The Effect of Applied Behavioral Analysis on the Communication Skills in Children with Autism Spectrum Disorder: Perceptions of Special Educators and Psychologists

Rafaela Andreadi[1*], Garyfalia Charitaki[2], Spyridon-Georgios Soulis[3]

[1]Cass School of Education, AKMI Metropolitan College in Collaboration with University of East London, Athens, Greece
[2]Hellenic Open University, Patras, Greece
[3]University of Ioannina - Department of Primary Education, Ioannina, Greece

Abstract: The principal criterion of effectiveness of Applied Behavioural Analysis (ABA) in communication skills in children with Autism Spectrum Disorder (ASD) constitutes the focal point of this study. For this purpose, special educators' and psychologists' perceptions were collected and analyzed. The study was conducted through a qualitative approach. More specifically, semi – structured interviews were conducted. The interview design was based on the Curriculum for children with ASD. For the data analysis, thematic analysis was used. One of the main findings of the study is that ABA implements structured programs for teaching, which develop the basic functions of children's communication with ASD through joint attention, PECS and various other methods. In addition, it is shown that ABA programs are interconnected and each one applies a generalization of the taught skills. It is worth mentioning that the initial level of the child, the cooperation of the participants and the role modelling are of particular importance for the ABA programs. In conclusion, ABA is an effective systemic approach, which can cope with communication deficits holistically. The findings are discussed in terms of educational placement.
Keywords: Applied Behavioral Analysis, Autism Spectrum Disorder, communication skills, special educators, psychologists.

INTRODUCTION

This research proposal refers to the effect of Applied Behaviour Analysis (ABA) on children with Autistic Spectrum Disorder (ASD). Specifically, the aim of the research is to register the perceptions of special educators and psychologists about the effect of ABA on the communication skills of children, diagnosed with ASD.

During the early days that autism was diagnosed, it was perceived that those persons were not eligible for training, a perception that changed along the way, as several training programs were developed for children with ASD. The positive effect of many of these programs is doubted, due to missing research data [1, 2]. On the contrary, there are the programs based on behavioural approach [2]. The first applied behavioural analytical researches were conducted by Donald Baer, Montrose Wolf and Todd Risley, who disputed the medical establishment of the time and sought to treat severe and chronic disorders [3]. Ivar Lovaas, in the mid '60s, using Behavioural Analysis methods documented experimentally and systematically his own theories about autism destroying myths which claimed

that the above-mentioned children were unable to be trained in elementary skills. Ivar Lovaas has contributed to the creation of integrated psycho-pedagogical programs that contribute to the acquisition of elementary self-service skills up to full school inclusion [4].

Applied Behavioral Analysis is based on behaviorism and is commonly accepted as a complete and effective approach dealing with autism [5]. Its aim is to improve the individual's life through the analysis, understanding and prediction of behavior, while the main educational goals are to achieve spontaneous and functional communication, improved social interactions, improved playing skills with peers and cognitive skills [6]. Research in the past has dealt with the effectiveness of the method in the communication deficits of children with ASD, yet there is a lack of surveys on the special educators' and psychologists' perceptions who implement the program. The value of this research is due to its contribution to acquiring new knowledge on the subject and the documentation of pre-existing research. Additionally, the incentive to conduct the research is based on the researcher's personal

interest in the effectiveness of the ABA in these children and the view of those involved in the use of this approach, as ASD falls within its current and future interests. An important factor and motivation is the opportunity given to children with ASD, their families, teachers and the whole educational community to be thoroughly informed about the usefulness of the approach to the communication skills of children with this disorder.

The research is based on the research questions that have been set and summarized as follows:

- How does ABA influence the development of basic functions of children's communication with ASD?
- How does ABA affect the development of social communication of children with ASD?
- How does ABA have an impact on the development of non-verbal skills for children with ASD?

Theoretical Background

Autism is seen as a neurobehavioral condition, which involves difficulties in social interaction and communication development, combined with rigid and repetitive behaviors, interests and activities [7]. Difficulties, which are observed in people with ASD, have an impact on their social and professional lives as well as other levels of functionality [8].

