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SPEECH FORMATION OF CHILDREN WITH AUTISM USING ABA THERAPY IN AN EDUCATIONAL PROCESS

Abstract

The number of children with autism spectrum disorders is growing every day. However, recently Applied Behavioral Analysis (ABA therapy) has been widely used to correct this disorder. A number of early intervention models based on ABA principles are a curriculum for teaching children with autism spectrum disorders. One of them is a model of Verbal Behavior analysis of B. F. Skinner, developing speech in ASD children. The VB approach is based on ABA research. This approach increases the child's ability to learn a functional language. This method allows children with ASD and related disorders to form and develop spoken language, focusing not only on how they speak, but also on the purpose for which the child uses speech. This article attempts a theoretical analysis and description of the use of Verbal behavior based on ABA in the development of speech in a child with ASD.

Keywords: autism spectrum disorder, ABA therapy, Verbal behavior, B.F. Skinner, operant activities.

Introduction. Autism spectrum disorder is a common developmental disorder that occurs in early childhood. The American Psychiatric Association has described autism with three main disorders: (1) difficulty communicating with other people, these strange and repetitive speech (stereotypic speech) patterns, (2) a significantly lower level of speech and language skills, even a complete lack of spoken speech, and (3) behavioral difficulties. In addition, these personalities have more difficulties in areas such as looking directly into the eyes, communicating with peers, playing skills and social or emotional interaction (Fombonne et al., 2021). As a distinctive feature of this disorder, we can mention obvious deviations in behavior patterns

that are characterized by limited, repetitive or stereotyped activities (Campisi et al., 2018). Children with ASD may exhibit repetitive behavior, such as repeatedly placing objects in a row or stereotypical body movements (such as swaying, waving arms). They exhibit restrictive behaviors, such as consuming only certain foods (for example, only chips for breakfast and chicken for dinner) (Alsaade & Alzahrani 2022); if the actions are not performed in a certain order, they create problematic behavior. Sometimes to resist changes in the environment. For example, soft toys should be placed in certain places on the bed every night, if this is not done, the child will show behavior.

The number of children with autism spectrum disorder is increasing day by day. However, in the elimination of this disorder, Applied Behavior Analysis (ABA therapy) has recently been widely used. A number of early intervention models based on ABA principles provide a curriculum for training people with autism. Let's dwell on a few of them. The models described below were published in peer-reviewed journals and demonstrated the effectiveness of their research (Wayne et al., 2021). Since then, it has been published as commercially available guidelines in the treatment of autism. Each model has its own main differences.

Early and Intensive Behavioral Intervention

Early and intensive behavioral intervention (EIBI) is an educational program for children with ASD. Intensive behavioral intervention is characterized by a comprehensive, hierarchically organized curriculum that is carried out over several years in order to increase the overall level of functioning of the child. Procedures used to increase adaptive behavior and reduce problem behavior are based on the principles of operant conditioning (for example, reinforcement (principle of strengthening), attenuation (principle of strengthening), control, generalization). Many learning opportunities are provided by fully programmed learning procedures and reinforcement (principle strengthening). Several areas of work are carried out sequentially to improve several broad areas of skills. The educational goals of eibi programming often include pre-academic skills and the academic skills themselves, language, social skills, and self-play skills.

In recent years, researchers have focused on eibi analysis by evaluating experimental studies based on empirically established criteria (Franz et al., 2022). Several research groups have developed criteria for evaluating EIBI empirically. There are significant discrepancies between these empirically specific criteria for experimental accuracy, diagnostic testing, and procedural integrity measures in EIBI.

There is a consensus that EIBI is an effective treatment for many behavioral disorders and, in particular, autism (Wergeland et al., 2022). The results of some EIBI studies show that the effectiveness of this intervention is closely related to the child's IQ. In addition, Reichow & Wolery said that there was no change in at least one child in the study, or regression on at least one outcome indicator. In general, recent literary reviews have shown the need for additional studies of children who have shown «good» results.

