

The Utilization of Applied Behavioral Analysis in a Child with Down Syndrome

Filipinas L. Bognot

Vice President for Academic Affairs and Dean, Institute of Education, Arts and Sciences, City College of Angeles, Angeles City, Philippines

This study utilizes Applied Behavioral Analysis (ABA) in a child with Down syndrome in order to control behaviors, teach new skills, maintain behaviors, generalize or transfer behavior from one situation or response to another, restrict or narrow conditions under which interfering behaviors occur, and reduce interfering behaviors. The objective of this study is to determine the efficacy of Applied Behavioral Analysis method in teaching a child with down syndrome. It aimed to increase the participant's mental ability, self-help skills, motor skills, perceptual skills, social and emotional development, and language abilities after using ABA. Through case study and experience, the intent of this study is to qualitatively examine the factors involved in determining a child's progress when using ABA. Pretreatment was conducted and included measures of mental ability, language, adaptive behavior, and social and emotional development. Based on the Individualized Educational Plan (IEP) and Applied Behavioral Analysis (ABA) programs for the three children, varying activities were prepared. Post-treatment testing utilized the same tests whenever and wherever possible. Results showed that the used of Applied Behavior Analysis program improved the self-help skills, perceptual skills, social and emotional development of the child with down syndrome. In some aspects like mental ability and motor skills, slight evident improvement was noted. This study proved that individualized instruction is effective in teaching a child with down syndrome. Direct instruction should always be observed in the delivery of instruction. The utilization of Applied Behavior Analysis program should be continued in addressing the needs of the children with Down syndrome. Such process could also be applied for other special learners.

Keywords: *applied behavioral analysis, intensive behavioral intervention, Down syndrome*

Introduction

Applied Behavior Analysis (ABA), which is one of the most widely used with this population, has been shown to be an effective means of intervention for children with developmental disorder. The ABA approach teaches social, motor, and verbal behaviors, as well as reasoning skills (Connor, 2009). It is a systematic process of studying and modifying observable behavior through a manipulation of the environment (McGill, Teer, Rye, & Hughes, 2005). It uses an experimental approach of manipulating the environment and tracking alterations in behavior to understand and manipulate functional relationships between behavior and environments

(Cole, 2012). It addresses generally significant age-appropriate behaviors with immediate value to the children using accurate measurement of those behaviors in need of improvement.

Applied behavior analysis emphasizes interventions addressing socially significant age-appropriate behaviors with immediate importance to the individual using precise measurement of those behaviors in need of improvement (Taylor, 2014). Generalized behaviors, that is, behaviors that are maintained over time, appear in other environments, and extend to other behaviors, are targeted (Hallahan, 2009). A functional relationship between changes in behavior and the intervention being implemented is demonstrated. Interventions, derived from the basic principles of behavior (e.g., reinforcement, extinction), are described so that they can be easily replicated, and their effectiveness is measured by improvement in the individual's performance.

ABA approach is especially useful in teaching behaviors to children with Down syndrome who do not otherwise "pick up" on these behaviors on their own as other children would (Feeley, & Jones, 2006). ABA teaches these skills through the use of careful behavioral observation and positive reinforcement or prompting to teach each step of a behavior (McGill, 1999). It addresses common behaviors and help children with down syndrome to learn more adaptive life-skills, increases language and communication skills, improves attention, focus, social skills, memory, and academics, and decreases problem behaviors (Patten, 2012). Moreover, it improves their education and career goals, while greatly improving their quality of life.

Down syndrome is a disability that was first described one hundred and thirty-five years ago. It is the most common and readily identifiable chromosomal condition associated with mental retardation (Richdale, Francis, Gavidia-Payne, & Cotton, 2000). It is caused by a chromosomal abnormality: for some unexplained reason, an accident in cell development results in 47 instead of the usual 46 chromosomes (Turner, Sloper, Cunningham & Knussen, 1990). This extra chromosome changes the orderly development of the body and brain. In most cases, the diagnosis of Down syndrome is made according to results from a chromosome test administered shortly after birth (Heward, 2000).

