

Verbal Behavior and Autism: Background, Assessment and Intervention

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Superheroes social skills training, Rethink Autism Internet interventions, parent training, EBP classroom training, and functional behavioral assessment: An autism spectrum disorder, evidence based (EBP) training track for school psychologists

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INTRODUCTION

One of the most important areas of a child's life is the ability to communicate. Language plays an essential role in an individual's development. Without communication a child cannot express his or her wants and needs. As a child grows older this ability to interact with the world around them can be one of the most enriching or frustrating experiences. As the child enters the age of formal education, the ability to interact verbally is irreplaceable. A child will fail to demonstrate proficiency in various educational concepts if lacking basic communication skills. As a child grows to adulthood, the ability to interact in the world and to be successful independently depends largely on the fundamental ability to communicate in a variety of settings. For a child with autism, verbal and nonverbal language is a key deficit and one of most difficult areas for intervention. An educational curriculum for children with autism must include comprehensive language acquisition for the program to be considered successful. In order to do this, identification of language and communication deficits are an essential component for the development of appropriate and effective interventions. Language assessments and interventions can be complicated and difficult to conduct because autistic children have a variety of language issues that are experienced across a broad spectrum.

One of the defining diagnostic criteria according to the DSM-V for Autism Spectrum Disorder (ASD) is a "persistent deficit in social communication and social interactions across multiple contexts" (APA 2013, page 70). Defining deficits for children diagnosed with ASD and can present in a child as a "failure of normal back and forth conversation" (APA 2013, page 70) or "deficits in nonverbal communicative behaviors used for social interaction and include verbal

and nonverbal communication” (APA 2013, page 70). Additionally, the DSM-V now classifies the communication deficit on a severity rating system. These levels range from Level 3, which requires very substantial support with severe deficits in verbal and nonverbal communication skills, to Level 1, which requires some support with difficulties for the child in maintaining reciprocal communication. Once diagnosed with ASD and a level of severity, language and communication continue to have a large impact on the interventions that are implemented with each individual child.

Parents whose children have been diagnosed with ASD often mention that one of the first differences that they noticed was the loss of language in their child by the age of 2. Many are alerted of this deficit by fearing that their child may be deaf at a young age. In looking back over their child’s developmental history, many parents report that their child did not engage in reciprocal play, turn taking, and failed to develop joint attention behaviors (Tager-Flusberg, 2009). Language and communication play a pivotal role in how successfully a child, especially one with autism, adapts and interacts to with the world. The importance of understanding language acquisition and development is crucial in assisting the child with autism to a more positive outcome. Research indicates that the emergence of spoken language is one of the most important variables in predicting positive outcomes in later childhood and adulthood (Tager-Flusberg, 2009).

LANGUAGE THEORIES

It is difficult to understand the language issues facing children with autism due in part to the complexities of human language development and theory. Language, defined as a general term, is, “the human capacity for acquiring and using complex systems of communication”

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(Merriam-Webster.com, 2013), and when used as a general concept, language may refer to “the cognitive ability to learn and use systems of complex communication, or to describe the set of rules that makes up these systems, or the set of utterances that can be produced from those rules” (Merriam-Webster.com, 2013). All languages rely on the ability of an individual to relate symbols with particular meanings and this can be demonstrated both with oral and sign languages. Oral language contains a phonological system that determines how each symbol is used to form sequences known as words or morphemes. In linguistic theory there is a system in place that provides guidance on how words and morphemes are combined to form phrases. Most theories agree that the human language is unique because it relies entirely on social and cultural definitions in order to be learned and expressed by the individual (Santrock, 2011). The system of language that is used in most contexts creates a vast range of possible expressions that can be unique from one individual to another and yet still yield similar results. The normal time period for language acquisition for a child is to develop fluency by the age of three. However, since language is learned almost entirely through social interaction and cultural norms this milestone can have a wide range of variability across cultures and socioeconomic conditions (Santrock, 2011).

Due to the complexity of studying language acquisition, different points of view regarding language have been discussed through several different theoretical approaches. Many theories have emerged over time, attempting to explain how humans acquire language. Among these approaches are the biological, cognitive, sociocultural, environmental, and behavioral theories. Each one approaches language acquisition from a slightly different perspective, and all are important to understand when beginning to study language acquisition.

LANGUAGE THEORY

Biological Theory and Linguistics Theory

According to Noam Chomsky, a renowned linguist, language acquisition is based in its biological influences. He argues that human brains contain what is called a language acquisition device (LAD). This device is a mechanism that children use in order to develop language skills. Chomsky believed that along with the LAD all children are born with “universal grammar” and that this universal grammar is biologically predisposed into each individual’s biological make-up (Cook, 2007). It is because of the biologically rooted universal grammar that all human language has common features across cultures, and children easily pick up a particular grammar once they are exposed to it.

Chomsky observed that the stages of language development seem to occur at the same time in children even if they have different experiences with their environments. He also felt that language development follows a similar pattern across cultures and that children acquire language fairly quickly as language as a whole seems to be learned effortlessly. Chomsky also observed that deaf children, although not exposed to verbal language, develop a language of their own. While studying this individually developed language he found that this language resembled spoken language in sentence structures even across different cultures. This finding offers further support to Chomsky’s tenet that we are born with an innate ability and set of rules and organizing principles of language.

Chomsky believed that it is the biologically based principles of language that explain how a child can develop the complex nature of communication and yet fail to complete simple cognitive tasks. Chomsky’s focus was on describing how language is used and argued that the development of language production leads to greater incorrect responses from the child at earlier stages than at later stages.

Chomsky focused most of his theory on how the system of language works. As the father of linguistics, Chomsky developed the following terms to describe language features. The smallest part of speech is called a phoneme. A phoneme is a distinct set of sounds in a language. Changing one phoneme in a word changes both the meaning of the word and the set of sounds that make the word. For instance, the word “fog” and “dog” use the phoneme of /f/ and /d/ to change the set of sounds in each of those words. He defines that a morpheme is an association of pronunciation and meaning of a word, for example, the word “bugs” has two morphemes: /bug/ and /s/. Both “bug” and “bugs” have a specified pronunciation and meaning that is different from one another. Each pairing, expression and meaning represented by the individual morphemes is to be learned individually by the child. The pairings in a language that are learned are called the lexicons, and the word pairings, for example, “bugs” or “trees”, are called lexemes. The lexemes in a language consist of all word pairings together, such as, “bugged, bugging, bugs and bug”.