Natural Environmental Training

The main features of learning in the natural environment are methods that increase response motivation with an emphasis on interaction with children, and generalization of skills. The NET was compiled by Stokes and Baer in 1977. NET, also known as the natural language approach, usually focuses on teachers who work with the child to expand learning opportunities in a natural setting (for example, at home) (Linda, 2006). This model uses natural speech development techniques to teach functional language skills.

Incidental Teaching

Hart and Risley (1968) developed a random learning strategy based on the experience of teaching language to preschoolers in natural conditions. Random learning strategies are implemented as long as they are not structured, such as free game time in the classroom. Episodic learning is child-oriented, and the teacher uses the child's initiative, that is, interest in something, as an opportunity to learn. The tests begin when the child is interested in a topic, by showing it or making gestures (Green, 2001). The purpose of random learning is to teach a child to speak spontaneously in response to many signals in the natural environment.

Natural Language Paradigm

Koegel, O'Dell developed the NLP model in 1987 by combining speech learning and gaming skills. Learning strategies are combined

with game features to make learning fun for the child and therapist. NLP is provided by creating superior stimuli (stimulus) to prevent loss of interest in things and increase the child's motivation to react during structured learning opportunities (Goldstein, 2002). Often choosing the most suitable interests will allow the child to change for the better throughout his studies.

Discrete Trial Training

DTT was developed by Lovaas, Koegel, Simmons, Long in 1973 as a form of behavioral intervention for children diagnosed with autism. This model teaches different skills by the child and the therapist sitting at the table, dividing and correcting each disorder into smaller units. In this way, the emphasis was on a highly structured learning approach that was short-interval programmable. Especially the objects that the child is interested in (usually small edible objects) and praise is given after the correct answers. Early studies on DTT for young children with autism, showing a significant increase in IQ scores, a decrease in negative behavior, and an increase in spontaneous social interactions in autistic children. DTT is more similar to the classroom learning format than other intervention models (for example, sitting at a table and answering questions), and it is ideal for mastering certain verbal operants (for example, tact, Echo) (Hillman et al., 2021).

Applied Verbal Behavior

Applied verbal behavior (AVB) is a way of teaching children with ASD communication skills based on Skinner's theory of verbal behavior (1957). This approach emphasizes the functional units of the language. By giving importance to a «functional» way of communicating, the verbal operant focuses not only on its topographic characteristics (for example, the child saying «red»), but also on previous events that trigger or trigger a reaction (for example, a picture of a red ball was shown by the parents) and subsequent events that enhance the reaction (for example, if the parent (Cooper et al., 2019).

Skinner's taxonomy of verbal behavior includes seven simple verbal operants, and Early Autism Intervention programs usually focus on four of them: Mand, tact, Echo, and interverbal. In the correction of ASD, it usually begins with Mand exercises, since this verbal operant is important in starting a relationship with the interlocutor. Mand is a verbal operant. It is

realized under the appropriate environment (e.g. walking down the street on a hot day) and the conversationalist enters into a relationship due to that situation (e.g. the child asking for a drink).

In the early stages of the speech development of an ASD child, AVB therapists often use other verbal operants as well. For example, in an AVB therapist, the child may use an interverbal operant (for example, «What do you need?») or Echo (for example, «drink») or the child may want something very much (for example, the child says «water»), and such a targeted response will be satisfied in the appropriate way. (for example, water supply). Over time, these quickly disappear due to the formation of a «pure» oral operant (Frost & Bondy, 2006).

After the appearance of Mand in the child's verbal behavior, it is combined with other operants to teach additional functions of language (for example, Mand-tact combined learning). Numerous studies have shown that the stimulus can be controlled and successfully transmitted from one verbal operant (e.g. Echo) to another (e.g. interverbal) during the conducted reading.

Skinner's theory improved the way we communicate during early intervention in ASD correction. And Mand emphasized the need for intraverbal training, emphasizing the primacy of ASD correction. The previous views would not have paid much attention to tact and interverbal learning. That is, people with autism were taught most of the objects in their environment through tact, but they could not communicate with others. By limiting learning in this way, people with ASD could not acquire the skills necessary to build relationships with their peers (Carr & Firth, 2005). Meanwhile, Skinner's theory (Mand and interverbal) has been proposed in ASD correction programs and has improved the quality of learning.