Common physical characteristics of children with DS include slanting eyes with folds of skin at the inner corners (called epicanthal folds) (Buckley & Bird, 1993), hyperflexibility (excessive ability to extend the joints), short, broad hands with a single crease across the palm on one or both hands, broad feet with short toes (Cole, 2012), flat bridge of the nose, short, low-set ears, short neck, small head, small oral cavity, and short, high-pitched cries in infancy (Evans & Gray, 2000). These characteristics do not interfere with their development and learning, nor is there any connection between the number of distinctive features and mental ability (Loveland & Kelley, 1988). However, hypotonia, or low muscle tone, which is present in many infants with DS, is likely to affect learning and development (Buckley & Bird, 1993). Hypotonia tends to be present to some extent in all muscles of those afflicted, causing the muscles to feel flaccid and floppy. Fortunately, hypotonia diminishes with age and early intervention can minimize its negative effects (Coe, Matson, Russell, *et al.*, 1999). Hypotonia affects the strength and movement of children with DS

and often is accompanied by excessive joint flexibility, which reduces stability in the children's limbs (Heward, 2005).

Many children with DS experience delays in the development of major motor skills. These delays can hinder their ability to explore and gain mastery over their environment. In addition, hypotonia can negatively affect other areas of development, including language and feeding skills (Waldron, 2006). In addition to the above physical differences, children with DS have a higher incidence of medical problems than children who are developing typically. Common conditions include cardiac defects, respiratory and intestinal problems, vision and hearing difficulties, hypothyroidism, vertebrae instability, umbilical hernia, and obesity (Oelwein, 2005). However, with early detection, most of these problems are treatable, and most individuals with DS lead healthy, full lives (Tileston, 2004).

In this light, the researcher decided to utilize ABA in a child with Down syndrome in order to control behaviors, teach new skills, maintain behaviors, generalize or to transfer behavior from one situation or response to another, restrict or narrow conditions under which interfering behaviors occur, and reduce interfering behaviors. The objective of this study is to determine the efficacy of Applied Behavioral Analysis method in teaching a child with Down syndrome. It aimed to increase the participant's mental ability, self-help skills, motor skills, perceptual skills, social and emotional development, and language abilities after using ABA. Through case study and experience, the intent of this study is to qualitatively examine the factors involved in determining a child's progress when using ABA.

It is hoped that the use of Applied Behavior Analysis in teaching children with Down syndrome could correct some behaviors associated with this disability which greatly interfere with the children's ability to learn. Furthermore, it could show the good track record of the use of ABA in teaching children with down syndrome. It provides some hopes to meet the needs of each unique person and learn skills that are useful in his other everyday life

Methodology

The data used in this study were collected to formally evaluate the effectiveness of the Applied Behavioral Analysis program designed by the researcher. The information to be shared was compiled over the past 18 months as a matter of general routine. A structured interview guide was used to present the background information of the child. The researcher prepared the psychoeducational assessment report of the child with Down syndrome which was based on his previous assessment and his present performance in terms of skills identified. Based on the assessments, the Individualized Educational Plan (IEP) and ABA programs were prepared. Although, the entire study referred to the child diagnosed with down syndrome, issues concerning anonymity and confidentiality were absolutely respected. Hence, real name and place were not used.

A child with Down syndrome who is profiled in this study was subjected for Applied Behavioral Analysis program. He is nine-year-old and three months at the end of the treatment.

The present is a case study which examines individual outcome. Reported data consists of pre-treatment and post-treatment measures of mental ability and adaptive functioning scores. The child had a variety of language capabilities; however, spontaneous speech from the child was either minimal or nonexistent.

