

Applied Behavior Analysis as an Intervention Strategy in Learners with Autism Spectrum Disorder

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Abstract: Autism Spectrum Disorder is a neurological developmental disorder that affects a child's ability to communicate, and socialize. Children with ASD as well have nonfunctional repetitive behaviors, activities and restricted interests. Many children with ASD may have intellectual disabilities, anxiety and sensory processing disorders in a comorbid state. Commonly, learners with ASD exhibit inappropriate and challenging behaviors that comprise attention and in turn significant time is lost redirecting behavior in class and during therapy sessions. Unwanted Behaviors in learners with ASD play three functions inclusive of avoiding work, earning a reward and getting attention. Managing unwanted behavior require that teachers and families identify the core triggers and functional cause of the targeted behavior. This is usually achieved through conduction of an objective process known as functional behavior analyses. When this is done successfully then what follows is a scientific behavior modification approach known as Applied Behavior Analyses. This paper discusses the nature, principles and goals of Applied behavior analyses. A thorough review of literature from researchers and behavior management experts has been conducted to compile it.

Key words: applied behavior analyses, comorbidity, target behavior, discrete trial teaching, pivotal response teaching, functional behavior analyses, early intensive behavior intervention, positive behavior support

I. INTRODUCTION

Autism Spectrum Disorder (ASD) is a developmental disability that is caused by differences in the brain (CDC, 2020). It is characterized by a triad of deficits involving, communication, reciprocal social interaction, restricted repetitive patterns of behavior interests and activities (Ospina, et al, 2008). It is a neurological disorder that affects affectivity and social relation of the individuals. Monotonous and stereotyped activities are also common in the affected individuals. Many of the individuals with ASD present language disorders, and intellectual disabilities (Bartolomé-Villar et al., 2016). Around 70% of individuals with ASD have intellectual disabilities while 25 % have epilepsy. (Ospina, et al., 2008). Further, research indicates that up to 40% of children with Autism Spectrum Disorder (ASD) exhibit co-occurring anxiety symptoms (Lei, 2017). More than 90% of Individuals with ASD also have a condition known as sensory processing disorder arising from dysfunction of one or more of the eight sensory modalities (Wairungu, 2020).

While it is not very clear what causes ASD, researchers are in agreement that its *etiopathogenesis* is multifactorial. The

condition originates from a complex interaction between genetics and environmental factors. The prevalence of ASD has enormously increased over the past few decades. Its current rate of increase is unprecedentedly high throughout the world. In USA for example, it is as high as one in every 68 children (Keenan, et al., 2014). The conditions prevalence is growing at a startling rate of 10-17 percent per year, causing a national health crisis in many parts of the world. It for example costs the U.S. government billions of dollars annually (Wang, 2009). Increased awareness of ASD and the screening of a wider range of children for ASD have both resulted in an increasingly heterogeneous population of children with ASD (Roane, et al., 2016).

Current diagnosis of ASD includes a variety of disorders inclusive of genetic disorders with features of ASD such as fragile X syndrome, Rett syndrome, and *tuberous sclerosis*. It also includes idiopathic forms with unknown causes (Brasic, 2020). Most recently, DSM-V unified the four DSM-IV diagnostic categories of Autistic Disorder previously referred to as Autism, Asperger's Disorder, Childhood Disintegrative Disorder, and Pervasive Developmental Disorder Not Otherwise specified, into the single category of Autism Spectrum Disorder (Evans-William & Williams, 2016). The Changes to diagnostic criteria in the Diagnostic and Statistical Manual of Mental Disorders, 5th Edition (DSM-V) therefore eliminated several sub diagnostic types using only one term for all "Autism Spectrum Disorder". The requirements for this diagnosis also decreased from three criteria (social reciprocity, communicative intent, and restricted and repetitive behaviors (in DSM-IV-Text Revision) to two criteria (social communication/interaction and restricted and repetitive behaviors in DSM-V (Shenoy, Indla & Reddy, 2017). The disability is referred to as a spectrum because the learning abilities, cognition and problem-solving skills of individuals range from gifted to severely challenged (Wairungu, 2020).

