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A General Overview of the Pragmatic Language-Social Skills and Interventions for Children with Autism Spectrum Disorders

Dimitrios Papadopoulos[1,2,3]*

[1]Greek Association of Mental Health for Children and Adults (PEPSYPE), Athens, Greece
[2]Academic Director of MSc School Psychology Program and Senior Lecturer Aegean Omiros College, Greece
[3]Associate Lecturer Canterbury Christ Church University, UK

Abstract

Autism Spectrum Disorder (ASD) is a severe neurodevelopmental disorder, whose symptoms are usually identified early on in childhood and remain present throughout one's lifetime, affecting the daily functioning and well-being of individuals with ASD. Impairment in social communication and behavior, in imagination and symbolic representation, as well as the tendency to maintain strict routines has been pointed out as the basic clinical features. The quality as well as the intensity in the expression of these symptoms are influenced by age and developmental changes, by the growth of intelligence and by resilience levels, as well as by early diagnosis and the intervention's beginning, by the role played by family and parents in handling trying behaviors, as well as by choosing the appropriate educational environment, which should be adapted to the cognitive and socio-emotional needs of students with autism.

This paper aims to review the psychological features creating the core of this disorder and leading the child to express autistic symptoms and mental arrhythmia. Particular attention will be paid to examining the pragmatic language and the communicative-social skills displayed by children suffering from autism spectrum disorders. Moreover, another important target of this paper is to connect theory with psychological practice, as well as to promote knowledge for psychologists, child psychiatrists, special teachers, speech-language therapists and parents, so that they can apply appropriate interventions, which have been found to be effective on the verbal, social and behavioral difficulties that children with ASD are facing.

Keywords: Autism spectrum disorders; Pragmatic language; Social skills; Development; Treatment intervention program

Introduction

Autism is a lifelong and severe developmental disorder. The references made by Kanner and Asperger remain pertinent to this day, as they describe comprehensively the symptomatology of the autism and they pose common issues on its nature, as regards communication particularities, social adaptation and the tendency for loneliness, noting however that autistic children's loneliness can be placed in a mainly psychological level and less on a physical-bodily level; moreover, it should not be confounded with the shyness and timidity manifested by children with typical preschool development, in which case it is something than can be expected of their age [1].

The term pervasive developmental disorder used in DSM-IV refers to the complex structure of the disorder, as it affects three main developmental areas: social interaction and communication, behavior and imagination, or symbolic play. These three areas form the triad of these disorders, meaning the core of the clinical features of autism [2-4]. According to Wing, difficulty in social interaction and reciprocity is linked to difficulties in verbal and non-verbal communication, in imagination and pretend play. This tendency that children and adults with autism have to insist in the 'real or literal level of a situation' and their weakness to engage in symbolic thinking and representation is linked with rigid thinking and behavior, stereotypes and repeated interests, as well as with their weakness to conquer the skills of the theory of the mind [5].

The early identification of autism symptoms in a child before the age of 36 months, constitutes an important diagnosis criterion, as well as a positive predictive indicator for the disorder's course and outcome [6-9]. The child's timely introduction in an early treatment intervention program can have positive effects on a developmental period where the brain is characterized by plasticity and has great capacity in learning new information and behaviors [10,11]. In clinical and school action, we often encounter cases of children diagnosed with ASD at a later age, at 5 years old for instance, or upon entering the schooling context (like kindergarten) because that is when children are required to socially interact in same-age groups and adjust their social behavior. This means that they need to be exposed to complex social, communicative as well as verbal skills. It then becomes evident that they are considerably lacking in these skills when compared to the mean average of their schoolmates. Subsequently, autistic children adopt strange and unsuccessful approach attempts, which lead them into further social isolation and they perceive themselves as 'different' or 'problematic'.

In the 5th revised version of DSM-V the 'pervasive developmental disorder' diagnosis category has been replaced by the 'autism spectrum disorder', which is considered a unified disorder with a common group of symptoms (social communication and stereotypes or repeated interests or routines), whose gravity is divided in subcategories according to the individual's degree of support and autonomy [12]. These changes in the revised version give rise to certain important issues: according to clinical experts and researchers, the new DSM-V criteria are very narrow and they could lead to the exclusion of some people from being diagnosed with ASD, therefore excluding them from access to mental health services, or the right choice of school context and psychoeducational interventions for students and for their parents [13-

***Corresponding author:** Dimitrios Papadopoulos, Greek Association of Mental Health for Children and Adults (PEPSYPE), Athens, Greece, Tel: 30215-5107708; E-mail: info@pepsype.gr

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15]; the clinical usefulness that the diagnosis of social communication disorder and of the repercussions that this diagnosis could have to the receivers of mental health services has yet to be clarified; and, finally, some reservations have been expressed as to the fact that Asperger disorder has been excluded and that it has been incorporated in autistic disorders without any notes or some discernible-different factor (like normal intelligence, adequate verbal skills) [16-18].