The participant was 7 years old and 9 months when he started receiving ABA treatment. He was diagnosed with Down syndrome upon birth. At the start of the treatment, his language skills were at pre-verbal level with gestures used for communication. The child had a vocabulary of approximately 100 words at the age of 4, but regressed at some point between the ages old 5 to 7. The use of words was almost non-existent with a limited vocabulary of small words. He cannot follow simple instructions and cannot formulate simple sentences or phrases. He cannot cope with varying situations. He cannot describe himself accurately and adequately. He had difficulty with executive control of reasoning abilities, especially when directions were not extensively structures throughout task performance. Adaptive and social skills are not evident. The child received Intensive Behavioral Intervention (IBI) therapy for 25 hours.

Pretreatment was conducted and included measures of mental ability, language, adaptive behavior, and social and emotional development. Based on the IEP and ABA programs for the three children, varying activities were prepared. Post-treatment testing utilized the same tests whenever and wherever possible. Assessment tools entitled *Development Skills Evaluation* (Dizon & Sacris, 2002) and *Omnibus Developmental Scale* (Dizon, et al, 2003) were used to evaluate the development or change in the characters of the three children.

The therapy consisted of 25 hours of ABA treatment per week with the assistant of a therapist in Applied Behavioral Analysis methods. Pre-test scores were compared to post-test scores in order to determine the amount of progress as assessed by the measures indicated above. Specifically, the data were analyzed qualitatively to more closely explore possible gains in the area of language, adaptive skills, and social and emotional development.

Results and Discussion

Case Summary

Based on the assessment done and Individual Educational Plan prepared by the researcher, activities were formulated to address the identified characters of the participant. In every activity or lesson presented, the use of Applied Behavioral Analysis was observed and this was administered for 18 months.

The Participant

The participant was diagnosed with moderate mental retardation. Reports confirmed the child's significant delays in psychosocial, language communication, and adaptive skills. Applied Behavioral Analysis was recommended by his developmental pediatrician and occupational therapist. The participant was initially assessed by the researcher. The participant received

Intensive Behavioral Intervention (IBI) therapy for 25 hours. A therapy was conducted five hours daily for 18 months.

Assessment was done by the researcher. During the assessment, the participant was very quiet but easily distracted and had difficulty to keep on task during actual testing. Hence, he was not very cooperative during the assessment. The child was assessed using Omnibus Developmental Scale.

Mental Ability

The participant was assessed using Wechsler Intelligence Scale for Children. As reported, the participant was unable to complete many of the subtests. The scores obtained from the test was 45 which is significantly below the first percentile when compared to his chronological age. His rate of mental development is approximately one-fourth to one-half that of an average child. He is extreme slow in development and attainment of specific intellectual functions needed for the efficient learning such as concepts of incidental learning, memory, discriminative learning, generalized ability, and typical reading readiness. However, when compared to his scores at the commencement of treatment, there is a slightly evident change in his comprehension.

As indicated above, the effects of ABA on the mental ability of the participant shows slightly evident comprehension. When the participant was subjected for assessment, a slight improvement was observed when different activities were presented. It is important to note, that he was previously deemed unstable, perhaps in itself a slight increase in overall mental ability.

Self-Help Skills

Participant's scale was evident in terms of self-help skills. He eats with spoon and fork simultaneously. He mixes his own drinks getting the right quantities of sugar, milk and powder. He clears his place at table before and after eating. He removes his shoes and socks and puts on his shoes and socks. He puts on clothes including zipping, buttoning and snapping. He washes his hands and face thoroughly. He brushes his teeth properly.

Participant's scale was compared between pre-treatment and post-treatment. It was observed that there is a significant change in terms of his self-help skills.

The participant showed significant self-help skills after treatment, when compared to his performance before the onset of the treatment. Although he showed an overall increase or improvement in this area, his gain still placed him within moderate range. Suffice to say, that more research is required to determine the lasting effects of Intensive Behavioral Analysis method on self-help skills.

Motor Skills

The participant jumps over an object with both feet. He balances well within a given path. He handles balls and blocks with ease. He rolls balls and holds pencils, crayons and paint brush

properly. He put small objects in a bottle and folded paper or napkins with ease. He has difficulty handling pegs on board properly. He cannot cut with scissors accurately. He performs less easy visual-motor tasks such as bead pattern, forming puzzles and arranging objects in a series. As observed, a number of characters were not evident even when IBI was applied.