In each case, we will discuss the use of methods based on Skinner's theory in the development of speech in children with ASD.

Main part. ASD is characterized by a wide range of speech disorders. This has a negative impact on the skills of communicative, personal development, social, cognitive life of a child with ASD. Thus, work on the correction and development of speech is one of the main priorities for children with ASD. Since the ability to speak has the potential to influence other areas of the child, applied verbal behavior is best considered

as part of a large-scale and comprehensive ABA therapy for child development.

Speech correction and development work based on the scientific achievements of the ABA is considered an integral part of the complex early intervention of children with ASD. ABA-based procedures have led to the creation of highly effective procedures and programs for speech, just as they have proven to be consistently effective in meeting the behavioral needs of children with ASD. The current approaches to ABA-based speech intervention are characterized by the use of a wide range of communication techniques, a functional curriculum, and flexible learning schemes. Forty-year studies of applied interventions in the ABA have proven their lasting effectiveness in improving communication in children with ASD. Currently, there are several publications on how to use Skinner's analysis of verbal behavior in correctional and developmental work with individuals with speech disorders.

We have already mentioned that ABA therapy is based on Skinner's verbal behavior in the speech development of a child with ASD. Now we will discuss the course of functional work of this applied verbal behavior, the influence of each verbal operant on the development of speech of a child with ASD. Also, we will try to theoretically analyze and describe the features of empirically confirmed procedures from the point of view of clinical experience of researchers who used Skinner's verbal behavior in correcting ASD speech.

Research materials and methods. B.F. Skinner spent more than twenty years developing his analysis of the spoken language. He began this project a few years after graduating from Harvard University in 1931 and completed it in 1957. Its main focus is the ability of a person to communicate. According to him, talking is a habitual behavior that occurs through environmental conditions and develops in each direction. Reflecting on his work, Skinner wrote, «I believe that verbal behavior will be proven in the future... my most important work» (p.122), which he wrote in his manuscripts. Skinner considered conversational language to be an important topic because verbal behavior is central to many important aspects of human behavior (e.g. language acquisition, communication, intelligence, academic education). His works

were scientifically and extensively analyzed only in the 80s of the last century, and today Research in this area can be seen in the scientific journal "The Analysis Verbal Behavior".

In principle, Skinner's book "Verbal behavior" is the most difficult to understand. The reader must first understand the basic concepts and principles of behavior analysis. In addition, linguists have been trying to understand human communication for centuries. Skinner's work, on the other hand, can contribute to many things, starting with the difference in human behavior between linguistic form and linguistic function.

An accurate definition of the concept of language has been driving linguists at a dead end for centuries. Meanwhile, Skinner argued that actions called human communication and communication are the habitual actions of the interlocutor and listener, which are non-verbal behavior, arising from the environment and expanding, preserving and developing. For this reason, Skinner called «verbal behavior», which focuses on the interaction of the interlocutor and the listener, and not on the term "verbal or conversational behavior" (Stemmer, 1990).

Thus, verbal behavior is a behavior that is reinforced by the behavior of a person when interacting with other people. Verbal behavior is clearly defined by a function rather than a form of reaction. For example, a mother distinguishes her child's crying; we use gestures, or coughing or clapping to get someone else's attention. In some cases, we also use characters and letter writing (written speech).

The behavior of the speaker and the listener, who are doing the same verbal communication, is controlled by different but interrelated situations. It is the behavior that arises from unforeseen circumstances or themselves in a relationship, although initially simple, but quickly reaches a large-scale development. Skinner gives a personal description of the behavior of the speaker and the listener, and called their interaction verbal episodes. In a verbal episode, the speaker initiates any kind of verbal activity (speech, sign language, eye contact), and the listener (1) acts as an audience for the Speaker, (2) supports the speaker's verbal behavior, (3) responds in a certain way to the speaker's verbal behavior (Baylot & Carter, 2023). The roles of speaker and listener alternate.