For Chomsky the “complete analysis of the lexicon, morphology and syntax of a language is called its grammar”, (Cook, 2007) Chomsky was more interested in describing how language is put together to create a language than defining how language acquisition takes place. He argued that it was a stage process, but did not further define the stages; that task was saved for the cognitive theorists.

Cognitive Theory

Cognitive theories in language were primarily defined by Jean Piaget, who aligned the development of language with that of cognition, posing that a child’s ability to speak and the spoken content are dependent on the current stage of thinking. He asserts that language encompasses both expressive and receptive processes, which use specific cognitive principles for development. Piaget proposed two major principles in his explanation of cognitive development,

and therefore, language acquisition: adaption and organization (Santrock, 2011). Adaption is the child's desire to seek a state of cognitive balance or equilibrium. When a child experiences a discrepancy between what is experienced and what is expected, the child must make an adaption through processes of assimilation or accommodation. Assimilation involves incorporating new information into previously existing structures or schemas. Accommodation, on the other hand, involves the formation of new mental structures or schemas because the new information does not fit into existing structures.

Organization refers to the individual's natural tendency to arrange information into interconnected structures. Piaget contended that an individual moves through biologically triggered stages of development depending on the age of the child. The first stage of development he called sensory-motor stage, which encompasses the first two years of life. It is during this stage of development that the child assimilates information by sucking or grabbing. Piaget defined language at this stage as egocentric (Santrock, 2011). This language is depicted by the child talking to him or herself or for the pleasure of associating others into their language.

The second stage of life is the pre-operational stage. This stage occurring around the age of two and extends to about the age of seven. It is during this stage that the child makes the largest gains in language acquisition. Children begin to develop their mental realities and accommodate many new words and situations into their experiences. It is also during this time that a child's language becomes symbolic (Santrock, 2011) which allows one to talk beyond the simple now moment to express feelings in the future, as well as the past.

The final two stages of development are concrete operational, comprising ages 7 to 11, and formal operational, ranging from age 11 onto adulthood. In this operational period, the child moves from experiencing the world with a concrete perspective, to understanding more abstract

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concepts and terms. For instance, once entirely literal speech begins to incorporate figurative content. During these two periods the child's language develops from immature to mature and from illogical to logical. The ability to view things in more than one perspective is developed and language becomes socialized in order to fit within cultural norms. Piaget maintained that development precedes learning, and that development is stimulated by cognitive conflict.

Socio-cultural Theory

Like Piaget, Lev Vygotsky believed that there was a biological stage for language development. He based his theory of language acquisition on the interaction between the child and his/her environment. He concluded that language is a symbolic system by which we communicate and that this tool is culturally and environmentally cultivated. He theorized that thoughts are private or "inner speech" (Santrock, 2011) and that social interaction plays an important role in the transformational and internalization processes of communication.

Vygotsky introduced the concept that language acquisition first takes place on a social plane. The child observes the parent's behavior, listens to the parent's speech and tries to imitate in a reciprocal interaction. This phase of development is termed social speech and corresponds to the time period between birth and three years of age. The parents then guide the child's efforts, making corrections when required and providing feedback and more challenging speech patterns as the child's language develops. Next, egocentric speech accounts for the period between 3 and 7 years of age. In this stage children use private speech to assist in regulating thought, almost as a running commentary. Vygotsky's concept of inner speech, or the internal plane, is largely developed from the age of 7 on. This idea asserts that as the child becomes more competent,

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information that the child receives becomes internalized as one learns to internally manipulate speech.

Vygotsky's biggest contribution to language development was the concept of the Zone of Proximal Development (ZPD). This ZPD development is identified by tasks a child is unable to accomplish on their own, but is able to complete with the assistance of an adult or more advanced peer. The ZPD utilizes the idea of scaffolding, which is the process of guiding the child from what he or she presently knows to what is to yet to be known, and this in turn moves the child to a new level of development (Santrock, 2011).

Environmental Theory

Moving from biological and cognitive perspectives to environmental theories is a theory by Bruner. Bruner supported Vygotsky's concept of scaffolding but also introduced the idea of "motherese", which is the language the mother, or other caregiver, uses when speaking with her child.

Bruner introduced Three Modes of Representation, which incorporates three stages a child goes through at specific years. Bruner asserts that these stages were triggered by biology, and children move through each while integrating them into the next stage. The Enactive stage appears first and involves the encoding of action-based information and stores it in the child's memory. An example of this stage is when a child is presented a bottle he or she will remember the sucking action (Santrock, 2011).

The second stage is the Iconic stage, where information is stored in the form of images. This stage is approximately from the age of one to the age of six. Bruner felt that at this stage the introduction of a picture paired with verbal stimuli would increase the child's known vocabulary (Santrock, 2011).

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The next stage is Symbolic, which is the final stage and occurs from age seven to adulthood. This stage is when information stored in the form of codes or symbols, which is represented by a culture's language. This stage is the most adaptable and incorporates a fixed relationship between language and the image to create a word. However, these words are flexible and can be organized or used in different ways. In the symbolic stage words represent the language (Piper, 1992). Bruner argued that language allows for the use of complex and flexible cognition and that the use of words as symbols assists the child in the development of new concepts (Applebee, 1986).

Behaviorist Theory

In contrast to the biological and environmental theoretical approaches is the behaviorist theory, which is described by B. F. Skinner in his book, *Verbal Behavior*. Skinner proposed that language is a learned operant behavior, and that the same ideas of behavior that constitute the foundation for applied behavior analysis also relate to verbal behavior. He (1957) starts out his explanation of verbal behavior with the following,

“What happens when a man speaks or responds to speech is clearly a question about human behavior and hence a question to be answered with the concepts and techniques of psychology as an experimental science of behavior” (p. 5).