An important issue rising from the conceptual delimitation of autism and its diagnosis criteria is their consequences on epidemiological data. The frequency of ASD among the general population has grown considerably over recent years [19-22]. This find can be attributed to the use of more credible diagnosis methods, to environmental factors (like environmental pollution, exposure to lead, mothers smoking during pregnancy) as well as to the sensitization of parents, teachers and pediatricians on issues pertaining to the development of children and to special education services [23]. Many cases of research have delved into the possibility of a connection between the increasing prevalence of ASD and the increasingly late age of parenthood. In most cases, it was found that the mother's older age was independently positively linked to the risk of a child being born with ASD, while other research cases have found a weak or no association [24,25]. The father's age has been investigated to a lesser degree and it has been mostly linked to other serious neuropsychological and childhood psychiatric disorders, as well as with problems in the infant's general health. The lack of consistency among these studies could be attributed to the limited sample size as well as to other methodological differences, including: a) the criteria for including children in autism as well as the gravity of the disorder b) whether the mother's age has been correlated to the father's age and c) whether the mother's age has been examined as a continuous or a categorical variable [24].

According to recent epidemiological research, the prevalence of this disorder ranges between 0.07% and 2.64%, while the frequency of its manifestation shows that boys are diagnosed with autism approximately three to four times more often than girls (1:42 in boys as opposed to 1:142 in girls) [19,20,22,17]. According to the research data by the US Center for Disease Control and Prevention the estimate percentage for children with ASD appears to be on the rise for 8-year old children, and for the year 2012 it was 14.6 out of every 1,000 children, compared to 14.7 out of every 1,000 children in 2010, 11.3 in 2008 and 9.0 in 2006 [26-30]. In the United Kingdom, it was found that out of a sample of 7,461 adults, 9.8% was falling into the ASD criteria

Recent research supports a strong connection between the DSM-IV & DSM-V diagnosis criteria. More specifically, when the DSM-V criteria were applied on individuals assessed through DSM-IV, it was found that a high percentage continued to fall into these criteria and to be diagnosed on the autism spectrum [31].

Early signs of autism

Modern research in developmental psychology and psychopathology for infants and toddlers concentrates on the first emotional interactions in the mother-infant relationship, which appear to be influencing the development of communication, language and cognition with the broader environment in general. The need manifested by infants with typical development for intersubjective communication is present from the moment of birth [32]. It first becomes evident in the cognitive field of infants and it takes place through eye contact, sensory perception, imitation of sounds and expressions as a result of the primordial relationship that the infant develops with the mother [33-36]. It is therefore understood that this mutual synchronization of communication constitutes a unique human attribute, not only because it assists the development of language and the promotion of speech, as well as because it also organizes the notion of knowledge for the world and it promotes cognitive and social development. Numerous studies support the existence of these innate signaling and communication mechanisms (such as crying, smiling, imitating) from the onset of childhood, and these mechanisms are linked to the subsequent skills for social communication and interaction [37].

However, some relevant findings in the field of developmental psychopathology also demonstrate the tendency that certain infants have for introversion, for very little communication with the mother or the significant others around them, and for aversion towards visual and bodily contact (like caresses, hugs, etc.) [38]. Tracing these forms of anguish on relationships can be placed within a context of behaviors pointing to the fact that the infant avoids relationships [39]. These behaviors are expressed through disorders in visual contact, in hearing, in static-kinetic and cognitive-emotional coordination. At the same time, these indications can be considered as precursors to autistic disorder, as these early cases of autism are set apart from other disorders in relationships or in psychological evolution.

Some typical mental expressions which worry parents with 12-month olds are: the lack of focus in the infant's gaze and the inability to imitate facial expressions, the absence of response to hearing their name, which is often accompanied by a feeling of 'deafness' of the infant and c) the deficiency of harmonization with the mother's embrace, which is a situation combined with lack of emotional proximity. All these indicative difficulties emanate from a failure to achieve the brain's innate and basic structures for neuropsychological maturity and conscious action. This evident tendency that the infant has to distance itself from communication and contact has secondary consequences in the rhythm of emotional stimuli from the mother and father towards the infant and in their interaction, and this creates long-term consequences in all developmental fields [40].