Autism Spectrum Disorder is a lifelong condition that is most usually noticeable by the time a child turns three years. Some children with ASD seem to develop typically until they turn around 18 to 24 months stopping to gain new skills thereafter. Some skills already gained could also be lost. Research indicates that one third to half of parents of children with ASD noticed an indicative problem before their children's first birthday. Further, nearly 80%–90% of parents reported noticing problems by 24 months of age (CDC,2020). Being a disorder of development, individuals clinical picture

could dramatically evolve. Some symptoms may change, emerge or disappear with age (Evans-William & Williams, 2016). While the condition can never be fully healed, its symptoms may improve over time depending with intervention strategies adopted.

Recommended intervention treatment involves various therapies inclusive of applied behavioral analysis, speech therapy, and sensory integration therapy. Medications have also been used to address behavioral symptoms. Techniques such as stem cell therapy and hyperbaric oxygenation have also been recently tried (Shenoy, India & Reddy, 2017). Applied Behaviour Analysis is significantly related to best outcomes when used especially with family involvement and training (Keenan, 2014). This paper discusses the nature, goals and principles behind Applied Behavior Analyses as an intervention strategy for learners with Autism Spectrum Disorder.

II. TRIGGERS OF CHALLENGING BEHAVIOURS IN LEARNERS WITH AUTISM SPECTRUM DISORDER

Challenging behaviors are common in learners with ASD often lasting across lifespan. They are barriers to effective education, and social development of affected learners (Matson, et al., 2008). They also contribute to high risk of later social problems and failure in academic progress. Further, they are not only harmful to the affected child but could hurt other parties (Beh-Pajoo, et al., 2011).

Severity of ASD correlates proportionally to the number and intensity of challenging behaviors (Matson, Wikins & Macken, 2008). While Challenging behaviors run across lifespan and have no known cure, core behavior deficits can be ameliorated through early intensive behavioral and educational interventional therapy (Shenoy, Indla & Reddy, 2017). Triggers of challenging behaviors vary with individuals. Children with Autism Spectrum Disorder (ASD) for example have difficulties understanding what's happening around them. They may not understand verbal and nonverbal language of those around them. Equally, they lack an effective way of communicating their own needs. This at times lead to their frustration expressing themselves through exhibition of challenging behaviors.

Approximately 30–42% of youth with ASD meet criteria for an anxiety disorder. It is currently debatable whether anxiety represents a co-occurring feature in ASD, or probably arises as a result of cognitive factors within an individual, or as a consequence of problematic interaction with the environment (O'Nions, et al., 2018). Anxiety could lead to secondary challenging behaviors. Typically, children with ASD rigidly prefer a predictable environment. They are resistant to change in routines and rituals. They commonly exhibit challenging behaviors if there is a drastic unexpected change in their daily routine.

Other contributory factors to challenging behaviors include sensory craving, overloads and transitioning. Many children

with ASD have comorbid Sensory processing disorders (Wairungu, 2020). Depending with the sensory modality affected, sensory craving or overload discomfort could lead to challenging behaviors. Sometimes for example, visual modality dysfunction could make a child get overwhelmed by excess light in class. Children with tactile sensory disorder on the other hand are extremely sensitive to touch. They get disturbed by something as minor as a feeling of clothes against their own skin, a label that is prickly, or even wet pants. They commonly exhibit tactile defensiveness (Baranek, Foster, & Berkson 1996). In such conditions chances of exhibiting challenging behaviors are quite high.

Unrealistic expectations in class and at home like with all typical children could also trigger challenging behaviors in learners with ASD. On the same note, pain and fatigue have also been known to cause aggression in learners with ASD. Finally, other medical and comorbid conditions such as AD/HD are also attributable to challenging behavior.

Commonly Externalized Behaviors in Learners with ASD

It is universally recognized that challenging behaviors have a significantly deleterious outcome on the lives of children with Autism Spectrum Disorder. Further, it is increasingly appreciated that they have an impact on the lives of families (Dunlop & Fox 2007). This mainly depends with nature and severity of ASD in the individual. A relationship exists between the severity of ASD and challenging behaviors. In a research conducted by Matson et al., in (2011) on effects of symptoms of co-morbid psychopathology on challenging behaviors among infants and toddlers with Autism Spectrum Disorder, it was observed that participants who scored high on symptoms of avoidance and conduct depicted a greater rate of aggression. They were also more destructive and had more self-injurious and stereotypies behaviors compared to those with low scores (Matson, et al., 2011).