According to Skinner, humans acquire their ability to talk and understand language the same way that they learn other behaviors as a child. Therefore, language is learned just like the behaviors of walking and crawling. The motor behavior involved in vocal cord movement gets shaped by the effects those movements produce on others, as well as the individual him/herself. The cries of a baby for example, are reinforcing to the baby as the caregiver attends to the child in various ways. It is in this way that crying becomes an initial form of social communication.

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Skinner asserts that language has special properties that include the social interaction between the speaker and the listeners. He proposes that this paired interaction is initiated so that the speaker can gain access to reinforcement and control the environment through the behavior of the listener (Skinner, 1957).

Skinner continues to make a clear distinction between the behavior of the speaker and the behavior of the listener. In his analysis of verbal behavior he is particularly concerned with the behavior of the speaker (Skinner, 1957). He argues against the use of the terms “expressive language” and “receptive language,” because he posits that these two terms are different parts of the same cognitive process (Skinner, 1957). It is important to teach a child to react to the verbal stimuli of speakers, as well as to behave verbally as a speaker, and to understand that these two behaviors are separate. Learning one type of behavior can sometimes facilitate learning in another area, but this learning must also be understood in the behavioral terms of motivation and consequences. Skinner did not feel that learning the meanings of words as a listener and then using the words in various ways, as a speaker was as important as the behavioral reasons behind the listener and speaker relationship.

A common misunderstanding of Skinner’s analysis of verbal behavior is that he rejects traditional linguistics and forms of speech such as nouns, verbs, prepositions, adjectives, etc. He in fact valued both the linguistic parts of language as well as the formal parts of speech. He simply felt that in order to train language, including the structure of words and phrases used, the scientist must also find the motivators for using these words. The causes of specific words and phrases are most generally attributed to cognitive processes, biological structures and not generally thought to be a cause of environmental variables. Skinner, however, asserts that the linguistic markers are still valuable when measuring and studying verbal behavior in a child.

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These two areas of language are described as formal and functional properties of language.

Formal properties involve the complete structure of a verbal response, while the functional properties involve the causes of each response (Skinner, 1957). A complete account of language must consider both of these separate elements. He (1957) suggests that:

Our first responsibility is simple *description*: what is the topography of this subdivision of human behavior? Once that question has been answered in at least a preliminary fashion we may advance to the stage called *explanation*: what conditions are relevant to the occurrences of the behavior--what are the variables of which it is a function? (p. 10).

The field of linguistics specializes in the descriptions of the language system. These structures are measured by (1) phonemes: the individual speech sounds that comprise a word; (2) morphemes: the units “with an individual piece of meaning”; (3) lexicon: the total collection of words that make up a given language; (4) syntax: the organization of words, phrases, or clauses in sentences; (5) grammar: adherence to established conventions of a given language; and (6) semantics: what words actually mean (Cook, 2010).

Skinner argues in his book, *Verbal Behavior*, that language is learned behavior caused by environmental variables that are similar to non-language behaviors such as motivators, reinforcers, or extinction. In Chapter 1, he identifies language as a “functional analysis of verbal behavior” (Skinner, 1957). The functional analysis of language is similar to the functional analysis of behavior analysis and to the treatment of behavioral problems. The first eight chapters of the book describe in detail what a functional analysis of verbal behavior entails and define what a basic elementary verbal operant looks like. The last eleven chapters of the book describes a detailed analyses of how these verbal operants make up components of more complex language skills such as thinking, problem solving, memory, grammar, self-editing, and composition to name a few (Skinner, 1957).

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The formal description of a language according to Skinner is a task that is accomplished by classifying parts of speech such nouns, verbs, adjectives, and adverbs. Sentences are made up of the proper rules as defined by linguistic theory. Formal properties of language include articulation, intonation, and pitch. Formal classification of language can be completed without a speaker even being present (Skinner, 1957).

A large portion of Skinner's theory revolves around the idea that language is acquired based on an individual's behavior. He believed that language, like behavior, is acquired using well-known principles of conditioning, including reinforcement. He believed that children learn words by associating sounds with specific objects. Additionally, he believed that children learn language very effectively by imitating other adults or peers. Adults assist in the active learning of language with children by teaching them with feedback and reinforcing the correct speech patterns of the child. For Skinner this means that it is vitally important to know and understand both the presence of language as a stimulus in order to produce the best response, which can be reinforced. Skinner's verbal behavior theory uses an operant conditioning approach, an example of this is of approach is a child who wants to play with a ball. If the child asks for a "bubble", and receiving a "ball" reinforces the child, then the response will, over time, become a conditioned response. For Skinner, this illustrates the importance of Pavlov's experiment as it applied to verbal behavior, which stresses that, both a stimulus and a response work together. In his view, babies' language habits are developed and reinforced by receiving reinforcement for basic babblings, which then later develops into utterances, and then appropriate words for rewards. The baby develops language by trial and error of sounds, groups of sounds, and eventually for sentences and phrases. With continued shaping and exposure to more complex

language structures, these errors will be replaced with the correct structures of speech (Skinner, 1957).

Language Considerations for Autism

Research in autism has identified two core communication deficits in children, which are joint attention and symbol use (Sigman and Ruskin, 1999). If a child has deficits with joint attention he or she will typically have difficulty maintaining attention between multiple people and objects. Autistic children show weaknesses in following directions, paying attention to others, shifting their gaze appropriately and sharing and understanding the emotions of others. These areas of communication are essential for a child to have successful interactions with verbal behavior and to have a shared experience with others. Additionally, joint attention is a major predictor for successful language acquisition and should be a primary goal in early communication interventions for autistic children. Autistic children may have difficulty using appropriate gestures, using objects appropriately, learning the correct meanings for words, and poor or absent symbolic play skills (Sigman and Ruskin, 1999).

Unlike deaf children, children with autism are not likely to compensate for a lack of verbal skills with the use of gestures. In fact, autistic children only use primitive gestures and rarely use conventional gestures to communicate. Many children on the autism spectrum will pull another's hand or lead adults to what they want but do not utilize more conventional gestures such as nodding, waving or pointing (Wetherby et al., 1998).