It is hard to fully interpret whether children on the autism spectrum withdraw deliberately from people, or whether it appears that way because they do not know how to form a relationship with others and they are instead occupied with the stereotypes that absorb them. Nor is it confirmed whether these stereotypes are employed to do good, in terms of having an unconscious, secondary benefit for the Self (maybe because they offer something predictable inside an unpredictable world), or as a means to seclude themselves from others. It is of course ascertained that the response of children towards their environment is improved with the increase of emotional interaction in the parent-infant relationship and with the decrease of anxiety and defense mechanisms emanating from early mental functions.

Developmental and psychological perspectives of autism

Children with ASD face impairment in multiple areas of development. This impairment is subject to maturing procedures, affecting overall daily functions including social relationships and school performance. For autistic individuals, development does not follow a consistent rhythm. Lack of homogeneity in mental functions provokes asynchronous development, which is a basic characteristic of children on the autism spectrum, leading them to express symptoms in a unique form. These symptoms are not interpreted as paradoxical or enigmatic; instead, they are integrated in the child's existing developmental and psychological dysfunction

For instance, how a child plays is assessed in relation to his/her age and developmental stage, as it is enriched or transformed through

the course of time. A 7-year old child with autistic symptomatology can engage in parallel and peer play in the same manner as a 2-year old. However, the same child can have very good memorizing skills and poor social understanding skills. In that case, the function of peer play and pretend play appears more slowly and at a later time, when compared to what would be expected based on that child's chronological age. At the same time, memory skills follow typical development levels, while social understanding skills are behind, when compared to the child's age. Moreover, it is possible for a 6-year old autistic child be physically developed according to its age, but so show the cognitive age of a 4-year-old, the verbal development of a 3-year old and social skills corresponding to infancy. This asynchrony in the development of inter individual functions has triggered the researchers' and clinicians' interest in order to quest for a deeper understanding of the cognitive and psychological mechanism which organizes this disorder's symptoms

A basic characteristic of children on the autism spectrum is lack of the ability to understand other people's thoughts, feelings and communicative intentions, as well as a weakness to put themselves into the other person's place [41-46]. According to the theory of the mind, these features are explained by the weakness of persons with ASD to acquire social cognition and metacognitive theory in order to successfully understand, as other people do, their own and other people's intentions and thoughts. This skills deficit in the theory of mind can explain some of the difficulties in communication, in representational thinking, as well as some behaviors of autistic children [47-50]. At school, it is common for an autistic child to manifest what is 'strange behavior' according to the classmates, due to the literal understanding of verbal behavior at each time, and due to the weakness in understanding the interlocutor's communicative intentions. For instance, if the teacher asks the autistic child 'Can you open the window?' on a hot day, the child will reply 'yes' concerning the literal dimension of the question, gut it cannot 'read the mind'- therefore, it cannot recognize the teacher's intention and request, which was for the student to open the window himself/herself.

The quality of cognitive and social development in autistic individuals depends heavily on their ability to focus their attention as a whole. This characteristic has been linked to the weak central coherence theory [51,52]. According to this theory children with ASD are able to perceive the other person's literal perspective (what the other person can see) although this does not happen automatically, but at the same time they cannot grasp the other person's mental perspective (what the other person knows or understands). These children's difficulty to function with converging, combined and reciprocal attention gives a parallel perspective to understand the facets of cognitive dysfunction, favoring fragmented instead of holistic elaboration (and with an actually limited ability to hierarchize the relevance in details). Autistic individuals fail to comprehend the total context of information and their attention focuses on details. They therefore have a very fragmentary knowledge on their environment [53,54]. Within this context, it can be explained how numerous persons on the autism spectrum are skilled in certain activities, like puzzles, memorizing numbers, routes and symbols. They can also remember every detail of a video and they can recite parts of it, without however being able to generalize and understand the information they convey.

