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Applied Behavior Analysis and Autism-Spectrum Disorders

Abstract

The purpose of my research was to inform others about the facts of applied behavior analysis. Before researching ABA, I had a basic understanding, or I should say misunderstanding, of the use and practice of this treatment. Unfortunately, the mis-practice of ABA contributes to many myths about the treatment. Throughout this paper, the reader should have developed an understanding of applied behavior analysis and how it is used to treat those with ASD.

Document Type

Thesis

Degree Name

MS in Special Education

Department

Education

Subject Categories

Education

Running head: APPLIED BEHAVIOR ANALYSIS

Applied Behavior Analysis and Autism-Spectrum Disorders

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Abstract

The purpose of my research was to inform others about the facts of applied behavior analysis. Before researching ABA, I had a basic understanding, or I should say misunderstanding, of the use and practice of this treatment. Unfortunately, the mis-practice of ABA contributes to many myths about the treatment. Throughout this paper, the reader should have developed an understanding of applied behavior analysis and how it is used to treat those with ASD.

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Applied Behavior Analysis and Autism Spectrum Disorders

Introduction

Applied Behavior Analysis (ABA) is an often misunderstood treatment used for working with those with Autism-Spectrum Disorders (ASD). This paper will answer common questions about applied behavior analysis, such as what is ABA, how is ABA used to treat people with ASD, and what is the evidence supporting ABA?

Research was conducted to analyze what teachers know about applied behavior analysis and if the participants were correctly practicing applied behavior analysis.

What is Autism-Spectrum Disorder?

Autism-spectrum disorder is categorized as a developmental disability in which a person has problems with social interactions, communication, and repetitive behaviors and interests. According to the Autism information center, diagnostic criteria (DSM-IV) for pervasive developmental disorders, a person must have a total of six or more identifiers that are listed under the criteria for Autistic Disorder, Asperger's Disorder, Pervasive Developmental Disorder Not Otherwise Specified, Rett's Disorder, and Childhood Disintegrative Disorder. (Appendix A) The behaviors can range from mild to severe.

According to the Center for Disease Control (2008), "the thinking and learning abilities of people with ASDs can vary- from gifted to severely challenged." The characteristics of ASD can present themselves in a variety combinations, affecting a person's functioning, abilities, and communication skills.

What causes ASD? It is not yet determined, but according to *Sense and nonsense in the*

behavioral treatment of autism (2008), ASD “... is a behavioral syndrome that most likely results from various brain abnormalities (p. 64)” The authors of this text, along with Mary McDonald, who participated in a QSAC conference on ASD and ABA (2008), agree that autism spectrum disorder has a genetic basis (slide 4, p. 1).

A child can be diagnosed as early as eighteen months and most cases by three years of age. The National Institute of Mental Health (2008) lists possible indicators, social symptoms, communication difficulties, and repetitive behaviors (see Appendix B) as a resource.

Incidence reports vary from source to source for those with an autism spectrum disorder. According to Fighting Autism, the number of those being diagnosed with a form of autism between ages six to twenty-two has drastically increased from 14,480 in 1992 to 224,594 in 2006 . (appendix C) According to graph data, the same source reports that New York has a 1 of 169 persons prevalence in public schools from 2006-2007 (appendix D).

A variety of treatments for ASD have arisen. It is important to research a treatment before undergoing the process. Not all of the treatments for ASD have empirical data or case studies that prove that the treatment works.

What is ABA?

Applied Behavior Analysis (ABA) is a scientific method that focuses on the relationship between a person’s environment and behavior. According to Autism Speaks (2008), “‘Behavior’ refers to all kinds of actions and skills (not just misbehavior), and ‘environment’ includes all sorts of physical and social events that might change or be changed by one’s behavior.” The

relationship between the events occurring before the behavior and after the behavior are also analyzed along with the environmental factors. Goals are created for the individual based on the data and observable behaviors collected. The measurement, data collection, and evaluation must be objective in order to create an unbiased and appropriate intervention for the individual.

According to Matt Potak, (n.d.), ABA ... “is the process of systematically applying interventions...to improve socially significant behaviors to a meaningful degree, and to demonstrate that the interventions employed are responsible for the improvement in behavior.” Socially significant behaviors refer to “...reading, academics, social skills, communication, and adaptive living skills,” according to Potak. If it is determined that the intervention is not improving the individuals behavior or having social gains, the practitioner will re-evaluate the individual to develop a functional intervention treatment. Analysis is an ongoing process that includes as many modifications as necessary when working with an individual.