The typical development for children with autism and language acquisition begins with a long period of echolalia, which is the repeating of others speech. The repetition often sounds like an echo and may be either delayed or immediately spoken. However, not all echolalia is

functional language and may not be a function of language development. An example of this is when a child repeats a phrase over and over to relieve a particularly stressful situation. If a child with autism is using echolalia toward language acquisition it will usually begin as single word utterances for events, objects or situations. As time goes on the child will begin to break down larger portions of language into more meaningful parts of language (Prizant and Rydell, 1993). If an autistic child moves beyond echolalia they will begin to develop skills with grammar and parts of speech in the same way as a typically developing child. However, they may still maintain difficulty with joint attention, following social cues, being able to maintain eye contact, and shift between the speaker and listener roles that are present in normal social communicative interactions (Tager-Flusberg, 1996).

VERBAL BEHAVIOR

One of the benefits to B. F. Skinner's theory of verbal behavior is that he outlines a very clear behavioral approach when assessing and intervening with children who have deficits in language. Verbal behavior, according to Skinner, is defined as behavior where the listener gives reinforcement to the speaker and that verbal behavior includes both vocal verbal behavior and nonverbal verbal behavior. Skinner identified several types of verbal behavior, including verbal operants called mands, tacts, intraverbals and echoics; he placed these verbal operants in the category of expressive language (Skinner, 1957).

Additionally, Skinner found a clear relationship to these verbal operants and antecedents, responses and reinforcements. The first skill that a child must display in order to learn verbal behavior is to have an established and working skill of imitation. Skinner believed that without the ability to imitate it would be nearly impossible to teach verbal language to a child. If a child

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can only initiate random babbling or random utterances as a response to a verbal stimulus correct verbal operants can never be appropriately reinforced. When a child, for example, is learning to tie a shoe, the child will first have to have developed a good motor imitation skill, in order to copy the movements required to tie shoes. The same process is true with language; in order for the child to learn to speak, he or she will have to have developed strong verbal imitation skills. This ability is described as an echoic, or the verbal operant used to describe verbal imitation according to Skinner's (Skinner, 1957). An echoic is controlled by someone else's behavior and is usually accomplished with one-on-one interactions with this other person; Skinner describes this interaction as point-to-point correspondence. In this interaction the mother says, "Milk" and the child will echo exactly what she says and respond with "Milk". The mechanism for reinforcement is not present for the child if he or she cannot mimic the word from the other participant. If the child does not have the ability to echo and does not have an established echoic repertoire, the child will not imitate the words that are given to the child for learning language and these words when imitated correctly will not be reinforced to further strengthen speech development. It is also essential for the child to have mastered echoics before he or she advances to more complicated verbal operants because the use of echoics is a key component used when teaching these additional skills (Skinner, 1957).

The mand is defined as a verbal operant that's use is controlled by the child experiencing a state of aversion or deprivation, in this way the use of the mand creates a self-reinforcing situation. A mand is generally used when the child wants to request or obtain something he or she wants. If the child wants milk, the child will say, "Milk," which means that the child is requesting milk from his mother. The lack of milk and then the child being given milk upon request is reinforcing to the child. The positive outcome, which is reinforcement, will make it

more likely that the child will ask for milk again in the future as a similar result is anticipated. One easy way to remember the meaning of mand is to associate it with the words “demand” or “command”. Learning how to use the mand request is one of the first steps in teaching children language because of the strong relationship to the child’s internal motivation. The child wants the milk, says, “Milk”, receives milk and this positive reinforcement for saying, “Milk” is reinforced by the desire to have milk. Manding increases language because along with the positive reinforcement the child receives; the child also begins to associate the sound of his voice along with the request with positive outcomes (Skinner, 1957).

Tied to the mand is the concept of motivative/establishing operations (MO/EO). The MO/EO is a set of environmental events that temporarily alter the value of other stimuli or events as reinforcements, which then evoke the child’s behaviors that have been produced in the past. Like the mand itself, the MO/EO relates to a child’s perceived conditions of deprivation and aversion. When the child does not have a desired object, the MO/EO for the item is high as deprivation causes the item to be more attractive to the child. For example: if a child who loves Cheerios has not had any for weeks, the MO/EO or the desire for Cheerios is probably very high. If a parent takes a bowl of Cheerios and offers some to the child, it is likely that teaching the mand for Cheerios would be pretty easy. The teaching instruction for this treat would be accomplished by holding it up and saying, "Cheerio." A child with a strong echoic repertoire will probably echo, "Cheerio," which is then reinforced by giving the child the desired Cheerio. Once this has been accomplished several times, the child will begin to mand "Cheerio" in the presence of the bowl of Cheerios. The child has associated that when his MO/EO for Cheerios is strong and he says, "Cheerio" this action has, in past experience, led to the receiving of Cheerios. Once, however, the child has eaten an entire bowl of Cheerios, the high value of the MO/EO is gone

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and the mand will be less likely to occur. This highlights the fact that MO/EO is dynamic and its usefulness depends on the conditions that have been established. When teaching mands to children, it is also important to remember that the use of the MO/EO can be one of the single most important motivating variables in teaching children language (Skinner, 1957).