The characteristics of autism are more apparent at the age of 2 to 3 years of the child and have been described as the triad of impairments, including social communication, socialization and social imagination and flexibility of thinking [11, 12]. Initially, in the disorder of social communication children in the spectrum of autism are divided into three categories, those who do not develop spoken words and express their needs with nods, those who develop oral speech, using echolalia and finally those who develop oral speech and use it almost physiologically [13]. In cases where children are not capable of developing the ability of speech, other communication systems should be taught [14]. In particular, their speech is characterized by echolalia, automatic or delayed, hyperlexia, neologisms, reverse use of pronouns, difficulty in tenses and words, strange use of metaphors and lack of understanding of humor, lower and exhaustive speech content, while language is considered specific with no hints. Furthermore, there is no voice fluctuation, lack of understanding of conventional phrases, lack of spontaneous speech, use of gestures and understanding of emotions and social norms as well as lack of understanding of reality [15, 1]. The main problem of children with autism is communication, focusing on the pragmatics of speech, which is distinguished in prelective, non-verbal and verbal [16].

Some of the therapeutic approaches proposed are TEACCH, PECS, MAKATON, ABA, speech therapy, music, medication and psychotherapy [17].

According to Gena [18, 19] in order for ABA to achieve positive impacts, a long, strictly structured and early psycho-educational intervention, with the involvement of experienced specialists and the family is required. According to its basic principles all children have the potential to develop cognitively, emotionally and socially, and the lack of progress is due to the inappropriate treatment of the child. It is acknoledged that each child is different, thus recommending the use of an individualized education program is recommended. Moreover, behavior is considered to be determined by its consequences and functional behavior analysis is a prerequisite for successfully coping with problematic behaviors that can retreat by acquiring new skills. In addition, it is claimed that the child's problematic reactions are acquired, human behavior is based on basic principles and that systematic and appropriately formulated treatment can present immediate and visible positive results, depending on the potential of the child [6]. Experts and parents need to be familiar with the basic methods used while the emotional and physical exhaustion they undergo must be prevented [54]. In particular, it is important for parents not to feel guilty about the temper tantrums and the social isolation of their children, while experts must set realistic goals achievable in the short term [5].

The basic methods of ABA, which are based on the educational program of children with ASD, are: the Discrete-trial teaching, which consists of concentrating the child's attention, presenting the distinctive stimulus, the child's response of the distinctive stimulus, the completion of the cycle by giving reinforcement or corrective feedback and the beginning of the next cycle [3]. The Shaping method, which teaches new response reactions, provides reinforcement for gradually successive reactions that progressively approach the final desired behaviour [20]. Chaining and task analysis, which is suited to learning multiple-stage reactions [21]. The method of Prompting and Fading help to avoid errors and to reduce problem behaviors [22]. The Token economy system is used to enhance the desired behavior. Fading of token economy system is as important as other forms of additional aid, without of course meaning the end of the ensuing reinforcement [9]. Additionally, Pivotal Response Teaching refers to the skills that children with ASD should be taught, while there are methods aimed at more advanced children, who lack academic, emotional and social skills compared to peers of formal development, such as Incidental teaching, Observational learning, and peer-to-peer social education. Finally, it is worth mentioning that children with ASD, internalizing skills, are led to a program of generalization and maintenance of these skills [3].

In conclusion, most of the ABA methods involve the use of positive reinforcement to increase the chances of repeating a behavior. These reinforcers may

be primary, for example physical and social, or secondary, such as the privileges and stickers of the token economy system [22].

The literature review shows that ABA's effectiveness has been a major concern for the educational community as there are a number of researches that have been conducted on this issue [23]. This review focuses on the effectiveness of intervention in the communication skills of children with ASD over the last decade, limiting the scope of research. More specifically, the research of Foxx [24] supports the ABA's effectiveness, claiming that interventions, based on its principles, provide full and lasting results to children with ASD. The same is supported by the research of Andreadi & Charitaki [13]. Furthermore, Gena & Galanis [9] defended the effectiveness of the ABA against other interventions while presenting important predictors of intervention.

According to Paul [25] children with ASD, benefit from the structured behavioral methods for the production of initial words. However these methods are restricted to maintenance and the acquired skills are generalized. The proposed solution is considered to be the increase of the provision of opportunities for interaction with peers outside the structured framework [25]. The research of Bono, Daley & Sigman [26] which related the intensity of intervention with the language development of children with ASD should be mentioned. ABA's effectiveness has been studied by another research conducted during a summer camp and showed a significant improvement in the communication and social skills of children with ASD as there has been a reduction in autistic stereotypes and antisocial and divergent behaviors [27]. Research on the use of ABA-based interventions such as the Discrete Trial Training and Natural Environment Training by speech therapists has shown that the techniques are effective for developing the communication skills of children with ASD [28].