The thinking of autistic children is characterized by rigidness and difficulty in finding and adopting a solution which is different to theirs [55]. Another basic feature in their thinking is the difficulty to comprehend metaphors and symbolic thinking, or to understand a mental condition in a symbolic manner. Usually, the play of autistic children is dominated by repetition, lack of imagination and functional use of their toys [56]. For instance, a 5-year old with autism can categorize his or her toys by size, shape, color and cognitive group (like animals, plants, family, persons, vehicles), but the child cannot symbolically combine these objects in symbolic play or in pretend play, as its thinking lacks post-representational ability, creativity and flexibility, when compared to the thinking of typically developed children, as well as with children with other mental disorders [57].

High-functioning autistic children express joy, fear, anger and other mental states, but they are often outside the wavelength of social expectations [58,59]. Although the social inadequacy of autism is evident, the tendency of children to 'shut down' within themselves lessens with age. Moreover, experience (learning) as well as the participation in a therapy program and in the appropriate school context contributes considerably to the improvement of social behavior, meaning that autistic children, when given the right support, become more integrated in social requirements [60-62]. The lack of appropriate emotional participation and responsiveness by the child in dual and much more so in social situations, is a particularly painful reality for the family having an autistic child, as well as for his/her peers at school. Children with high-functioning autism (IQ>70) can conquer the notions of socio-emotional interaction in a better pace, compared to children with low functionality autism and mental retardation, but they still have considerable difficulty in spontaneous communication and psychosocial interaction with same-age children at school or in extracurricular activities. Moreover, they do not feel the genuineness, extent and depth of friendship, as they tend to evaluate as friends the people who satisfy their needs or who are being friendly to them [57-61]. The social and emotional development of autistic children presupposes the intention to communicate and participate in verbal conditions, as well as the development of an understanding for other persons' intent and thinking, in combination with post-representational, metacognitive and symbolic skills.

Pragmatic language and social skills in children with autism spectrum disorder

Language is a socially accepted code between humans, whose primordial aim is to communicate, represent and transfer thoughts and feelings about the world. In this light, language cannot be studied separately from social communication, social cognition and social skills [63-65]. For Vygotsky, language is the mediation tool par excellence which promotes the child's learning and development, while for Piaget language is the function through which the infant and child act on the object, meaning on their environment, thus promoting cognition [66-68]. The systematic study of language is imprinted in the basic recognition of its subsystems: the phonetic, semantic, syntax and pragmatic system.

Divergence in the development of pre-verbal and verbal communicative skills and behaviors is a typical symptom of individuals falling into the spectrum of autism, while some individuals with ASD develop insignificant verbal communication [69]. The language subsystem pertaining to the social use of speech, aiming at communication, is pragmatics, which seems to be lacking in autistic individuals [70]. Pragmatics examines the use of language as a social condition, as social behavior and as social communication [71]. The use of language as a social condition refers to the use of social context and to the identification of the speaker's intentions, desires and communication strategies; it is linked as social behavior to the manner in which it is being used in different communicative needs, and as a social communicative

intent, it refers to the pertinence of a person's communication with others. Pragmatics can be characterized as preverbal and it pertains to the infant's initial communicative actions with its environment and caregiver (mother) which take place through focusing attention on a person or an object, and the sequence of gaze and gesture, as non-verbal, pertaining to communicative skill and interaction before the expression of language, like body posture, responsiveness to linguistic, sensory and emotional stimuli, body posture denoting proximity. As verbal, pragmatics pertain to the appropriate social use of speech in different social contexts and conditions [72,73]. At that stage, the person aspires to transmit ways of thinking through speech, to make ascertainments and to inform, while oftentimes, language is used to express wishes or commands, to judge or approve individual behavior, that is, to give rise to emotions or actions. In order to be successfully completed, many of these language actions presuppose the child's ability to understand literal and metaphoric speech, humor, rhetorical questions, as well as more complex skills, which appear to be linked to the abilities of the theories of the mind [74].

The most common pragmatic difficulties encountered in literature and clinical practice concerning autistic children consist in the beginning of making conversation, in pursuing a discussion subject and in alternating between the series of speakers. Other difficulties also include greetings, the expression of wishes and emotions, asking for something, narrating, verbal obsessions, lack of politeness, excessive timidity, lack of knowledge on someone's position and role. It is interesting to note that some studies claim that children with autism use language more in order to handle their interlocutors and less in order to communicate with them [75,76].