Potak referred to six ways in which ABA supports an individual. These include

1. to increase behaviors (eg reinforcement procedures increase on-task behavior, or social interactions);
2. to teach new skills (eg, systematic instruction and reinforcement procedures teach functional life skills, communication skills, or social skills);
3. to maintain behaviors (eg, teaching self control and self-monitoring procedures to maintain and generalize job-related social skills);
4. to generalize or to transfer behavior from one situation or response to another (eg, from completing assignments in the resource room to performing as well in the mainstream

classroom);

5. to restrict or narrow conditions under which interfering behaviors occur (eg, modifying the learning environment); and
6. to reduce interfering behaviors (eg, self injury or stereotypy).

According to Higbee (2005), “the overall emphasis is on teaching the child to learn from his/her natural environment (like typical kids do)” (p. 4). Through multiple learning trials, those undergoing treatment are given opportunities for learning skills and eventually generalizing skills to multiple contexts. Higbee also states that there is no “down time” (in ABA practice). Instruction is embedded into every activity during the day “to ensure the learning and generalization of skills and replacement, reducing, or distinguishing behaviors of behaviors” (p. 3)

Discrete Trial Training (DTT) is a common technique used in ABA to treat those classified in the autism spectrum disorders. It is through DTT, that social gains can be made, as discussed by Potak, through a comprehensive and objective treatment plan.

What is Discrete Trial Training?

Discrete Trial Training (DTT), can be used to “maximize learning for all ages and populations,” according to the Leaf, et al (p.5). While DTT does not need to be specifically used for individuals with autism, it is a commonly used by ABA practitioners. Discrete Trial Training involves a series of specific steps used to teach and expand upon skills, “...including cognitive, communication, play, social, coping and self-help skills” (Leaf, et al, 2008, p.5). Leaf, et al. (2008) identified seven steps for the DTT process:

1. Identifying needed skills

2. Breaking complex skills into smaller parts
3. Teaching one component skill at a time until mastered
4. Allowing repeated practice within a concentrated period of time
5. Providing prompting and prompt fading as necessary
6. Using reinforcement procedures
7. Facilitating generalization of skills into the natural environment...research shows that this is an important component of treatment. (p.5)

One skill at a time must be identified for the treatment process, so as not to create confusion or a biased treatment process. Tackling more than one skill at a time could interfere with data collection and the individual's learning process of the skills he/she is attempting to acquire. The practitioner continues to collect data and observe and record behaviors of the individual during the process.

Another component is breaking the skills into small parts in order to allow the individual to learn the skill. The individual proceeds onto the next sub skill only after the previous skill is mastered. According to Thomas S. Higbee (n.d.), "a key feature of discrete trial methods is the many repetitions of learning trials" (slide 36, p. 6). Repetition provides many opportunities for the individual to master the skill or subskill. The practitioner may provide prompts in order for the individual to complete the skill correctly. Prompt fading is also used so that an individual does not rely on a prompt in order to perform the skill. The individual should be able to perform the skill in multiple contexts also.

“Consequences such as feedback or rewards are provided immediately after the child attempts to perform the skill or provides a response...” (Leaf, et al., 2008, p.5). Finally, the individual should be able to generalize the skill to different contexts.

Negative effects could occur from using a DTT process when treating an individual. The individual may respond to specific cues if the skill is not generalized. Also, the individual could form a dependence on the practitioner. The dependence could focus on a specific reward or on the assistance of an adult to complete the skill (Leaf, et al., 2008, p.8).

Dr. Lovaas

Dr. Ivar Lovaas, a psychologist, is known for his research on ABA. He began investigations and research in the early 1960s. “Although Dr. Lovaas was certainly one of the first to employ the principles and procedures of ABA with children with ASD...the foundation of ABA and treatment procedures were developed prior to Dr. Lovaas” (Leaf, et al., 2008, p. 10). Lovaas’ treatment and research were instrumental to the employment of ABA on individuals with autism.