Once the child has a strong echoic repertoire and has acquired many consistent mands, the next step in teaching language to a child is to introduce them to the tact. The tact is a verbal operant described by Skinner as one that is under the control of the nonverbal environment. This verbal operant also includes parts of speech and includes nouns, verbs, adjectives, and adverbs. Tact can be thought of as a label that is used to describe something in the environment. The word tact comes from Skinner's idea that this comes from the child's desire to make contact with the environment. Tacting and manding are very different. If a child sees a Cheerio and says "Cheerio," but has just eaten breakfast or has already had a considerable amount of cheerios and the MO/EO is weak, the saying, "Cheerio" is not functioning as a mand, but as a tact. To demonstrate tact a child could say, "Do you see that Cheerio?" Since this commenting is something that is done all the time in language and communication, it is hard to demonstrate, but it is a way of labeling what is seen in the environment. Because the tact and mand are different and serve different functions, they are also reinforced differently. To reinforce the tact the delivery of the item named is not appropriate because the tact is not reinforcing in itself. Giving the child a general reinforcer such as praise or confirmation reinforces a tact. Some examples of reinforcing tacting in a child would be by praising him or her with responses such as, "Good job! That is a Cheerio!" or "You're so smart, that is a Cheerio!" Reinforcement can also be paired with a primary or tangible reinforcer that the child is highly motivated with by saying, "Wow, you are doing such a great job! That is a train. Here's your iPad." The use of tact occurs in our

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everyday conversational language and makes up a large part of what is spoken. Due to the importance of learning to tact and its impact in day-to-day language it is usually a major focus of many discrete trial training programs (DTT), although echoics and mands are far more important when first teaching language to children. For this reason the MO/EO is still a critical component in tact training. The difference between the MO/EO in tact training from mand training is that the MO/EO is paired with a reinforcer that is different from the target stimulus (Skinner, 1957).

Requests and vocabulary, or mands and tacts, are very important in language acquisition. Another operant essential to language development is the intraverbal. The intraverbal is a verbal operant that is under the control of other verbal operants and is strengthened by social reinforcement. Intraverbals are defined as verbal operants that are used in terms of conversational language because they are responses to the verbal behavior of another person (Skinner, 1957). These responses are most likely used in response to “who, what, when, why or where” questions. Skinner identifies two types of intraverbals, the fill-in responses and the responses to “who, what, when, why and where” questions. For instance, the child may be asked to respond with an intraverbal to his mother saying, “Hey sweetie, we are going to the zoo to see...” and the child will answer with, “Lions and tigers and bears.” this type of response would be the intraverbal classification type of a fill-in because the child is using their own unprompted language to fill in the missing parts of the conversation. If the child’s mother asks, “Where are we going today?” and the child responds with a unique answer of, “To the zoo”, it is an example of the intraverbal classification type of a wh-question (who, what, when, why, where or how). Intraverbals give the child an opportunity to discuss ideas and concepts that aren't present, which occurs in most day-to-day conversations. When using an intraverbal, what the child says in response to the caregiver or peer's language does not match what the adult or peer said originally,

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the child expands the nature of the communicative response by coming up with an independent answer to the query. When teaching a child how to use intraverbals there are a few ways that intraverbals can be reinforced. These reinforcers can be praise, generalized reinforcers, or, simply the natural continuation of the conversation. This is demonstrated as, "Where are we going today?" "To the zoo!," followed by the intraverbal response and natural reinforcement of "Wow, the zoo! I can't wait to go with you!" When instructing a child on the proper use of an intraverbal, the first step is to introduce a question and then prompt the child's response with the use of an echoic. To optimize this trial, a reinforcement based on the MO/EO that best works with the child when the response is echoed correctly may be used (Skinner, 1957).

Verbal behavior following Skinner's approach mirrors that of Applied Behavior Analysis (ABA), which is the application of behavior analysis and the modification of behaviors as part of a learning process (Sundberg, 2011). The process starts by assessing the relationship between a targeted behavior and the environment, and concludes with the use of ABA methods to change that behavior. Skinner argues that in order to develop verbal behavior an understanding of the principles that explain how learning takes place is essential. In the area of verbal behavior, a behavioral approach includes the principles of reinforcement, fading, shaping, chaining, extinction, generalization, discrimination and task analysis to foster language development and communication in a child (Skinner, 1957).

Reinforcement is the process by which a behavior is strengthened in frequency, rate, duration or intensity. Reinforcement may occur naturally or be planned and has the sole function of increasing or maintaining a desired behavior. There are two types of reinforcement that can be used, either positive or negative and both work to increase or maintain the desired verbal behavior in a child. Fading is the systematic and gradual removal of prompts or cues that are

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used to foster a response from the child. Shaping is the method used to establish a response from the child. It reinforces subsequent responses that are closer and closer to the final desired response. If you want the child to say, "I want to eat Cheerios" you would reinforce for the mand, "eat" and the tact, "eat Cheerios," and finally to the phrase, "I want to eat Cheerios." Each step of the process involves reinforcement at closer responses and non-reinforcement of more distant responses.

Chaining is a more complicated process, which results when one response alters some of the variables that control a consecutive response. For example, the first word a child mands in saying a phrase becomes part of the stimuli that controls the next verbal operant he or she may say. Each response spoken alters to some degree the stimuli to which the child responds.

Extinction is the operant behavior that discontinues a response. In behavioral conditioning, extinction is presenting the conditioned stimulus that is no longer in relation to, the unconditioned stimulus (Skinner, 1957).

Generalization is observed when the spread the effects of reinforcement from the original stimulus to another stimulus as a means of supporting the desired behavior or language in various settings. Discrimination refers to the ability of the child to discriminate between a set of different stimuli responses. An example of this is when a child no longer generalizes all furry four legged animals as dogs and now can discriminate if the animal is a cat, bunny, or cow. Task analysis is used when breaking down a complex skill, job or behavior that occurs with a chain of smaller steps into its simplest chain of events. Each component is stated in its order of occurrence and each component sets the occasion for the occurrence of the next behavior. Task analyses are used in planning specific stimulus control and chaining procedures. There are two types of task analysis: rational and empirical. Rational task analysis is used when studying the

subject matter and specifying the process or procedure that is presumed while completing a task. The empirical task analysis is based on observing individuals who are completing the task actions (Skinner, 1957).

In addition to using these behavioral principles in using verbal behavior, Skinner also stressed the importance of using behavioral procedure methods. Some of these methods include discrete trial learning, data collection, peer interactions, functional analysis and parent involvement. Functional analysis of verbal behavior provides evidence of defective mands, tacts or intraverbal responses. A functional analysis is used when determining why a behavior occurs, and which behaviors can be manipulated in order to identify which function is really maintaining the undesirable behavior. Discrete trial learning consists of four parts: (1) the instruction is stated concisely, (2) the child's response is identified as compliance or noncompliance, (3) the consequence is provided based on the child's response, and (4) a pause before starting the next trial. Skinner's verbal behavior theory takes all of these concepts into account when describing how to understand, assess for, and teach language to children, especially when the child has language delays or deficits (Skinner, 1957).