Skinner pointed out that the number of simple verbal actions during verbal behavior is six. This includes: Mand, tact, Echo, transcription, intraverbal action, and textual actions. He also considered public communication and text as separate activities (Luiselli, 2023).

Mand is the creation of an application. To get what you want. For example, a child asks “sweet” if the child really wants to take a sweet.

Tact is the name of objects, events, events, etc. For example, when a child says «sweet» because he sees a sweet.

Echo - repetition of one word. For example, after someone says «sweet», the child also repeats «sweet».

Intraverbal action is to answer a question or create a dialogue. For example, we asked a child “what do you like for tea?“, and the child said, “sweet”

Text action means reading texts. For example, the child said “sweet” because the child saw the word “sweet”.

Transcription is the recording of heard words. For example, a child hears someone say ”sweet“ and writes “sweet”.

Let us dwell on these above-mentioned verbal actions separately.

Mand is a type of verbal action in which the speaker asks what he wants or needs. The word Mand comes from the English words command and demand. Mand is a reaction that occurs under the control of motivational operations and a real amplifier. The actual reinforcer is directly related to the motivational operation. For example, a child’s indigestion 1) turns food into an effective booster and 2) causes a «give bread» reaction if this reaction is previously enhanced by taking bread (Figure 1).

Mand it is the first type of verbal behavior in children with normal development. Mand allows children to get what they want and when they want. And it will allow you to avoid what you do not want. Mand is the only verbal activity that directly benefits the child, creating an opportunity to control the social environment.

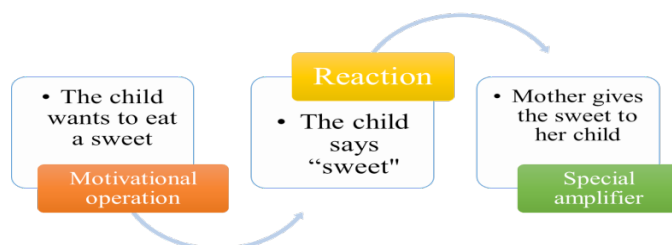


Figure 1. *Mand verbal action*

Mand reactions are necessary to teach the social interactivity of conversation, teaching, work and all aspects of human life, strengthening the role of the listener and speaker. And also allows the speaker to perceive new information, acquire new forms of verbal behavior.

All Mand reactions occur with the help of motivational operations. These motivational operations should be such that they are interesting to receive during the training of Mand reactions. However, the power of motivational operations can change over time (the child is interested in something else), so the effect of learning is also likely to be temporary. For this reason, the teacher should be able to distinguish between the

period of emergence of motivational operations and the power of interest of the child.

Tact is a form of verbal action. The speaker names objects and actions that are communicated through the senses (Figure 2). The word tact comes from the English word contact, that is, contact with the environment.

When a child looks at his roommates and calls them, he usually does the tact act. Tact refers to the speaker’s ability to verbally identify aspects of the physical environment. The tact response ratio refers to a type of verbal behavior in which the reaction form is under the functional control of a non-verbal discriminatory stimulus and a history of conditioned reinforcement (for example, after seeing snow, saying “snow”).

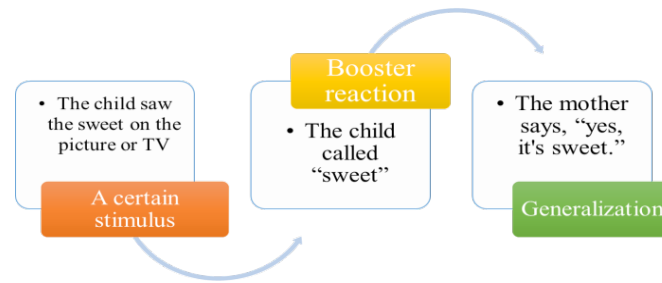


Figure 2. *Tact verbal action*

Echo is a type of verbal action that occurs when the speaker repeats the verbal action of another speaker. Accurate repetition of the words, phrases and vocal behavior of others.

The action of the Echo is controlled by a specific verbal stimulus, and it corresponds exactly to the reaction and is formally similar (Figure 3).