As observed, a few of characteristics were not evident in the participant even when IBI was applied. He cannot perform even simple visual-motor tasks such as building blocks, sorting beads, putting forms in form board and pegs in pegboard. He does well only when bigger objects are the materials to be manipulated. There is a need to continue using IBI in order to improve the fine motor skills of the participant.

Perceptual Skills

Participant identifies shapes and primary and secondary colors. He understands distinction of up and down, in and out, and left and right. He recognizes simple pictures of objects and creatures. He could name the members of a family. On the other hand, he has difficulty identifying size, length, texture and quantity. He cannot understand front and back, beside and between, and under and above. He cannot identify the taste of food such as sour, bitter and salty. A great improvement was observed in terms of his skills.

A great improvement was observed in the participant in terms of his perceptual skills. Learning to follow simple instructions in determining spatial relations was noted. He improves a lot in identifying the colors. Recognition of shapes such as square, circle, rectangle, triangle, pentagon, and hexagon were also observed in the different activities. Although the activities were presented in different schedules, the participant was able to accomplish the tasks assigned to him. On the other hand, more lessons identifying front and back, beside and between, and under and above should be given using IBI.

Social and Emotional Development

He responded to his name when called. He initiates plays with peers. He responds positively to authority. He stops crying with verbal attention. He waits for his turn and knows how to listen and greet visitors and other familiar faces. He plays appropriately with toys and packs them away. He uses polite expressions appropriately. He behaves properly in varied social settings. On the other hand, he cannot welcome responsibilities and copes with varying situations. He has difficulty in following directions and obeying appropriate social rules expected of his age. His performance improved a lot as compared to his characteristics 18 months ago.

Participant's performance in terms of social and emotional skills were evident. He cooperates well with family members, peers, and teachers after the application of IBI. He learns to share his toys and waits for his turn. He knows how to raise his hand – palm up in asking position and saying "give." He imitates his teacher and peers in action singing, rote counting, physical exercise and other group tasks. On the other hand, he enjoys doing routine activities and usually

Reacts negatively when such activity is not observed for the day. There is a great need to develop further his psychosocial skills especially in understanding his roles in a group.

Language Abilities

He recognizes his name in print. He knows sounds of alphabet. He describes pictures, things or persons. He listens attentively to orally read stories or poems. He imitates actions that go together with songs rhymes. He colors evenly following lines. He can recall three objects in a picture. He has difficulty in expressing his thoughts or ideas clearly. He cannot speak distinctly. He has limited vocabulary which is appropriate for his age level. He cannot read simple consonant-vowel-consonant pattern words. He does not use lowercase and uppercase in writing letters, and does not know how to place punctuation marks. Significant changes were noted as compared.

The participant showed significant improvement in his language abilities. It indicates that the use of Intensive Behavioral Intervention had a positive effect in improving his speaking, reading, and writing skills. At the start of the treatment, the participant did not know his name, had a limited knowledge about phonemes and not interested in stories, and was not able to pronounce words correctly. With the use of Intensive Behavior Intervention, he showed improvements on the above-mentioned characteristics. He is well attentive in listening to stories with simulation. There is a need to continue the use of IBI to enhance the language skill of the participant.

Conclusions and Recommendations

The use of Applied Behavior Analysis program showed improvement in the self-help skills, perceptual skills, social and emotional development of the child with down syndrome. In some aspects, mental ability and motor skills, slight evident improvements were noted. On the other hand, it still offers some degree of hope, where, perhaps previously, there was none. It is important that parents and professionals identified the factors that could potentially affect outcome.

This study proved that individualized instruction is effective in teaching a child with down syndrome. Direct instruction should always be observed in the delivery of instruction. The utilization of Applied Behavior Analysis program should be continued in addressing the needs of the children with down syndrome. Such process could also be applied for other special learners.

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