VERBAL BEHAVIOR ASSESSMENT

Verbal Behavior – Milestone Assessment and Placement Program

In order to begin to assess a child's verbal behavior ability it is essential to understand how these verbal operants work so that an accurate assessment of the child's current language skills can be determined and an appropriate level for instruction can be formulated. Once the child has developed strong echoic skills the child can be taught across all the functions of language by prompting echoically and using differing reinforcements. Teaching of verbal

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behavior can be enhanced by using a variety of verbal operant targets, providing easy and difficult tasks, and utilizing clear instructions aimed toward fluency. According to Mark Sundberg, this combination of curriculum and teaching procedures has led to great success for many children with autism. Sundberg emphasizes how important it is to teach children using verbal behavior theories and that these techniques can be effective for anyone whose language is delayed or disordered. Sundberg also stresses that with this teaching style, technique or curriculum does not differ based on the level of instruction a child may require; all learners who need language instruction can benefit from ABA with a focus on teaching verbal behavior (Sundberg, 2008).

When assessing and teaching children with language deficits it is also essential to know how to measure language in order to clearly identify the independent and dependent variables. When measuring language the main focus is on the topography and structure of language and the incorporation of well-known linguistic terms such as phonemes, morphemes, lexicons, syntax, grammar and semantics. The length of words, phrases, and sentences that a child utters breaks down the measurement. Language is also measured by the parts of speech, which include verbs, nouns, adjectives and adverbs. Language can then be further classified into categories, which include echoic and imitation, (repeating words), copying-a-text (copying verbal behavior of others), transcription (written or typed response), and listener (reinforcer for the speaker). The purpose of a language assessment is to identify the verbal skill, language barriers, and to develop teaching strategies to foster language development (Sundberg, 2008).

There are only a few types of verbal assessments available to assist with the assessment and monitoring of progress with verbal behavior. The VB MAPP is one of these assessments and

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will be discussed in detail. Others include the Peabody Picture Vocabulary Test, and the Expressive One-word Vocabulary Test. The Peabody Picture Vocabulary Test (PPVT-III) measures receptive vocabulary and screens for language variability and proficiency (Pearson, 2007). This assessment requires no reading or writing and is fairly easy to administer. It is generally used with preschool children and with children who have been identified with having autism. The PPVT-III can be used with ages two to ninety and tests areas of listening comprehension. There are two different forms used with the PPVT-III and each form has four separate training areas and 204 test items ranging in difficulty. During the test session the examiner presents an oral stimuli word and a set of pictures and the child is asked to select the best picture representation of the word. The test continues until both a basal and a ceiling of items in each section are established, basal is established by correctly selecting five items in a set and ceiling is established when the child makes eight or more errors in a set. The PPVT-III takes about 12 minutes to administer all five sets in the test (Pearson, 2007).

The Expressive One-word Vocabulary Test (EOWPVT-4) assesses expressive vocabulary. It is appropriate for testing individuals ages two to eighty (Pearson, 2010). The EOWPVT-4 is an assessment of how well an individual can name each object seen in a set of photos. The test contains 190 items presented in sequence. The EOWPVT-4 contains age-related starting points and ceilings, which are met when the examinee makes a specified number of consecutive errors. The EOWPVT-4 takes about 20 minutes to administer (Pearson, 2010).

The Verbal Behavior Milestone Assessment and Placement Program (VB MAPP), was developed by Mark Sundberg in 2008 and has five components. The first component is the Assessment, designed to provide a sample of the child's existing verbal skills. It contains 170 measurable language milestones that are spread across three developmental levels. These levels

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include 0 to 18 months, 18 to 30 months, and 30 to 48 months. The skills assessed are mand, tact, echoic, intraverbal, listener, motor imitation, and independent play, social and social play, visual perception and matching to sample, linguistic structure, group and classroom skills, and early academics (Sundberg, 2008).

The second component included is the Barriers component, providing an assessment of 24 common learning and language acquisition barriers, which are commonly faced by children with disabilities. The barriers included in the assessment include behavior problems, instructional control, impaired mands, impaired tacts, impaired echoic, impaired intraverbals, impaired imitation, impaired visual perception and matching to sample, impaired listener skills, impaired social skills, prompt dependency, scrolling, impaired scanning, impaired conditional discrimination, failure to generalize, weak motivators, response requirements weakens the motivators, reinforcer dependency, self-stimulation, impaired articulation, obsessive-compulsive behavior, hyperactive behavior, failure to make eye contact and sensory defensiveness. By identifying these barriers the clinician can develop specific intervention strategies to help overcome these problems, which can lead to more effective learning (Sundberg, 2008).

The third component is the Transition Assessment, which contains 18 areas and can identify whether a child is making meaningful progress and has acquired the skills necessary for learning in a less restrictive education environment. This assessment provides a measurable way for a child's individualized education program (IEP) team to make decisions and to set priorities in order to meet the child's educational needs. It is comprised of several summary measures from other parts of the VB-MAPP and other skills that affect transition. It includes measures of the overall score, from the assessment, barriers, as well as including measures on negative behaviors, classroom routine, group skills, social skills, academic independence, generalization variation of

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reinforcers, rate of skill acquisition, retention, natural environment learning, transfer skills, adaptability to chance, spontaneity, independent play, general self-help, toileting skills, and eating skills (Sundberg, 2008).

The fourth component is the Task Analysis and Skills Tracking, which provides a breakdown of skills and serves as a more complete and ongoing learning and language curriculum guide. There are close to 900 skills presented covering the 16 different areas of the VP MAPP. Once the milestones have been assessed and the general skill level has been established, the task analysis can provide further information about a particular child. The skills that are identified on the task analysis contain a wide range of target areas. These skills may not be significant enough to identify as Milestones or IEP goals, but assist in moving the child toward a more typically developing communication profile. It also provides parents with activities that can facilitate generalization, maintenance, spontaneity, retention, expansion and the functional use of skills in a variety of educational and social contexts. This component presents a very new addition to the VB MAPP (Sundberg, 2008).