A research aimed at low-cost reduction of problematic behaviours of children with ASD, has shown that parents can use ABA to treat them, regardless of whether the treatment is directed by trained staff or by remote telemonitoring, and has similar results and lower cost [29]. Furthermore, another research has questioned the importance of treatment by trained staff, stating that children with autism will have improved IQ and visual-spatial IQ, language comprehension and expression, social and motor skills, and general behavior, even if carried out by the family with intensive monitoring by teachers [30]. Finally, Alshurman & Alsreaa [31] have argued that children with ASD can improve non - verbal communication through peer - to - peer education.

In September 2009, a survey was published which claimed that Early Intensive Behavioral Intervention improves the cognitive, linguistic and adaptive functionality of children with autism. However, not all ABA intervention scenarios are considered effective [32]. Later, the research by Warren *et al*. [33], advocated improvement in the above-mentioned areas and the need for further research into the effectiveness of intensive care in children under 2 years of age. In 2009, another survey supported its effectiveness in improving intelligence and complex adaptive behaviors in these children [34]. In addition, a research that referred to Early Intensive Behavioral Intervention based on ABA has demonstrated its effectiveness as experimental groups have overcome the control group in tests that evaluated IQ, non-verbal IQ, expressive and perceptual speech, and behavior [35]. Ben - Itzchak & Zachor [36] supported the importance of the child's cognitive, social and communicative level prior to the implementation of the Early Intensive Behavioral Intervention, to predict subsequent outcomes.

At the research of Hilton & Seal [37], ABA with DIR (floortime), were compared on twin siblings with ASD. Their communication and symbolic behavior was graded pre and post intervention, revealing the increase in the composite score of the child that was applied to ABA. On the contrary, a 2014 study, comparing Pivotal Response Therapy (PRT) based on behavior analysis and the structured ABA approach, presented the PRT as more effective in improving children's communication skills with ASD [38].

On the other hand, surveys that focus on the perceptions of teachers on children with ASD and the ways of intervention they choose, argue that they use alternative ways of communicating, as positive effects on communication and social interaction are observed. In addition, practitioners use enough therapeutic remedies effectively but only when there is a proper assessment of the child's abilities and family involvement [39]. Another research agrees with the active involvement and collaboration of the family with teachers and adds that the difficulties they face are due to the difficulty of thinking and learning flexibility, behavior and communication management of children with autism [40]. Similar results have also emerged from the research of Dimitriou, Kosmou & Kyriazi [41], adding that the cooperation of teachers and parents is moderate, as with those specializing in Special Education. For the successful inclusion of children with ASD, teachers recommend proper training of their own and the necessary resources, adaptation of teaching methods to the needs of children, teamwork within the school, cooperation with parents and building a relationship with pupils as well as an in-class acceptance environment through disability awareness and education [42]. Further on, in the research of Yesim [43], it is stated that the qualifications of educators who teach children with ASD affect educational effectiveness, so it is important to organize well-designed educational programs for teachers that will

allow them to develop their skills and knowledge on autism. Finally, research carried out on self-efficacy, anxiety and occupational exhaustion experienced by ASD educators showed that they consider the level of self-efficacy to be high and vice versa for the other two [44].

It is noteworthy that there is a scientific gap on research, which is required to present the perceptions of educators applying the ABA to children with autism. Therefore, the most relevant survey compared the preference of children with ASD in ABA and TEACCH. The results of the survey showed that teachers, parents and administrators prefer the combination of the two models [45]. The combination of the basic principles contained in both approaches was also supported by the research of Callahan, Shukla – Mehta, Magee & Wie [46]. The opposite is found in a research which argued that health and welfare professionals consider TEACCH and then PECS and MAKATON to be the most effective method of communication and that the difficulties faced by teachers in working with children with autism are identified in the attempt to socialization, while agreeing with the results of previous researches that have been reported on the therapeutic tools they use, the importance of proper assessment and cooperation of parents [47]. It is worth mentioning that research on PECS – *Picture Exchange Communication System*, based on the principles of ABA, has shown that the learning of its use is feasible by children with ASD, while it has also indicated the increase in verbal communication and socio – communication behaviors as opposed to problematic, supporting its effectiveness [48]. Moreover, a research which was conducted that concerned the importance of ICT in emotional education and development of children with ASD highlighted the effectiveness of the intervention program while it was observed that autistic children are able to gain a deeper conceptual comprehension of the emotions and to recognize and develop their level of emotional attainments. This research, also, claimed that educational software has open access, is easily applicable and mentioned the importance of early intervention for children in this population [49].

