communication impairment is being unable to engage in make-believe play, which involves nonverbal communication (e.g., extending the arms out to the sides while pretending to be an airplane) and verbal communication (e.g., making airplane sounds). "*All children and adults with autistic disorders have problems with communication,*" states Dr. Lorna Wing.

*“Their language (that is grammar, vocabulary, even the ability to define the meanings of single words) may or may not be impaired.*

*The problem lies with the way they use whatever language they do have.”*

*3. Restricted, Repetitive, and Stereotyped Patterns of Behavior, Interests, and Activities* What this means: Children with ASDs may obsess about a certain topic (e.g., trains or bus schedules) or object (e.g., piece of string or bottle cap) to the point where nothing or no one else seems to exist.

They may have a tendency to fixate on a specific routine or ritual (e.g., touching each wall of the bedroom before bedtime), have stereotyped or repetitive actions or movements e.g., hand flapping, now known as *stereotypies*, or fixate on parts of objects (e.g., wheels of a toy car). Ing.

Children also may have heightened sensitivities to certain sounds, sights, smells, tastes, or textures (e.g., insisting on wearing only certain clothes or eating only certain foods). *“Stereotypies are not just present in movements, but also in thoughts, and hence can be invisible,” states Uta Frith, Professor of Cognitive Development at the Institute of Cognitive Neuroscience at University College, London.*<sup>5</sup> (Exkorn, 2005, pp. 17-18)

Problem statement

The ASD children need to go to the hospital and they need to comply with some rules in order for the investigations to be carried out successfully. Unfortunately, not during all imaging investigations ASD children comply. Most of them trigger specific reactions to children, making them totally unable to cooperate.

Maybe cognitive behavioral therapy could help the children with mild autism.

### **“What is Autism Spectrum Disorder?”**

ASD is a developmental disorder characterized by marked engagement in repetitive behaviors, deficits in the ability to freely communicate and interact socially with others. Individuals with the disorder tend to also have restricted interests and a combination of these symptoms often impact an individual’s ability to manage their daily life.

## **Benefits of Cognitive Behavioral Therapy for Autism**

### **Reduce anxiety in patients with autism spectrum disorder**

Anxiety is a common and impairing problem in those with autism. Many patients with autism will also receive another diagnosis, with several medical conditions linked to the disorder.

According to a study by researchers at York University, about 70% of children with autism will face some form of emotional problems. Approximately half of these children will have anxiety and 25-40% percent will experience anger or depression. Furthermore, the study found that CBT helped patients with autism to cope with, and manage, not only their anxiety, but also any additional emotional issues they experienced.

### **Help Patients Handle Stressful Situations**

Children and adolescents with autism may have difficulty handling stressful situations. Cognitive behavioral therapy is recommended for children with mild symptoms of autism. The therapy aims to define the triggers of certain behaviors, so the child can identify the scenarios themselves. For instance, when children learn the practical responses needed for a certain situation, they will also learn to cope with any accompanying anxiety and fear. As a result, they can reduce negative thoughts and swap them with positive ones.

### **Help Individuals to Change Maladaptive Beliefs**

Those with autism may show maladaptive beliefs, which can be defined as beliefs that are false or irrational, including negative thoughts. Some of these beliefs include “all or nothing” thinking. This unhelpful thinking style is also called “black and white” thinking, wherein the patient thinks about the extremes of a situation. For instance, if a patient thinks about their ability to complete a task, they might say they’ll do really well or terribly.

Another negative thinking style is when the patient generalizes everything based on a single event. If an individual with autism fails a task, they may believe that they’ll fail any other tasks they’re set. Lastly, personalization is a negative thinking style wherein the patient blames themselves for something that was not completely their fault. Cognitive behavior therapy has been found to be effective in addressing these thinking styles in those with autism. Cognitive behavioral therapy has been present since the 1960s, and it’s still being used until today. Aside from mental health issues,

CBT has been proven to be effective for children and adolescents with autism” (Betsaida, 2019).

### **Analysis of Results**

I tried to make an analysis, studying for one year the situation in the Department of Radiology, at the Clinical Hospital of Children, St. John, Galati.

There are four type of investigations that can be carried out there.

1. Radiography;
2. Ecography;
3. CT;
4. MRI.

While the first three require the patients to stay still and cooperate with the doctor for just some minutes, up to 10-15, the MRI investigation is more complex and it can take one hour.

I conducted a study of 45 children, through the direct observation, who came during a year for these three types of imagining investigations. The duration of the investigation determined their reaction, half of them cooperated well with the doctors when radiographies, CTs and ecographies needed to be carried out, where the investigation didn't take more than ten minutes. Concerning the MRI investigation, that take up to one hour, half of the children, 50% needed to be sedated with melatonin, while 30% required general anaesthesia, 20% managed to comply while the parents sang to them, or they stood awake a night before the investigation.

### **Conclusion**

While the three imagistic investigations: radiography, CT and ecography could be carried out successfully without sedation or anesthesia, the fourth, MRI investigation, needed both types of intervation for making the ASD children comply.

I consider that through the non-invasive methods like psychotherapy and through cognitive behaviour therapy the children with mild symptoms of autism can be convinced to be investigated successfully, at the MRI department.

## References

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