Self-injurious behavior is estimated to affect 35% to 60% individuals with ASD. The behavior could lead to a higher risk of psychiatric hospitalization. It may also lead to reactive physical intervention. It lowers the quality of life of the individuals with ASD and to a reasonable extent that of their families. Caregivers and parents of children with self-injurious behavior actually report more stress and staff burnout. (Richards, et al., 2016).

Other challenging behavior in learners with Autism Spectrum Disorder include refusing or ignoring requests by parents or teachers, behaving inappropriately in typical situations and verbal and physical aggression. Some other behaviors that may concern stake holders are self-stimulating behaviors like hand flicking and rocking in typical situations. A research conducted by Khantreejitranon in the year (2018) on effect of social stories in reduction of inappropriate behaviors in preschool kids considered a number of target behaviors. They included making loud noises, not sharing toys, and walking around in class. Further, the research studied lack of patience, showing frustration when feeling unsatisfied and not putting

toys away when finished. Other behaviors also considered in the research were taking other people's belongings without permission, giving hugs in the inappropriate time, not knowing how to greet others, and destroying items when frustrated. Specific education skills could also be targetable behaviors in Applied Behavior Analyses intervention (Grey et al., 2018).

III. NATURE, GOALS AND PRINCIPLES OF APPLIED BEHAVIOUR ANALYSES

Applied behavior analysis refers to an approach of using scientifically established principles to change socially useful behaviors (Kearney, 2015). Procedure based on this have been used successfully to address socially important behaviors in education, medical clinics, homes and work settings for long (Roane, et al., 2016). It is a therapy anchored on theories of learning and operant conditioning. One of its key goals is to facilitate and stimulate typical development of cognition, language, and socialization in learners with ASD. As well, it has an objective of decreasing condition bound maladaptive behaviors such as rigidity, repetitive and stereotypic behaviors. ABA also aims at reducing or eliminating nonspecific maladaptive behaviors like irritability and impulsivity. Finally, it also aims at alleviating stress and burden for the family. The therapy is anchored on targeted behavior, positive reinforcement and repeated learned trials. In the last few decades of years it has increasingly become very popular as an intervention strategy in ASD.

In 1987 and 1993, Lovaas *et al.* published articles describing what they referred to as the “recovery” of approximately 50% of a group of very young children with Autism Spectrum Disorder. They had been treated intensively with applied behavioral analysis for several years. ABA therapy produces medium to large positive effects on intellectual functioning, language development, daily living skills acquisition, and social functioning in individuals with ASD (Shenoy, Indla & Reddy, 2017).

Applied behavior analytic interventions satisfy seven dimensions. They include focusing on socially significant behaviors, targeting on measurable behaviors and decisions made based on data. Further, Procedures are replicable, clearly based on behavior analysis and has positive impact on targeted behavior. Finally, skills achieved are transferrable from the learning setting to other contexts (Fennell & Dillenburger, 2018).

Applied behavior analyses therapy breaks down behavior into three components. They include the Antecedent_which is whatever triggers or precedes behavior, the behavior itself, and the consequence of the behavior (Kearney, 2015). It is sensitive to general intervention guidelines for children with Autism Spectrum Disorder. It further incorporates factors identified by America National Research council as characteristic of an effective intervention program for children with Autism Spectrum Disorder. It uses planned teaching with intervention being done in early ages. On the same note, ABA

therapy is intensive enhancing achievement of individualized goals through one to one or small group instruction. It has frequent but brief instruction sessions focusing on appropriate behavior, development of spontaneous social communication, adaptive skills, play skills, cognitive and academic skills. Further, based on the same guidelines, ABA is systematic and individualized, and also considers parent support and training as critical. Finally, it targets social communication domains systematically targeting individual goals. Finally, it emphasizes generalization of Knowledge and acquired skills from one setting to the other (Fox, 2008).