It is important to note that the present research goal is to fill the gap in the perceptions of teachers working on the therapeutic intervention of the ABA in terms of its effectiveness in the communication skills of these children. Its significance lies in the confirmation of previous investigations in the country of the researcher, Greece, where there are few researches on this subject.

METHODOLOGY
Research Design
The present research proposal aimed at investigating the effectiveness of ABA on the

communication skills in children with ASD. The researcher used interviews in order for special educators and psychologists to express their perceptions about the effectiveness of ABA in this population. The data collection took place between February 12 and March 16, 2018, in the participants' personal space and each interview lasted about 40 minutes. The seventeen (17) open-ended interview questions concerned the perceptions of the participants on the subject of the study. In particular, Questions 1-10 sought to answer the first research question, which concerned the influence of ABA on the development of the basic functions of communication, the next three questions, addressed the impact of the approach to the development of social communication, 14-17 referred to the impact of ABA on the development of non - verbal discussion skills in children with ASD. The analysis of the qualitative data gathered through the interviews was carried out using the thematic analysis. The validity and credibility of this research was ensured through triangulation, carried out through in-depth analysis of the data, studying from more than one angle, as the sample consisted of two different groups of professionals [50]. In particular, the study had data triangulation, since the collection of research data was done using a tool, the interview, but two groups of interviewees [51].

Research Methodology
The chosen method for the present study was qualitative, aiming to explore and understand social phenomena, providing the possibility of obtaining information on the subject as it is considered an appropriate methodology for answering several questions about the phenomenon of each research. The choice of the qualitative method was based on the ability of the participants to study the subject in depth and to develop their understanding of the application of ABA to children with autism.

Sample - Participants
Regarding the sample used to conduct the survey, it consisted of nine special educators and seven psychologists who were specialists in the ABA intervention program. In addition, these individuals were working on structures where the method is applied to children and adolescents with developmental and other disorders, such as ASD, learning difficulties, speech and language disorders. The sampling, therefore, was purposeful as the sample selected was from a population accessible to the researcher. It is noteworthy that this sampling is not considered representative for the general population, so that generalization of the findings cannot occur. Its use is often carried out by young researchers, as the investigator of this research is considered [52].

Data Collection Instrument/Research Tool
The researcher was asked to interview his sample as this was the data collection tool while the

type was semi - structured interview. The interview was conducted so as the seventeen (17) special educators and psychologists to express their perceptions on the effectiveness of ABA in children with autism, while the chart of the interview was based on the Curriculums for Students with Autism, 2011, in particular communication skills [53].

RESULTS

The results of the special educators' and psychologists' perceptions who participated in this research proposal were of particular interest as they analyzed the steps and techniques used by the ABA to develop the communication skills of children in the autism spectrum.

The teaching of requesting a desired object is based on the level of the child, as the children with low functionality start with finger pointing and PECS, then the verbal expression is done singularly and then with complete sentences, while finally comes the automation and the generalization. Some of the techniques used are incidental teaching, prompting, shaping and role modeling. Reinforcement is provided to the child if it presents functional communication, without stereotypes or other non-socially acceptable behaviors.

The second question of the interview was about the contribution of the ABA to the development of the focus of attention skill of such children to third parties whether they are away or close. Responses have shown that teaching, initially, is done with the therapist closely, insisting on the child's eye contact, or through joint attention and then with other people through whom generalization takes place. Later, it is taught that focusing on others being at a distance, with the therapist of each child being a point of reference in space. The methods applied are sharing and prompting, while it is important to reinforce the child through the token economy system in order to increase motivation and focus on a third person.