Numerous studies maintain that there is a strong association between verbal pragmatism, social skill and the theories of the mind, given that the use of language is not conceivable outside the social context. This happens because through social speech, persons communicate their thoughts, concerns, requests, feelings, they attribute intentions and wishes to their interlocutor, they represent the other person's mental state and they promote knowledge about themselves and about their thoughts. Failure of children on the autism spectrum to correctly use language in social action-they tend to participate in a discussion without waiting for their turn or without taking into consideration the subject, while actually giving irrelevant information-leads to communicative failure which is likely to influence the pace of social interaction and to lead the autistic child to use unacceptable or paradoxical forms of pragmatic behavior.

Children with ASD fail to convey their thoughts through speech, as these thoughts remain exclusively egocentric and unrelated to conscience and external reality. Pragmatic disorders in autism are characterized by this tendency for superficial interest in communication. However, the child does not feel the need to act upon the interlocutor, to teach him/her something or to listen carefully to the verbal messages of a conversation. This phenomenon has been characterized as collective monologue and according to Piaget it leads the person to develop autistic thinking, meaning a flat way of thinking, based solely on egocentric reasoning and depriving that person of communicative action or emotional interaction [77]. In its modern version, Piaget's term autistic or egocentric thinking appears to share some semantic elements and features with the ascertained pragmatic and social difficulties that autistic individuals experience in order to conquer the theory of the mind.

Despite our limited knowledge on the pragmatic skills of autistic teenagers, some important differences have been mentioned in research and clinical studies, such as: poor discussion capacity, unusual prosody, poor reciprocity, often prompting towards the interlocutor and unstable eye contact. Depending on the degree of their disorder and their functionality level, individuals with autism are lacking in differing degrees and in differing skills within the realm of pragmatism and their social skills [78].

Effective interventions for children with autism spectrum disorders

Dealing with ASD though established treatments is a challenge and it has occupied scientific interest for many years now. Systematic research on the etiology behind autism has decisively influenced psychological practices as well as the design of valid, effective and proven therapy interventions, clearly aiming towards improving behavior, communication and social skills [70,79,80]. The different approaches in dealing with autism spectrum disorders reflect the different theoretical base under etiology and interpretation. Although autism cannot be cured, at least with today's givens, there are methods which can help with children's verbal and socioemotional development, while timely diagnosis and early intervention on children under 3 years old can ensure greater and quicker chances for improvement in verbal and social behavior [81-84]. Applying these interventions is the final stage of therapy design, which requires a detailed and individual assessment on communication, behavior, intelligence and functionality levels, as well as realistic goals on possible treatment effects [85]. Further, the implementation of appropriate interventions can help persons (e.g. teachers, students, parents and mental health practitioners) to improve positive their social perceptions to issues related to disability [86]. This article chose to present established and evidence-based interventions [87], in which research as well as clinical data is proven to be effective for autism [88].

Applied behavior analysis

Applied Behavior Analysis (ABA) maintains that behavior is largely formed by its results and that the increase of positive consequences (in behavior) promotes learning and therefore development. According to behaviorists, autism is considered a disorder characterized by deficiencies in communication, social skills and behavior. Applying techniques and principles from behaviorism is particularly popular within the context of a global therapy approach, independently of each program's philosophy. The detailed observation and the assessment of the child's behavior and conditions of its environment offer the basis from which one can design an intervention. Behavior modification takes place through teaching some specific and clearly defined behaviors in a systematic manner, and within a context which is dominated by repetition and which promotes learning [89].

The basic method utilized by the ABA is the discrete-trial teaching which includes five steps: a) focusing the child's attention, b) the presentation of the distinctive stimulus by the therapist, c) the child's behavior, d) the attribution of positive or negative consequences according to behavior and e) the interval between systematic teaching attempts. For instance, in order to improve a skill, like communication or speech, the therapist follows a behavior plan, based on teaching this skill in small subsections with clear, measurable goals. The ABA therapist offers positive reinforcement after each response or interaction from the child, while negative behavior has consequences, like shortly stopping the activity and returning to teaching the same skill, until the child acquires positive connotations and the skill can be performed in a repetitive manner [90].

Many research studies have found ABA interventions to be particularly effective in developing speech and social skills, in improving the child's behavior and in reducing parents' anxiety, teaching them appropriate ways to handle their children's behavior [91]. Eleven intervention studies which took place between years 2000-2015 were chosen in order to assess the effectiveness of the intervention programs applying the ABA to young children. The criteria behind the selection of the research in question were that the age range should not exceed 66 months, the interventions' duration should not exceed 37 months and the interventions' intensity should not exceed 40 h per week. Research cases which did not follow the ABA principles and practices, as described in the manuals of Lovaas [90] and Maurice et al. were excluded [92-98].