Training of implementers is critical in ABA for productive outcomes. In a research conducted by Grey and others in (2015), support plans by teachers on targeted behavior produced an average of 80 percent. Questionnaires completed by parents and teachers at the end of the research indicated that children significantly benefited. To achieve this, teachers had undertaken 7 months of training and supervision. In Applied Behavior Analyses, before, a behavior can be analyzed, it gets defined in a precise, clear, concise, and objective manner for easy data collection. This is usually done through Functional behavior analyses. The process is discussed below.

IV. FUNCTIONAL BEHAVIOUR ANALYSES

Functional behavior analyses (FBA) also known as Functional Behaviour Assessment is a systematic process of identifying the purpose and more specifically the function of a behavior. It Investigates the preexisting factors that serve the purpose of the targeted behaviors (Zirkel, 2012). FBA culminates in developing and implementing an effective behavioral intervention plan (BIP) (Moreno & Bullock, 2011). It seeks to understand the form, function and context of a behavior. They are also known as the ABC of behavior (Kearney, 2015). Form of a behavior refers to the observable behavior, function on the other hand is the goal or reason underlying the expression. Common reasons include gaining attention, earning a reward or escaping work. Finally, context is the setting of the behavior. It includes where exactly the behavior occurred and what happened immediately before or after. FBA is critical in an effective applied behavior analytic intervention. Practitioners must be effectively trained on skills of conducting an objective functional behavior assessment (Fallon, Zhang & Kim, 2011).

FBA is achieved through review of archival records, interview with caregivers, and direct observations of behavior. Experimental procedures are also sometimes used to establish the causal relationship between the dependent and independent variables of a behavior. An objectively done FBA increases the success possibility of Applied behavior analytic intervention (Fennell & Dillenburger, 2018).

Strategies used in Applied Behavior Analyses

Autism Spectrum Disorder and challenging behaviors are lifelong but can be ameliorated through appropriate

interventions. Evidence of positive outcomes when interventions start early has placed the early treatment of Autism Spectrum Disorder as a health priority throughout the world (Coolican, Smith, & Bryson, 2010). There are diverse strategies used in Applied Behavior Analyses inclusive of positive behavior support, early intensive behavior training, pivotal response training and discrete trial training.

Positive Behavioral Support

Positive behavior support emergence is associated to the controversy surrounding the use of aversive consequences in learners with Autism Spectrum Disorder (Johnson et al. 2006). It discourages use of humiliating procedures to manage behavior. PBS movement also advocates for inclusive home, school, work, recreational, and community settings for individuals with Autism Spectrum Disorder (Lucyshyn, et al., 2014). It uses Positive reinforcement of targeted behaviors to increase the possibility of their occurrence. PBS is a well-established intervention approach for individuals with challenging behaviors (Grey, Lydon & Healy, 2016). It is highly effective and concurrently addresses clients' preferences, values, and perspectives while at the same time improving their quality of life and lowering problem behavior prevalence. The strategy stands out due to its critical concern of implementation in "real-world" settings where there are usually complex circumstances, many competing priorities, and frequent unplanned changes, (Hieneman, 2015).

Pivotal Response Training

Another common strategy is known as pivotal response training. The technic makes use of the child's everyday environment to teach skills and manage undesired behaviors (Stahmer, 2010). Its goal is to improve a few "pivotal" skills, inclusive of motivation and taking initiative to communicate. PRT is particularly productive for developing social behavior communication and adaptive behavior in a natural setting (Lei, 2017). It enhances four pivotal learning variables which include self-initiations, self-management, and motivation and responding to multiple cues. They are referred as pivotal skills because they are the foundational skills through which learners with ASD make widespread and generalized improvements in many other areas (Vismara, & Bogin, 2009). The strategy is particularly effective in increasing verbal communication, joint attention, play skills, peer social interactions, and homework skills (Stahmer, 2010). Its naturalistic interventions make it more effective (Pierce & Chreibman, 2009).