Afterwards, it was answered how children with ASD are taught to focus their attention on third parties if there is or is no eye contact. Teaching starts with eye contact and then, depending on the cognitive level of the child, it learns through role modeling or prompting, to address the therapist's name and to say what he or she wants. Another way is by joint attention, where the child looks in the direction of a desired object, then the therapist and finally the subject together. The completion of teaching with the therapist carries the focus of attention to third parties, such as school teachers, classmates and other non-intimate people, resulting in generalization. Prerequisites for achieving this skill are the good therapeutic relationship between the therapist and the child, early intervention and reinforcement.

In the next question, the participants argued that the pursuit of the child's attention to someone who either looks at him and is close to him or does not look at him and is away, belongs to the social skills program, based on ABA. Initially, teaching involves eye contact and greeting. One way to achieve the child's pursuit of communicating with someone, is to reinforce the motivation. Moreover, it can be done through the rules of conversation that children are taught, with the joint attention but also with PECS. Some techniques used for teaching are prompting, role modeling and shaping. Finally, it was reported that after teaching the child with the therapist, other people not familiar to him are getting involved with him / her. The pursuit of one's attention brings reinforcement to the child.

The interviewees were questioned about teaching the denial to something undesirable, which is done with the therapist offering an undesirable object to the child and asking if he / she wants it, expecting him / her to deny. If the child does not deny in socially acceptable manner, then the therapist asks the question again and forestalls him / her by saying "No I do not want", called errorless learning. After the child has responded correctly, the object is removed. Then the child is given a second, desirable object, the question is reformulated and its acceptance is expected. It is important that the object taken by the child, is reinforcement and that if he / she has no expressive speech, the corresponding nods are taught. The methods used are prompting, role modeling and incidental teaching.

Subsequently, the participants answered that enriching the vocabulary is done initially by identifying or distinguishing objects, then naming a wide range of objects, verbs, such as actions, opposing meanings, sentences, simple and more complex, and finally generalization is applied. Vocabulary enrichment is also achieved with PECS, while the contribution of speech and language therapists, which seek to improve communication skills through oral/facial exercises, is particularly important. The materials which are used vary in 3D objects and 2D cards, as well as the techniques that are applied to teaching are the discrete - trial teaching, role modeling, prompting, shaping, errorless learning, distractors, which are intermediate questions in teaching and the token economy system.

The next question concerns the development of descriptive speech. It is essential that teaching begins with categories of objects already familiar to the child so that he / she understands them, names them and then enriches them by using sites and actions at the appropriate tense. The majority of respondents agreed that the description should be from general to special and eventually generalized. In addition, it has been observed that this program can also be applied by logopedics in combination with ABA techniques, which are positive reinforcement, role modeling, verbal

extension, prompting, shaping, errorless learning, distractors and PECS.

The provision of information, according to the participants, by children with ASD is included in the descriptive speech program. Teaching develops the ability to comprehend, and then enriches the information to familiar elements, firstly by the therapist and then by the child. The child learns to provide information through the description of images, games and in real conditions (invivo), to answer general questions about other people as well as himself or herself. Information is also provided through the narrative of the child's daily routine, while generalization is sought in the end in all environments. The techniques which are used are role modeling, prompting and reinforcement.

On the other hand, children with ASD find it hard to ask for information, so they learn to recognize their knowledge in order to ask for what they do not know. Teaching is done through texts, objects or games, which can motivate their interest, rules of conversation and narrative of everyday life from others. It is important to mention that teaching is initially applied to a structured framework and then is generalized outdoors. In order to achieve the teaching, the development of motivation and the technique of errorless learning, prompting, role modeling and reinforcement are used.

The next question was about learning the expression of emotions through intervention. ABA teaches children to express themselves with socially acceptable behavior. Teaching starts with the recognition, naming and justification of the four basic emotions to others, namely joy, sadness, fear and anger, and then teaches understanding and expressing feelings to themselves based on their personal experiences. The teaching involves visual material, social stories, scripts and real conditions while techniques are role modeling and incidental teaching.