The research findings, as presented succinctly in table 1, manifest that after the completion of the interventions, considerable improvement was noted in speech and communication skills, in cognitive ability and adaptability for the group participants who received the behavior treatment, as opposed to the control group. Although one case of research was not statistically different in its measurements following the

ABA Intervention Studies	Sample		Frequency and Duration	Measurements	Outcomes
	N	AGE			
Smith T, et al. [78]					
1. Intensive Behavioral Treatment	15	36	24-25 hours per week/33 months	Cognitive, visual–spatial skills language/ academic	1. Intensive treatment > parent training
2. Parent Training	13	No Child			2. Improvement of IQ
					3. 4 children with full school integration
Boyd RD and Corley MJ [79]					
ABA	22	41	30-40 h per week/23 months	Language Behavioral	1. 4 children integrated in school with support
					2. Improvement in communication
Eikeseth S [80]					
1. Intensive Treatment	13		28 h per week/12 months	IQ	1.Intensive treatment in all measures > eclectic group
2. Eclectic Group	12	66		Language	
3. Parental involvement				Adaptive skills, and Behavior	2. Eclectic group showed better scores in socialization.
Howard SJ, et al. [81]					
1. ABA Treatment	29	37	30-40 h per week/14 months	Cognitive language and adaptive skills	1. Behavioral > eclectic in all measures.
2. Eclectic Treatment	16				2. Eclectic group showed better scores in motor skills
Sallows GO and Graupner TD [82]					
					2. 8 children with full school integration and 3 with support
Remington B, et al. [83]					
1. ABA Treatment	23		25 h per week/12 months	IQ	1. ABA Treatment in all measures > Comparison group
2. Comparison non-ABA group	21	<42		Language	2. Positive impact for family members
3. Parental Involvement				Adaptive skills	
				Behavior Check list	
Hayward D, et al. [84]					
1. Intensive ABA Treatment	23	35	36 h per week/12 months	IQ	1. Improvement in both groups
2. Parent Treatment (supervision only)	21			Language and Adaptive skills	2. No significant differences between the two groups on any of the measures at follow-up
Kasari C, et al. [85]					
1. ABA Treatment	38	30,8	2 h per week/8 weeks	Focus attention and Communication skills	1. Greater focus attention between caregiver and child after the intervention
					2. Maintenance of these skills 1 year later
Carter AS, et al. [86]					
1. ABA Parent-Child Intervention	48	20	1 group session with parents per week × 8 weeks, and 3 at home individualized sessions for parent and child	Communication skills Parent-child relationship	1. Treatment effects were noted on child communication and parental responsivity
Rogers SJ, et al. [87]					
1. ABA Brief Parent Training (B-ESDM)	98	21	1 h week × 12 week	Play	1. No treatment effects on parent-child interaction nor improvement in development or ASD symptoms.
				Communication	2. Both groups showed improvement related to hours of intervention.
				Parent-Child Relationship	
Kasari C, et al. [88]					
1. Parent Training Behavioral Intervention (JASPER)	86	22-36	10 Weeks	Focus attention	The JASPER intervention was found to have significant effects on joint engagement and attention

Table 1: Selected Applied Behavioral Analysis (ABA) intervention studies participating children aged <66 months (2000-2015).

completion of the treatment, some qualitatively positive differentiation was noted in the child-parent interaction, taking into consideration the program's short duration and the fact that the intervention was implemented by the parents, as a form of parent training. It is worth noting that the selective intervention studies addressed some crucial findings: a) the actual commitment and involvement of parents is a considerable supportive factor for the interventions' effectiveness [97], ABA intensive interventions are more effective than classic ABA intervention, c) eclectic therapies administered to control groups were less efficient than the ABA intensive interaction interventions.

One limitation in the ABA treatment is the fact that one can note a slight generalization of the skills that children have been taught outside the context of therapy.

For instance, children with autism following the ABA can learn to use speech for functional purposes (in order to answer to questions), but this skill does not appear to have been established in social conditions which presuppose spontaneous communicative intent and social interaction. It is therefore proposed to enrich the therapy program with intensive interaction activities, oriented towards child-therapist interaction; the program must be applicable to the child's natural social environment (home, school) and include people other than the therapists but equally important in the child's life (same-age children, siblings, parents). Through this eco-systemic perspective in the child's therapy, the generalization of taught skills may be promoted in a more immediate and swift manner [99]. The child and parent motivation to continue the therapy effort is reinforced, thus setting higher targets for the long-term, so that the child can be led in a higher zone of proximal development than the one currently established.