Dr. Lovaas began his research investigating and treating disruptive and dangerous behaviors. The behaviors included self-injurious acts, such as “...head banging, eye gouging, eating flesh, and even biting off fingers” (Leaf, et al., 2008, p.8). According to Leaf, et al, Dr. Lovaas found that the self-injurious behaviors could be reduced and the treatment was generalized to multiple contexts. Dr. Lovaas further

“...speculated that disruptive behaviors were, perhaps, a child’s way to gain attention, communicate a desire, or avoid situations...to prevent relapse, or the emergence

of new disruptive behaviors, it would be essential to teach a child new ways to achieve the same outcome... (without)... a detrimental effect” (p.9)

Dr. Lovaas’ research contributed to the recognition of treatment for those with ASD and the realization that behaviors can be reduced and treated. Dr. Lovaas continued his research and evolved his treatments throughout the 1980s (Leaf, et al., 2008, p. 10)

Research

Dr. Lovaas began research for interventions for those with autism and severe and self-injurious behaviors in the 1960s. Beginning in the 1970s, a comprehensive evaluation of interventions for autism began taking place. According to icare4autism.org, in 1972, “Hingtgen and Bryson reviewed over 400 research articles...published between 1964 and 1970” that “concluded that behaviorally-based interventions demonstrated the most consistent results.”

In 1973, Dr. Lovaas and his colleagues conducted a long term study called the Young Autism Project (YAP). Those participating in the project were to receive forty hours of ABA intervention a week. Also, the thirty-eight participants in the study were four years of age or younger. Treatment occurred for two or more years and all the children lived with their parents, who were “...extensively trained in ABA and were a major part of treatment” (Leaf, et al., 2008, p. 15). Leaf, et al. (2008) also reported that

“The parents worked as part of the team throughout the intervention: they were extensively trained in the treatment procedures so that treatment could take place for almost all the subjects’ waking hours, 365 days a year” (p. 24)

Children were placed in either of two groups; Control Group and Intensive Treatment Group. The intensive treatment group received the forty hours of ABA intervention, which

included sessions with two therapists. Two control groups were compared to the intensive treatment group. The first group contained nineteen children that received approximately ten hours of ABA and other intervention strategies (Leaf, et al.,2008, p. 15). The second control group was evaluated after the study and the participants received a diverse mix of services.

Pre-treatment took place in which information was collected from interviews, testing, and observations. During the treatment phase, the focus was on decreasing disruptive behaviors and using appropriate means of communicating and responding as a replacement. The YAP used DTT, language programs, academic skills, communication and conversational skills, and play skills to teach for learning of appropriate behaviors. Leaf, et al (2008) reported that "...both verbal and physical punishments were used in order to reduce disruptive behaviors" such as "...a hard slap on the child's thigh...always accompanied with a verbal punishment (e.g. a loud "no")." According to Leaf, et al. (2008), "generalization of therapy was further achieved by conducting treatment in a variety of environments to which the child was exposed: home, school and clinic" (p. 17). Generalization is a key component for allowing for learning and transferring of skills to multiple contexts and also for the participant to hold on to the skills over time.

Follow-up studies were conducted and published in 1987 and 1993. The results show that nine out of the nineteen children in intensive treatment were "...indistinguishable from their peers on measures of IQ, adaptive skills, and emotional functioning" (Leaf, et al, 2008). According to icare4autism (1987), "...the children ...were re-evaluated between the ages of six and seven by independent evaluators who were blind as to whether the child had been in the treatment or control group." This eliminated any biases that could take place. The other ten participants in the intensive treatment continued to show significant gains. The control group did

not show significant gains and Leaf, et al reported that "...only one client out of the 40...achieved a similar outcome" (p. 18).

In 1981, DeMeyer, Hingtgen and Jackson reviewed over 1,100 additional studies from the 1970s (icare4autism.org, n.d.). The findings concluded

"...the overwhelming evidence strongly suggest that the treatment of choice for maximal expansion of the autistic child's behavioral repertoire is a systematic behavioral education program, involving as many child contact hours as possible, and using therapists (including parents) who have been trained in the behavioral techniques.

Both the the YAP and DeMeyer, et al. (1981) concluded similar results in that a systematic program and procedure with specific guidelines, therapies, and parental help will improve the behaviors of those with autism.

According to icare4autism.org, Baglio, et al (1996) concluded based on findings that "...interventions based upon ABA have consistently resulted in positive behavioral outcomes." Research on ABA continues to provide similar outcomes with intensive treatments on those with autism spectrum disorders.

Conclusion

The study of autism spectrum disorders continues, and answers to many questions are still yet to be found, such as what causes autism? Looking at evidence and peer-reviewed studies, the findings on ABA research appear to have similar results. Empirical data suggests that an ABA program provides systematic instruction to decrease, replace or distinguish behaviors. Objective observations contribute to validated evidence supporting successful, meaningful outcomes of those receiving ABA treatment for autism.