Interviewees' answers respond to the first research question, which is "How does ABA influence the development of basic functions of children's communication with ASD?". It is noticed that ABA is a well-documented effective method based on behaviorism, with a structured program for the education of these children, which is based on the definition and the research of Andreadi and Charitaki [13] and Foxx [24] who states that ABA uses methods derived from scientifically established behavioral principles while incorporating all the factors identified by the US National Council as features of effective interventions in education and treatment programs for children with ASD. Initially, the majority of responses included the use of PECS, which enables alternative communication to children with ASD before speaking [3]. According to Charlop – Christy, *et al.* [48] PECS

learning can be carried out by these children and its use can lead to an increase in communication skills, in contrast to problematic behaviors. Also, in the teaching of basic communication functions, the joint attention was mentioned, which has been associated with the increase in language development [26]. As far as speech therapists are concerned, according to Mosier [28] applying ABA techniques such as the discrete – trial teaching as well as teaching in the natural environment, including incidental teaching, role modeling and prompting, as well as other speech and language therapy techniques such as oral/facial exercises can facilitate the acquisition of speech and communication skills.

Subsequently, the participants were asked about the inclusion in the teaching program of the execution and provision of commands / instructions from children with ASD. It was mentioned that teaching involves simple, complex and then double commands. Commands are distinguished in physical, functional, in space as well as commands with objects and distinction of commands with the same object. Regarding the provision of commands or instructions, teaching is done to children of high functionality so as to provide them to their friends. Teaching begins with the therapist reading or explaining a game, and the next time the child is the one to give the instructions. Also, teaching can be done for the functional use of an object or through social stories. Finally, the techniques used are prompting, shaping and role modeling.

The next question concerning the contribution of ABA to the development of narrative speech is achieved by describing the child's daily routine, which initially can be answered uniquely but gradually enriched with more vocabulary and information from the therapist. In addition, this skill can be accomplished by telling a personal story from the child or through books, fairy tales, and the sequencing of images. The methods used are role modeling, errorless learning, prompting and the token economy system which reinforce the child.

Therapists have replied that the teaching of initiating, continuing and integrating a discussion takes place in a structured context with the therapist and then generalizes it to other therapists and peers. In particular, teaching seeks the child to greet, to ask questions, to keep eye contact, to listen to the interlocutors, to exchange information as well as to ask for something that he wishes, verbally but also through joint attention. The techniques for teaching are role modeling, prompting, shaping and the token economy system.

According to the participants, it is noted that ABA teaching programs that are carried out for the development of social communication of children with ASD, which constitutes the second research question, are a continuation of the basic communication functions

while the program aims and applies generalization of the skills. In particular, therapists have reported on children providing information that teaching is done through game instructions for use to their friends. In relation to the development of narrative speech, generalization involves the child's narrative of a personal history with proper use of tenses, which includes earlier programs such as vocabulary enrichment and descriptive speech. Finally, initiating, continuing and completing a discussion is a combination of all the programs, while it was reported that generalization is achieved with the help of other therapists and peers. Consequently, the present study contradicts that of Paul [25], in which structured behavioral methods show positive results in uttering the first words but exhibit restrictions on the maintenance and generalization of skills, suggesting less guidance by therapists in activities, in order to increase the child's communication initiatives and increase opportunities in new environments and with different interlocutors. In contrast, in the Gena [9] survey, the effectiveness of behavioral analytical approaches, to generalizing both children with high functional autism and children with lower functional autism is being highlighted. It has also been argued that generalization relates to the starting age of the intervention, the people who apply it, and the venue [9]. At this point, we ought to say that in the survey of Ben – Itzchak & Zachor [36] children with ASD were evaluated before the intervention and were divided into groups according to IQ and seriousness in social interaction and communication. After one year of intervention, it was observed that children with a higher initial cognitive level and children with reduced deficits in social interaction showed better skills acquisition, such as expressive speech and game, while improvement in perceptual speech was observed in both groups. Also, the improvement of the expressive language with the initial social skills and the development of gaming skills with the initial cognitive level were associated, indicating the importance of the level of cognitive and social interaction, before intervening to perform prognostics on the results of the intervention [36]. The same is evidenced by Mosier [28], who claimed that the effectiveness of a method and the achievement of generalization in a given child varies according to the severity of the disorder, age, teaching hours, participation, resources, and parental support. The importance of parental cooperation is reflected in the present research and in similar researches, such as Gourniezaki & Balomenaki [39], Gioti & Frogaki [40] and Dimitriou, Kosmou & Kyriazi [41].