Modern and post-modern ABA approaches have been influenced by new behaviorists and by the rapid development of cognitive-behavior therapy (CBT). They gradually transfer the weight of the intervention to the child itself, to its spontaneous initiative for communication, while gradually integrating higher level cognitive skills, including the resolution of problems, managing one's self, auto-reinforcement and verbal expression, aiming for emotional exchange [100]. After having conquered the aforementioned basic targets, skills which are more advanced in the developmental scale are being taught, such as socioemotional interaction, the ability to learn through observation, cognitive flexibility, self-servicing and entertainment skills, as well as preschool activities promoting school learning. Research has found that these forms of teaching have better generalization percentages in their spontaneous use, while parents and children express more positive remarks on the overall intervention result.

However, it remains to be seen whether the implementation of the new CBT forms is as effective as classic ABA in low functionality children with increased support needs, and whether these results can be seen as fast. Over the last decades, specialized interventions programs have been designed, following the ABA philosophy and principles and incorporating other techniques, such as:

- Pivotal Response Training (PVT) which is a method presupposing parental participation and aiming to strengthen responsiveness in social stimuli through the increase of children's motivation and initiative [101],
- Social stories and narrations which train the individual to deal with social situations demanding interaction [102],
- Picture Exchange Communication System (PECS) using visual aids to assist communication [103],
- Self-management program which aims at the children's self-reinforcement [104] and
- Bright start program, aspiring to the cognitive development of young children with autism [105].

The TEACCH program

The Treatment and Education of Autistic and Related Communication Handicapped Children (TEACCH) program incorporates the principles of applied behavioral analysis, aspiring to a structure teaching of skills for autonomous work through environmental organization and visual support, which is the program's main teaching approach [106]. The TEACCH program follows a holistic approach in training children, promoting the view that there are many and differing needs in autistic individuals. These needs are related to differing paces in development, communication and knowledge generalization, and specialized support services are needed throughout these individuals' lives. Such interventions must be adapted to the person's and to the environment's needs and capacities and they must take into consideration the complex family situation of autistic individuals.

This model pays great attention to the cooperation between parents and therapists, between parents and the child itself, as well as to the parents' commitment throughout the intervention, as they undertake a co-therapeutic role at home and in their social interactions, aiming to benefit their child. The basic principle in this teaching program is to build important parameters in the lives of children on the autism spectrum, such as constructing their natural space, building their personalized daily education program, their personal work system and their educational activities [107].

The need for structure and organization offers to the individuals with ASD: a) consistency and predictability of events, so that the environment is understandable and the actions of the persons accompanying the child are visually organized beforehand, thus provoking less stress and uncertainty, b) established behavior which is socially acceptable, c) mobilization and self-reinforcement and d) increase of autonomy, which is finally achieved through gradually adopting functional forms of behavior Past and recent studies as well as data from clinical practices support the method's effectiveness after the introduction of a structured learning environment in teaching rooms or in individual children's sessions [108,109]. The effectiveness of the TEACCH method requires that the ensuing research efforts include appropriate control groups, in order to check whether the improvement of the children having received this intervention is owed to this structured education instead of their developmental maturing.

The DIR/Floortime program

Although the active participation of the parents in the therapy process of children with ASD is a priority in all the aforementioned approaches their role in therapy is more oriented towards generalizing the knowledge they have acquired through repetition. The Developmental Individual Difference Model DIR/Floortime program was developed by Dr. Stanley Greenspan, according to whom the cognitive and socioemotional development of all children, including children on the autism spectrum, is achieved and promoted when caretakers acknowledge the individual pace in their children's development and the need to approach them at their own level [110]. According to this model, child development is characterized as a developmental ladder, where children are led to important landmarks, which are necessary for their cognitive and socioemotional development. These landmarks are:

a) autoregulation and interest in the world, b) devotion and commitment in human relationships, c) reciprocal communication, d) a sense of self, emotional regulation and problem resolution, e) expression of logic through symbols and f) emotional thinking and rationale.