The fifth is called the Placement and IEP Goals; this section incorporates the other four sections and integrates possible IEP goals for each child. This section assists in placement recommendations and can create a balanced intervention program including all relevant IEP areas (Sundberg, 2008).

The primary goal of the VB MAPP is to identify the baseline of a child's skill and then compare it to a typically developing child. If an intervention program is created and utilized the assessment can provide guidance in terms of what skills should be focused on, what level the intervention should begin on, what barriers to learning and language acquisition should be addressed, what types of augmentative communication styles are best, what teaching strategies

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are most effective for the child, and what type of educational setting the child will be most successful in. Additionally, the VB MAPP can be used to progress monitor the child at various times to track and compile data and update or change IEP goals as well as intervention strategies. Some teaching strategies with the VB MAPP for language acquisition include pairing verbal stimulus with conditional discrimination, listener responses, language development curriculum, stimulus to stimulus pairing, reinforcement, mixing verbal operants, transfer of stimulus control, and augmentative communication (Sundberg, 2008).

Sundberg outlines several important key elements to keep in mind when administering the VB-MAPP. There are no age or diagnostic criteria for administering the VB-MAPP; the one criterion is that the individual being assessed has a language delay. Sundberg stresses the importance that the administrator understand Skinner's theory of verbal behavior and that they also have a strong grasp of linguistics. It is also important that the administrator understand how parts of speech are used in language. Many of the skills assessed in the VB-MAPP can be observed by simply watching the child in a classroom or social setting rather than a clinical setting if the information can be gathered by other means. Some of the skills have time frames that must be followed and are best tested in a more formal setting with a test administrator (Sundberg, 2008).

Sundberg presents four different types of testing possibilities of the VB-MAPP, which include: formal testing, observation, and either formal testing or observation and times observation. Formal testing includes asking the child to complete a task in a more formal setting with the child and the administrator present. Observation can be more unobtrusive with the administrator simply observing the child to see if any of the target behavior takes place in the social, home or educational settings. Timed observation is when the targeted behavior occurs in

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a particular time period as specified by the test protocol. The time periods can be broken up into sessions if necessary. The testing protocol is followed in sequence, but not all areas must be tested in one testing session. Formal settings and observations can be used to create the best testing environment for the individual child (Sundberg, 2008).

Sundberg also suggests that before the assessment is started that the administrator has the child's family complete a reinforcement survey to give the administrator some ideas of the child's interests, and background information. This information can be used as talking points with the child during the skills assessment. He also suggests that the administrator establish a rapport with the child, have reinforcements on hand, take mini breaks, avoid prompting or cueing the child, give only a three to five second response window, and keep the assessment fun and positive by ending on a positive note or correct response. Materials that are required for the assessment for all three levels include; the protocol, pencil, stopwatch, and reinforcers. Testing materials for level one through level three vary and range across developmental levels (Sundberg, 2008).

Scoring the VB-MAPP includes the ability to administer and record four different testing sessions. It is recommended that the VB-MAPP be administered to a child only once per academic year. The master-scoring sheet can be used to formulate a profile for the student. There are only three options for scoring on the VB-MAPP, consisting of a 0 for not tested or achieved, $\frac{1}{2}$ for a score that demonstrates some skill and a 1 if the skill is achieved. For each section the total scores are added up for a total score and transferred to the milestone master form. If the skill received a 1 then the entire block is to be filled in, if a $\frac{1}{2}$ was received, half the block is to be filled, and if 0 was achieved then the box for that skill should not be filled. If the skill was tested and the child received a 0 there is a circle below the skill that can be filled in

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(Sundberg, 2008). There are 35 pages of task analysis in the protocol of the VB-MAPP that can provide skill tracking and direction for the 93 skills identified, as well as intervention and curriculum suggestions for each child (Sundberg, 2008).

The National Autism Center, Standards Report (NAC) report (2009), places the VB MAPP and its practices and research in the behavioral package, which is in the established area. It defines these interventions as interventions used to reduce problem behavior and teach alternative behaviors through behavioral change principles. The VB-MAPP falls into this area because it uses the concepts and principles of applied behavior analysis, behavioral psychology and positive supports. According the NAC established treatments are “considered sufficient evidence is available to confidently determine that a treatment produces beneficial treatment effects for individuals on the autism spectrum. That is, these treatments are established as effective” (NAC, 2009). The VB-MAPP itself is not critiqued by the National Standards, but it is included in the studies examined for the behavioral package. Because of the lack of specific evidence for this program, more research is needed in this area in order to show empirical support for the VB-MAPP.

Mark Sundberg began his research in the area of verbal behavior in 1977 with sign language. Soon after he began working with the concepts of Skinner’s verbal behavior and focused on automatic reinforcement in early language development. Throughout the 1980’s Sundberg began to further explore and research the concepts of mand, tact, and intraverbals in many different ways. He began working with children with language delays and disabilities in the 1990’s testing the acquisition of these tasks with this special population. In 1998 Sundberg and Partington developed the Assessment of basic language and learning skills (ABLSS) program. From the late 1990’s to the early 2000 Sundberg shifted his research to focus on using

his well-established strategies to work with children with autism. In his research with mand training, Sundberg was able to increase a child's ability to mand by 51% and by 85% in a later study (Sundberg, 1987; Sundberg 1987). In a 2002 study his study yielded a 90.5% mean increase when teaching mands to students with autism. The positive results of these studies led to the development of the VB-MAPP.

VERBAL BEHAVIOR INTERVENTION

Picture Exchange Communication System

There are quite a few suggestions for interventions for developing language and communication for children with autism. This paper will focus on the Picture Exchange Communication System (PECS). PECS was developed in 1985 as a system for alternative communication for individuals with language delays or deficits due to autism (Bondy, 1985). PECS has been recognized for focusing on the basic components of communication. The system of PECS is easy to use and does not contain complicated materials. The PECS system is inexpensive and designed for use in a wide range of settings from home to school. The PECS intervention begins with the exchange of a picture for a desired item. Once the child initiates the exchange with the picture the requested item is immediately given to the child as a reward and reinforcement.