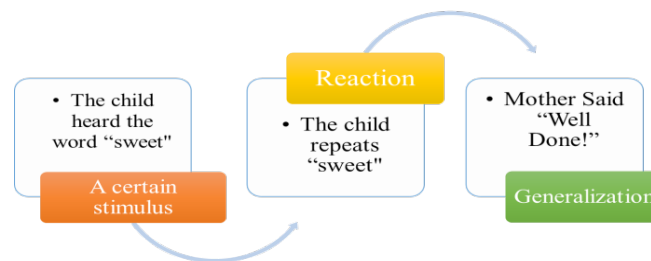


Figure 3. *Echo verbal action*

The child's ability to repeat other people's phonemes and words is very important for learning, recognizing objects and actions. Echo verbal behavior plays a key role in complex forms of verbal behavior, such as random verbal learning, derived relational response, combined

control, bidirectional naming, and problem solving.

Intraverbal action is the verbal action of the Speaker, different from other verbal actions. This includes answering questions, comments, and explanations. The intraverbal effect is enhanced by a generalized amplifier (Figure 4).

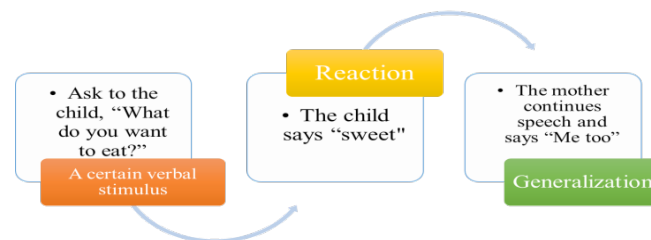


Figure 4. *Intraverbal verbal action*

The intraverbal repertoire contributes to the acquisition of other verbal and non-verbal skills. Intraverbal actions prepare the speaker to respond quickly and accurately to the requests of others

and play an important role in the development of conversational skills.

Text actions. Skinner defined the text as reading, not related to reading comprehension (Figure 5).

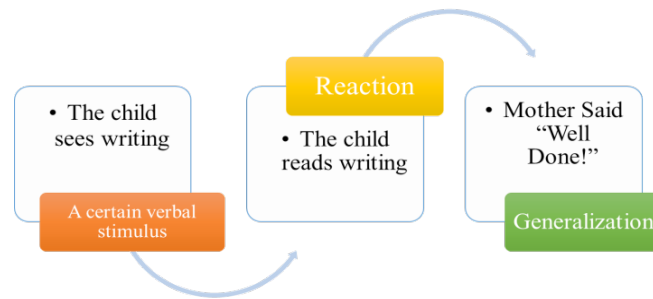


Figure 5. *Textual actions verbal action*

Reading comprehension includes other verbal and non-verbal activities, such as intraverbal and receptive (understanding instructions). Textual action has a clear correspondence between the stimulus and the reaction. Echo and textual actions are very similar, they are controlled by a specific verbal stimulus, amplified by a

generalized conditional amplifier, and have an exact match.

Transcription consists of writing and pronouncing a word with a letter (Figure 6). Transcription is a type of verbal action in which the spoken word is monitored by writing or sign language translation response.

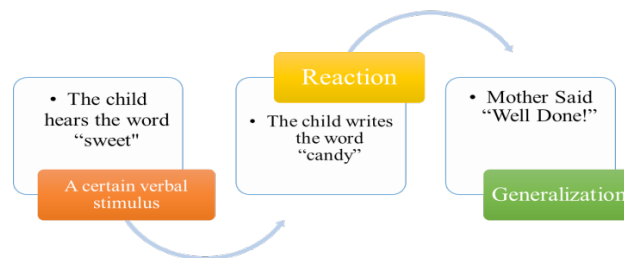


Figure 6 *Transcription verbal action*

Results and Discussion. The analysis of verbal behavior carried out by Skinner was able to serve as the basis for assessing speech. The Verbal Behavior Assessment Program includes identifying the features of simple verbal operants, the listener’s actions, the possibilities of self-knowledge in the course of a conversation, the ability to repeatedly answer questions in parallel with self-control and the interaction of the speaker and the listener in the development chain in a conversation situation. These are all based on ABA training procedures. Barbera & Rasmussen 2007; Carr & Miguel 2012; Dixon, 2014; Greer & Ross, 2008; LeBlanc & Dillon, 2009; McGreevy et al., 2012; Partington, 2006; Schramm, 2011; Sundberg, 2014, 2016B; Sundberg & Michael, 2001; Sundberg & Partington, 1998; Weiss & Demiri, 2011 and

other researchers have currently made several publications on how Skinner’s analysis of verbal behavior should be used in working with people with speech defects.