The transfer of this approach in action is achieved through the parent-child relationship which promotes the intensive emotional interaction and takes place on the floor, with child play as the main material and tool, so as to promote this kind of emotional exchange. The child-parent interaction is favored for at least 8 times per day, at least for twenty minutes at a time. The basic philosophy behind DIR is that through a relationship of safety, interaction is encouraged, when the parent respects and participates in the actions and activities that interest the child. The choice behind the games is not random, but properly coordinated to the child's developmental level, to the level of its mental maturity and ability for functional or symbolic play. The therapists start by training the parents in steering their children from the simplest towards the more complex interactions. The DIR developmental stages include observing the child's actions, recognizing the child's emotional tone and gestures in communication, encouraging its sense that its actions create feelings within the parent, and the child's ability to close the circle of communication that was formed during the DIR play activities [111].

This method's effectiveness has been researched over the past few years, and important findings have supported the view that it is an appropriate therapy method, with short-term and long-term benefits. Greenspan and Wieder have examined the method's effectiveness on 200 children with autism having differing functionality levels, and who attended this therapy for at least two years. More than 50% of the children acquired very important benefits from their therapy in the fields of socioemotional skills, cognitive development and academic success at school. Moreover, these benefits were associated with the minimization of isolation and repetitiveness behaviors, as well as with the minimization of autistic symptomatology on the CARS scale. A follow-up study undertaken 10-15 years after the completion of this intervention studied 16 children and it was found that the therapy's benefits were still evident after the course of time, while this particular group of children still had no deficiencies and symptoms, or at least manifested very few traces of ASD [112]. Future research should integrate stricter criteria as to the control groups and as to whether the DIR as a main therapy treatment could be as effective in the course of time without the parallel use of other therapy programs (as ABA).

Programs emanating from a similar philosophy, focusing on the parent-child relationship, such as the Parent-Child Interaction Therapy (PCIT), have been applied on children with ASD and the research results were equally encouraging [113,114]. From a clinical point of view, shifting the weight to therapy approaches which use play as their main tool, utilizes the dynamics in the parent-child relationship, in order to transfer the child from a mental state of minimal ability to play, and therefore to think symbolically, into a situation where the child manages to do better and bridges the gap between its introverted and arrhythmic mental state and its communication with the outside world.

Conclusion

Children with ASD exhibit extensive and lifelong impairments in pragmatic language, social communication, repetitive behavior and psychosocial adaptation. Firstly, therapy interventions must be preventive for infants and young children with behaviors veering towards avoiding relationships and communication and therefore liable to manifest ASD. In older children and young adults with established autistic symptomatology, the interventions aim to reduce mental dysfunction and to increase adaptability in the school, academic, work and familial environment. A well-designed treatment approach on an child with autism is effective when it is individual, according to the child's age and developmental level, when it realizes the child's psychological dysfunction and problematic behavior within the context of an eco-systemic thinking, which incorporates the family, school and broader social context of everyday life, in which the child will be called to interact.

The assessment of the person and family's mental and functional state, the understanding of the psychological mechanism in which symptoms are organized and the definition of the intervention targets, the special education and implementation of different approaches in different life stages, and the assessment of the factors influencing the therapy process, ensure a global and interdisciplinary approach. Numerous therapy approaches have been suggested in order to deal with autism and related disorders, but the assessment of their effectiveness remains open and under discussion. In the case of children with autism, applied behavior analysis (ABA), the TEACCH method, combined with parent training, as well as the inter-subjective and relationship-based interventions aiming to strengthen the bond between parent and child through play, have been found to be quite effective, as they offer a large range of application, promoting functional behavior, communicative capacity and social skills. Furthermore, medication treatment combined with psychological therapy is useful in controlling symptoms in case of teenagers and young autistic adults with severe behavioral disorders [115].

It is necessary for future research to carefully examine some important issues such as the long-term effect of pragmatics, behavioral and relationship-based interventions on children with ASD; the application of family therapy for adolescents with high-functioning autism; and finally, the need to develop assessment tools and appropriate interventions concerning pragmatic language and theory of mind for teenagers and young adults. Assuming that the disorder is slightly more prevalent with increased parents' age, future research should examine whether parents >35 years old, with higher education and financial level than younger parents can be indirectly led to be more sensitized concerning child development issues, and subsequently in receiving an ASD diagnosis [116].

Autistic individuals need an organized network of mental health services and specialized training, which would be capable to respond to their changing developmental needs through the lifespan. The effectiveness of these interventions is ensured when therapy design comes as the result of an integrated interdisciplinary assessment and focuses on the services required for each individual case [117].

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Author's Contribution

Dr. Dimitrios Z. Papadopoulos wrote the article and he is responsible for the data collection and for reporting the study results.

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