Once this pattern is mastered by the child, the PECS continues to build on this concept to teach the child discrimination skills and then moves up to more advanced techniques by teaching the child how to put multiple pictures together to form simple sentences. Later in the more advanced phases of the PECS program the intraverbals are taught to the child enabling him or her to converse fully with others. Like the VB-MAPP, the PECS intervention and teaching techniques are based on the concepts of B.F. Skinner and his theory of verbal behavior. The

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verbal operants described in Skinner's book are used as building blocks for instruction in the PECS system. The PECS system does not use verbal prompts which eliminates the child's dependency on verbal prompting. PECS's main goal is to give a child a form of communication and assist in language development non-verbally; however, some individuals have even been successful in developing speech by using the PECS intervention. Currently there is a voice output application of the PECS system that can be used on mobile devices for students who are more non-verbal (Bondy, 1985).

There are six phases of the PECS system. The first phase teaches the child how to communicate by teaching the child to exchange single pictures for desired items or activities. The second phase teaches the child distance and persistence, which still uses single pictures, but allows a student to learn to generalize new skills by using it in different places, with different people, and across distances. Students are also taught to be persistent with their communication. The third phase teaches picture discrimination. In this phase students learn to select from two or more pictures and are asked which object is their favorite. These pictures are placed in the communication book, which is a ring binder with Velcro strips where pictures are stored and easily added and removed for convenient communication. Phase four focuses on sentence structure, which teaches students to learn to construct simple sentences on a detachable sentence strip using an "I want" picture followed by the requested item. In this phase, students also learn attributes and language expansion to quickly expand their sentences by adding adjectives, verbs, and prepositions. Phase five assists the students with answering questions and teaches the student how to use PECS to answer the question "What do you want?" Phase six completes the system by teaching the student how to comment and in this phase students are taught to comment in response to questions like "What do you see?" "What do you hear?" and "What is it?" (Bondy,

1985).

The developers of PECS use the Pyramid Approach to Education in their instructional processes. The Pyramid Approach to Education establishes effective learning environments for individuals with developmental disabilities and/or learning impairments. This approach was designed by Dr. Andrew Bondy, and is also based on the principles applied behavior analysis (ABA). In his model, the PECS program can be taught and reinforced in many areas of the child's life, especially the home and classroom. There are two learning elements in the Pyramid Approach: structural and instructional. Structural elements make up the base of the pyramid and create a solid foundation for learning. These foundation elements are functional activities and communication, reinforcement, and the identification of inappropriate behaviors. Instructional elements make up the top of the pyramid and create effective teaching strategies and lessons. The top of the pyramid consists of lesson formats, teaching strategies, and prompting strategies. The pyramid illustrates how and what to teach and how to create an individualized intervention for each child (Bondy, 1985).

PECS was rated by the National Autism Center, Standards Report (2009), as an emerging intervention, with 13 studies assessing its effectiveness at the time of the review. For an intervention to be considered emerging means that, "although one or more studies suggest that a treatment produces beneficial treatment effects for individuals with ASD, additional high quality studies must consistently show this outcome before we can draw firm conclusions about treatment effectiveness" (NAC, 2009). By being placed in the emerging category, PECS interventions show positive and favorable outcomes when used properly, but more research and data needs to be collected before it is fully established as a treatment of choice.

According to a meta-analysis of the effectiveness of the PECS system with children on the autism spectrum, the following statement sums up PECS, “overall effectiveness of the PECS approach for communication outcomes with children with ASD is promising although not established” (Flippin, 2010). The meta-analysis goes on to further explain its conclusion by examining both communication and speech outcomes separately.

For the communication outcomes the meta-analysis found that there were increases in communication with single-subject studies as well as in group studies. In the single-subject studies the reported effect size was 0.51, which indicates that the PECS interventions had a positive and effective outcome on children with autism. One caveat to this finding was that non-verbal communication methods such as sign language had better long-term outcomes than did verbal communication. Due to limited data on generalization and maintenance across all the studies there are limited gains reported and this area requires more study in order to determine the effectiveness with PECS and children with autism in this area. In group settings the effect sizes for communication gains by using the PECS system was negligible, the effect size overall was a 0.04, which does not indicate strong empirical evidence that group settings work well for this intervention.

Although the PECS intervention was not developed as a tool to teach language to children with autism, there does seem to be speech gains attributed to this system. In a review of the single-subject test data the effect sizes for this group ended at 1.37, but for groups the effect size was negligible at 0.17. Again, for speech outcomes, generalization and maintenance phases were not built into the studies so limited data is available on the ability for the child to maintain these gains over time and to generalize across settings. Although this data does suggest that there are some positive outcomes of using the PECS, due to a lack of research, it is unclear what

those outcomes are as a whole.

CONCLUSION

Language is a complex system that has many ideas, from varying disciplines within psychology that seem to drive and explain its form and function. Humans, whether it is demonstrated verbally or non-verbally, use language, in order to communicate desires and needs to the world. It is an essential developmental milestone that enables those who use it to successfully navigate a variety of environments. It is essential to create relationships with others and to be successful in the world. Children with autism seem to have a common deficit when it comes to language acquisition and these deficits can take many different forms. Determining the exact nature of a child with autism's language strengths and weaknesses is essential to successful acquisition of these skills. By using Skinner's theory of verbal behavior and incorporating these measures and assessment criteria in a scientific process assists the child in making strides to independent communication. Using the VB-MAPP as an assessment tool and the PECS system as an intervention for language is a valuable tool for most children with autism. Both the VB-MAPP and the PECS can have lasting positive effects for assisting children gain language. Ensuring that a child is as verbal as possible is essential as the more communication a child utilizes will result in a greatly enhanced the life and yield greater positive outcomes in adulthood.

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