Early Intensive Behavioral Intervention

Early and Intensive Behavioral Intervention (EIBI) is another evidence-based intervention strategy in ABA. It provides individualized, behavioral instruction to very young children with ASD. It is time consuming and is usually conducted one-on-one or as a small-group instruction (Klintwall & Eikeseth, 2014). Research indicates the strategy works well with all children. Children starting before age two are however more

likely to benefit with more significant gains. It is recommended that children get 20 to 40 hours per week of one on one therapy. As well, it is more gainful if families are incorporated. This makes children get as much exposure as possible.

Discrete Trial Teaching (DTT)

This technic entails teaching skills in a controlled, step-by-step manner with a lot of reinforcement in between. It is a structured ABA strategy that breaks down skills into small components hence the term, "discrete". Teaching of the skill takes place systematically but separately. As practitioners instruct, they use tangible reinforcements to encourage desired behavior. Once a skill is learned and mastered in the DTT format, it is important to develop plans for teaching its generalized use across settings and learner initiation of the new skill (Sullivan, Rogers, & Stabel, 2010).

V. APPLICATION AND DISCUSSION

As noted by Ospina et al. (2008), learners with ASD have challenges arising from deficits in triads of communication, behavior and social skills. They also have other comorbid conditions such as intellectual disabilities, and sensory processing disorders. They also commonly exhibit nonfunctional repetitive behaviors, restricted interests and challenging behaviors. Further as noted from the literature, ASD symptom severity and challenging behavior are proportionally related. All the above affects learning in learners with ASD and an intervention is necessary especially in this era of inclusive education.

Inclusive education provides a platform with opportunities for students with special educational needs (SEN) to learn with typical peers (Zakaria, 2017). While this is the case, challenging behaviors makes it hard for learners with ASD to readily fit in those classes. It is even a challenge to teach them by themselves and ABA intervention is extremely necessary. The behaviors compromise learners' attention with much teaching and learning time wasted in behavior redirection.

Challenging behaviors in learners with ASD play a function. According to research, learners with ASD portray challenging behaviors to get attention, win a reward or avoid work (Kearney, 2015). In order to effectively and productively conduct ABA, a functional behavior assessment must be conducted (Zirkel, 2012). Identifying the function of a behavior is a significant step in ABA. It is critical to train teachers and other practitioners on how to collect baseline data and conduct an objective FBA. The assessment is the cornerstone of a successful ABA therapy.

According to Onions and others (2015), approximately 40 percent of learners with ASD have anxiety disorder. It contributes significantly to challenging behaviors. It is important therefore that practitioners work hand in hand with family and medics to address anxiety issues as they conduct ABA therapy. It is also important to ensure that situations that would make learners anxious especially unpredictable

environment and abrupt change of routines are avoided. This will significantly lower incidences of challenging behaviors.

More than 90 percent of individuals with ASD have sensory processing disorders (Wairungu, 2020). Some challenging behaviors are as a result of sensory overloads or sensory craving. According to Baranek, foster & Berkson (1996), learners with tactile modality disorder for example may exhibit tactile defensiveness. They are reactive to touch that typical peers would not even notice. This in turn could result to aggression or any other challenging behavior due to discomfort. ABA Practitioners must work collaboratively with occupational therapists to address this. Activities that would require learners to be in contact or too close to one another should be avoided. It is important to train practitioners on the eight sensory processing modalities, their disorders and corresponding challenges.

According to Bartolome et al. (2016), 70 percent of ASD learners have intellectual disabilities while another 20 percent are epileptic. When using ABA, instructions given to individuals with ASD must put into consideration the cognitive abilities of the learners. Instructional goals must be realistic for the individuals to comprehend. Training on first aid skills is also important to avoid injuries related to epilepsy during therapy and after.

ABA therapy is highly technical, comprehensive and systematic. Training and Effective supervision is necessary for a productive outcome. In a research done by Grey et al., (2015), there was 80 percent decrease in targeted behaviors with effective supervision and seven weeks of training. Further ABA strategies should be varied based on the heterogeneous needs of ASD learners. Teachers should be trained on features of diverse ABA strategies including Positive behavior support (Kearny, 2015), discrete trial training (Sullivan, Rogers, & Stabel, 2010), pivotal response training (Lei, 2017). And Early intensive behavioral intervention for young kids (Klintwall & Eikeseth, 2014).

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