A number of studies have shown that corrective methods based on the analysis of Skinner’s verbal behavior are effective for the development of speech in children with ASD. For example, Duker, Dortmans, & Lodder, 1993; Hartman & Klatt, 2005; Yamamoto & Mochizuki, 1988 researchers studied speech-mediated requests for help in ASD children using the Mand action. Carr & Durand, 1985; Shafer, 1994 was able to reduce various difficult behaviors in ASD child through the analysis of verbal behavior. Arntzen & Almas, 2002; Carroll & Hesse, 1987; Nuzzolo-Gomez & Greer, 2004 researchers have shown the effectiveness of

other operants, such as tact, in the formation of speech. In addition, many researchers (Naoi, Yokoyama, & Yamamoto, 2007; Partington, Sundberg, Newhouse, & Spengler, 1994; Sundberg, Endicott, & Eigenheer, 2000) have done their research on the use of the tact operant in children with ASD.

Arntzen & Almas, 2002; Carroll & Hesse, 1987; Lamarre & Holland, 1985; Ross & Greer, 2003; Tsiouri & Greer, 2003; Twyman, 1995; Williams, & Greer, 1993, Arntzen & Almas, 2002; Greer, Yuan, & Gautreaux, 2005; Nuzzolo-Gomez & Greer, 2004 found that it is possible to develop a child's speech by using two operants (mand and tact) together in the speech development of children with ASD.

Conclusion. The Verbal Behavior or VB approach is based on all ABA studies, but also increases the child's ability to learn a functional language. VB is included in the Applied Behavior analytical approach to teach all skills, including, most importantly, children with autism and related disorders. This method provides for the formation of speech and the ability to develop it, paying attention not only to what the child says, but also to the purpose for which he uses speech.

The VB approach is a very new and popular approach that has emerged from the basic teachings of the ABA over the past 20-25 years. B.F. Skinner's 1957 book *The Verbal Behavior* follows the basic concepts, principles, methods in this area. However, this book is very complex. For this reason, it has been neglected for decades. Only Dr. When Jack Michael and his graduate student at Western Michigan University (WMU) Mark Sundberg began using concepts of verbal behavior to teach speech to children with various developmental disabilities, they focused on Skinner's concepts of verbal behavior.

The first few VB evaluation projects were developed in the late 1970s by WMU and the University of Kansas and tested with the great influence of Joe Spradlin. Mark Sandberg's doctoral dissertation "Developing a Verbal Behavior Repertoire using Sign Language and Skinner's Analysis of Verbal Behavior" was published in 1980.

It was only in 1998 that Dr. Sandberg and Partington became interested in the VB approach in correcting ASD children after publishing three book collections. The main book «teaching language to Children with Autism or Other Developmental Disabilities» was published in 1998. But the most popular book in the trio was the *Assessment of Basic Language and Learning Skills*, often referred to as ABLLS.

ABLLS can be used as an assessment of the child's abilities, a training program, as well as a form of skill control, consisting of several sections that need to be completed by an adult who is well acquainted with the child. An initial assessment using a diagnostic condition can take three to four hours. ABLLS is a great tool for a teacher who is proficient in the VB approach, but it is very likely that it will be very difficult for a parent who has no experience in ABA.

Thus, Skinner's concept of verbal behavior has been widely studied in recent years and scientific work is being done. His methods play a significant role in the development of speech in children with autism spectrum disorders and are the basis for effective work. These ABA and VB-based diagnostic and training programs for autistic children have spread to all corners of the world and are being used to correct the autism spectrum disorder.

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