Methodology

Participants

Twenty two elementary teachers were asked to fill out an anonymous survey on Applied Behavior Analysis. Fifteen teachers were asked from School X in the Rochester area , three teachers and one para professional was asked from School Y a BOCES in the Rochester area, and three teachers were asked at School Z from a school district in a suburb of Rochester. Seven teachers were male and fifteen teachers were female. Twenty-one teachers had their Bachelor and Master degrees and were qualified special education teachers. The para professional participant had a Bachelor degree and was currently taking classes toward a Master degree in special education. Out of the twenty-two asked to partake in the survey, four participants returned the surveys.

Participants were selected to participate in the survey based on experience with Applied Behavior Analysis. Every participant reported that they are currently or have previously used Applied Behavior Analysis with one or more students.

Procedures

I designed my questions based on what I wanted to achieve out of this project. I wanted to know what professionals knew about Applied Behavior Analysis (ABA) and if they practiced ABA. If the participants practiced ABA, I wanted to know if they were practicing ABA correctly.

I asked fifteen teachers at School X. Two teachers said that they would participate in the survey, however only one returned the survey. Two non-participant teachers had previously

practiced ABA, but did not feel that they knew enough information to fill out the survey. The remaining eleven teachers had not heard of Applied Behavior Analysis.

I asked four teachers and para-professionals at School Y. One para-professional submitted the survey. The remaining three teachers replied that they could not find the time to fill out the survey. They also replied that they had received too many surveys within the past week and did not want to fill out another one.

I submitted surveys to three teachers at School Z and two teachers returned the surveys. The remaining teachers had not heard of ABA.

Each participant at School X and School Y was asked to fill out the survey to the best of their knowledge and return it back to me. Each participant at School Z was asked to fill out the survey and return it to Carolyn, a teacher in the Victor School District, who would then hand the surveys to me. To keep the surveys confidential, Carolyn handed back the surveys folded and placed in a sealed envelope to the researcher.

All surveys were remained confidential and participants were told not to put their name, student names, or the names of schools they are working at or have worked at on the survey.

Findings/Results

The participation rate was 80% out of all the participants that agreed to fill out the survey. The participation rate was 18% out of all the professionals asked to fill out the survey.

Out of the four surveys handed out, five were returned. Two participants were special education teachers and one participant was a general education classroom teacher.

Question 2 asked the participants to define applied behavior analysis and describe the purpose of applied behavior analysis. Participant 1 reported that ABA is a “system of data used to track changes in behavior over time.” The behavior is then altered into a replacement behavior. Participant 2 reported that ABA “is an evidence based approach to teaching behavior.” Applied behavior analysis is supported through approaches to obtain a desired behavior and a specific goal. Participant 3 reported that ABA “applies techniques to change behavior. The purpose is to find a behavior and work to alter that behavior to something more acceptable.”

Question 3 asked if the participant has practiced or is currently practicing applied behavior analysis. If the participant is currently practicing ABA, the participant is further asked with whom. The participant is reminded to keep students anonymous. Participant 1 has previously practiced ABA, but replied that the participant is “currently not working with students with autism.” Participant 2 reported “ABA is in structured teaching. I practice and implement structured teaching and approaches.” Participant 3 has not practiced ABA.

Question 4 stated “Who can practice applied behavior analysis?” All three participants reported that teachers, both special education and general education teachers, and parents that have been trained in applied behavior analysis. Participant 1 reported the practitioners must be trained in applied behavior analysis to practice ABA. Participant 2 reported that related service and para-professionals with “proper training” can practice applied behavior analysis. Participant 3 reported that autism specialists can practice ABA.

Question 5 asked what the key components of applied behavior analysis are and how can these components help to support the individual? Participant 1 and participant 3 reported that consistency is a key component in ABA. Participant 1 also reported recordable data, observable

and measurable behaviors, discrete trial training, unbiased views, and trials and observations conducted over an extended period of time. Participant 2 reported “ $A+B=C$. To get the behavior you must complete $A+B$ to get the desired behavior.” Participant 3 reported that behavior must be monitored to detect any changes, by using charts and other forms of data collection over a period of time.

Question 6 asked who can benefit from applied behavior analysis? All three participants wrote that applied behavior analysis is used with students with autism spectrum disorders. Participant 1 reported that ABA can be used with any student and participant 3 reported that any student struggling with controlling their behavior can benefit from ABA.