Improving eye contact during the conversation was another question of the interview. The instruction of eye contact is included in other programs and the absence combined with the wrong body posture makes it impossible to continue any program as it lurks the lack of attention and communication is considered to be partially incomplete. Teaching to young children is done with an object that is placed in front of the therapist or plays with it in order for the child to look at the subject and the therapist or ask for it by looking at him, respectively. Also, teaching can be done by asking the therapist the child's name and the technique of prompting, to turn the child to look at him. For high-functionality children, eye contact is taught in the rules of conversation, friendship and social stories. Finally, it is achieved by increasing motivation, reinforcement, while another technique is the discrete – trial teaching.

The participants responded to the voice-changing program according to the circumstance that their teaching includes the phonometer, scripts, visual aids, social stories, comic strip and in real-world conditions to achieve generalization. In teaching, the child learns the allowable voice volume for instance, low, normal or strong, and the corresponding circumstances while it is important to repeat and reinforce the child. Role modeling, shaping and prompting are used.

Afterwards, they were asked about waiting for the child's turn during the discussion. Teaching is done in independent, daily, individual, binary and group programs. Teaching is done through the rules of conversation, the "traffic lights", which is a reminder to the child if he can speak, the toys he / she will have to wait to play, an object placed in front of the child who has the floor while the rest are quiet, in real circumstances but also through the child's eye contact with the therapist, who can remind the child to wait for his or her turn. It is worth mentioning that socially acceptable ways of avoiding a discussion are taught while teaching about the expectation of a child is done by role modeling, which can also be made up by the classmates, by incidental teaching, prompting but also by token economy system.

Finally, the comprehension and expression of gestures and facial expressions are included in the ABA programs as they are important for the child's autonomy. At first, children are taught to understand the non - verbal communication as well as the venue and way of expressing it on occasion and then they are being taught to use them. They are also taught what is and is not socially correct depending on the situation, providing solutions and defining the consequences of their actions. Explicitly, teaching involves the recognition of empathy, recognizing the expressions of others and regulating their behavior through visual aids with pictures of nods, which are fading in the process, social correct or wrong, role plays, behavior rules, real conditions in conjunction with the mirror, so that they see their face, understand the emotion and correlate with it. The therapist is called upon to reinforce the child's efforts while teaching is done using the role modeling and the prompting.

From the participants 'answers, the last research question "How does ABA influence the

development of non - verbal skills of children's discussion with ASD" is answered. In their answers, it is noted that the presence of eye contact during the discussion is particularly important and its teaching is applied in conjunction with all the other programs. On the other hand, alternating the intensity of the voice according to circumstances, waiting for one's turn during the discussion and understanding and expressing gestures and facial expressions have the role modeling as a common teaching method, either through peers or through therapists. These results are in line with Alshurman & Alsreaa [31], who found that peer education improves non-verbal communication of children with ASD.

CONCLUSIONS

In summary, this research highlights the perceptions of the special educators and psychologists who apply the ABA in Greece, which lacks data on the subject, for its effectiveness in the communicative skills, such verbal and non-verbal, of children's with ASD. These perceptions confirm recent studies on the efficacy of ABA. Especially, the importance of eye contact and correct posture was recorded as it is believed that their absence may cause a lack of attention, resulting to incomplete communication. It has also been observed that all programs are interlinked, although some are considered to be of primary importance, followed by other programs. It is important that the cognitive and communication level of the child, plays a special role for the start of each program. Additionally, it was reported that the therapeutic relationship between those involved, the existence of early intervention and the contribution of parents are important for the improvement of children's communication skills. In addition, the methods used to develop these skills are incidental teaching, prompting, shaping, role modelling, discrete–trial teaching, errorless teaching and distractors. Finally, for Applied Behavioural Analysis the importance of generalizing skills and reinforcing socially acceptable behaviours of the child is mentioned.

The outcome of this research maps the issue but cannot be generalized as it is a qualitative survey and its sample is small, but it is compensated by the triangulation that is taking place. In the future, it would be a good idea to carry out further research into the efficacy of ABA in children with ASD and the perceptions of therapists who apply it in Greece. In particular, research could be done through observation for a longer period of time, in order to observe the implementation of the methods and to record the development of each child during the sessions over time, providing precise results for its implementation. Also, a proposed survey, is the statistical analysis of the development of children with ASD, when ABA is applied, in order to measure its effectiveness. Finally, a survey could be carried out to obtain the perceptions of therapists applying ABA or other therapeutic

interventions in order to compare and codify the effectiveness of the various interventions.

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