Question 7 asked if the participants had experience with discrete trial training (DTT). If the participant did have experience with DTT, they were asked what steps were followed to maximize learning and do they find this effective? Participant 1 reported previous experience using DTT. The participant reported the steps were using an extended period of time for trials because “results are not automatic,” frequent evaluation to determine effectiveness, and a series of steps need to be individualized. The participant also reported that the practitioner must be unbiased when observing and analyzing data. This participant found DTT to be effective. Participant 2 reported experience using DTT. “I do not believe that this approach is for all ages. Children can grow out of this.” The participant also added that repetition should be used for children when they are young. Participant 3 did not have experience with DTT.

Question 8 asked the participants to state their personal views on using applied behavior analysis and if they felt this was an effective method. All participants agreed that ABA can be effective when used correctly. Participant 1 reported that ABA is often “...misunderstood and

misused. Teachers give up on a trial because they are not seeing immediate results. I have seen behaviors altered drastically when done correctly.” The participant added that patience and an unbiased report are essential, which is a common struggle. Participant 2 reported that ABA is blended in teaching. “It takes multiple approaches to be effective. No one approach works on every child all of the time.” The last statement was emphasized in the participants writing since it was underlined. Participant 3 reported that the approach can be effective but “...it needs to be done very specifically in order to see results.”

Discussion

According to Matt Potak (n.d.), the definition of applied behavior analysis includes applying systematic interventions to improve socially significant behaviors. The ultimate goal is to improve behavior. The three participants all stated that applied behavior analysis was related to changes in behavior. Participant 1 stated that data is collected and tracked over a period of time. Participant 2 stated that ABA is supported through approaches to obtain a desired behavior. Participant 3 stated that the purpose of ABA is to change a behavior to a more acceptable behavior. All participants reported that a behavior is changed but they did not explain what a behavior is. According to Autism Speaks (2008), “Behavior refers to all kinds of actions and skills” which are affected by the environment, both physical and social. Each of the participants kept their statements brief and did not discuss examples of behaviors that would need to be changed or give examples of socially acceptable behaviors.

All participants agreed that applied behavior analysis can be an effective method to be used when practiced correctly. The participants reported their knowledge of applied behavior analysis. When reviewed, the participants had varying, yet limited knowledge of ABA, it's

purpose, key components, and how ABA supports an individual. The participants demonstrated that they did not know the steps of discrete trial training, often used in applied behavior analysis. Participants reported that steps are used and data is analyzed. According to Leaf et al., (2008) discrete trial training is made of seven steps consisting of identifying needed skills, breaking down skills, teaching one component at a time until mastered, allowing repeated practice, providing prompting and fading, providing reinforcement, and facilitating generalization of skills (p.5). Participants also reported that generally, ABA is practiced with students with autism. This is often true, however ABA can be beneficial for any student. Finally, question 5 asked the participants to list the key components of applied behavior analysis and explain how the components support the individual. Participants reported on using consistency, recordable data, unbiased views, recording observable and measurable behaviors, and achieving a designed behavior. Participants did not report on how an individual is supported through ABA. According to Matt Potak, n.d., key components of ABA include systematic interventions to improve behaviors, the understanding the importance of the environment and it's affect on behavior, ongoing analysis, and the ability to modify analysis when an improvement is not seen in a behavior over a period of time.

Limitations

The biggest problem encountered was the rate at which the respondents returned the surveys. The researcher reminded each of the participants three times to return the surveys, sent a reminder letter to the participants, and sent an email reminder to the participants.

Another problem with the research was question 7, which asked the participants what discrete trial training was, and if the steps maximized the learning process. The participants seemed unclear about the steps of discrete trial training that reported they had experience with DTT, but continued to answer the question. Instead of asking if the participants knew the steps, another question reminded the participants of the steps and asked if they felt the steps were effective.

Future Research

The next step would be to observe professionals practicing Applied Behavior Analysis. The researcher would need record data conduct individual interviews. The data and observations collected can then be compared with the literature and the research that was reported back from the participant surveys. The participants for the research portion reported what they knew about applied behavior analysis and how they felt they practiced ABA. To really discover how ABA is being practiced, the researcher will need to observe this in action.

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Appendices

Appendix A

Center for Disease Control DSM-IV
(http://www.cdc.gov/ncbddd/autism/overview_diagnostic_criteria.htm)

Appendix B

Indicators of Autism Spectrum Disorders
(<http://www.nimh.nih.gov/health/publications/autism/complete-publication.shtml>)

Appendix C

Fighting Autism Graphs
(<http://www.fightingautism.org/idea/autism.php>)

Appendix D

Fighting Autism State Rankings
(<http://fightingautism.org/idea/autism-state-rankings.php>)

Appendix E

Applied Behavior Analysis Survey