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A review of Applied Behaviour Analysis (ABA) as a method of early intervention for foundation
phase learners living with Autism in South Africa.

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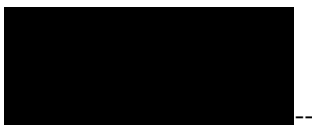
Thesis submitted in partial fulfilment of the requirements for the degree of Master of Social Science
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2023

DECLARATION

I, ***Rivendri Govender*** (student no. 214529970), declare that:

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DEDICATION

This dissertation is dedicated to all “my kids” at The Star Academy who are living with Autism. Thank you for crossing my path and inviting me into your world. Thank you for allowing me to play a small part in your journey with Autism. I hope that one day I, too, can be as brave as you are as you continue to overcome the obstacles that you are faced with.

“Autism is like a rainbow. It has a bright side and a darker side. But every shade is important and beautiful”.

- Rosie Tennant Doran

ACRONYMS

ABA: Applied Behaviour Analysis

ASD: Autism Spectrum Disorder

DTT: Discrimination Trial Training

FCT: Functional Communication Training

NET: Natural Environmental Training

PECS: Picture Exchange Communication System

SD: Stimulus Descriptor

LIST OF FIGURES

Figure 1: Number Domains of Functioning

Figure 2: Number of Lessons within Domains of Functioning

Figure 3: Administration of Lessons

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Figure 5: Targeted Behaviours

Figure 6: Frequently Implemented Behavioural Interventions

LIST OF THEMES AND SUB-THEMES DERIVED FROM THE STUDY

Theme	Sub-Theme
Targeting Domains of Functioning	<ul style="list-style-type: none"> • Number of Domains of Functioning • Targeting of Functioning within Domains of Functioning • Number of Lessons within Domains of Functioning
Application of the ABA Model	<ul style="list-style-type: none"> • Administration of Lessons
Targeting of Behaviour Management within the ABA Model	<ul style="list-style-type: none"> • Targeted Behaviours • Behaviour Management • Frequently Implemented Behavioural Interventions
Assessment of the Maintenance of Progress Achieved as a result of the ABA Model	<ul style="list-style-type: none"> • Mastery of New Skills • Review of Newly Acquired Skills

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ABSTRACT

Background:

Applied behaviour Analysis (ABA) is a form of intervention that is primarily used in the treatment of Autism Spectrum Disorders (ASD) and is based on the premise that behaviours are caused by external stimuli resulting in the implementation of a reward and punishment system in order to discourage or encourage behaviours.

Aim:

This study is aimed at evaluating the effectiveness of the Applied Behaviour Analysis model as a method of intervention for foundation phase learners who were diagnosed with ASD.

Methodology:

Embedded within the Theory of Learning and Development, data was collected through the analysis of secondary data retrieved from case files from The Star Academy (South Africa). The study population focussed on foundation phase learners who were diagnosed with ASD and were receiving ABA intervention as the primary method of intervention and purposive sampling was employed in the selection of the case files.

Results:

The findings of the study revealed that the ABA method of intervention, has an array of areas of functionality which were targeted within each domain of functioning. This allowed the child to acquire a complete repertoire of skills in a natural manner.

Conclusion:

This research study concludes that the Applied Behaviour Analysis method of intervention is effective in the treatment of Autism in foundation phase learners within a South African context.

Keywords: Applied Behaviour Analysis, Autism, Behavioural Intervention, Discrete Trial Training, Natural Environmental Training

CHAPTER ONE: INTRODUCTION

1.1. Background of the Study

Neurodevelopmental disorders are conditions that manifest in the early stages of development and are characterized by developmental deficits that produce impairments in personal, social, academic, or occupational functioning (American Psychiatric Association, 2013). Initially, autism was classified as a subtype of schizophrenia and it was not until 1980 when the disorder was reclassified in the Diagnostic and Statistical Manual of Mental Disorders (DSM), third edition, as *Infantile Autism* (Cook & Willmerdinger, 2015). Following numerous changes to the classification of the disorder, the various subcategories were consolidated into an umbrella category, namely Autism Spectrum Disorder (ASD) and was published in the DSM-5 (Cook & Willmerdinger, 2015).

Autism or Autism Spectrum Disorder refers to a range of conditions and is primarily defined by (1) a persistent deficit in social communication and social interaction and (2) restrictive and/or repetitive behaviour patterns (American Psychiatric Association, 2013). Over the last few decades, global autism awareness and research on Autism Spectrum Disorders has increased considerably (Daniels et al, 2017). An overview of epidemiological studies as reviewed by Taylor (2006) concluded that Autism is more likely to be diagnosed in males as opposed to females (ratio of 4:1). During the 1970s, autism was estimated to be prevalent in 2 in every 10 000 children (Sun & Allison, 2010). In a recent overview, it was revealed that approximately 4-10 cases of autism were reported in every 10 000 children (Taylor, 2006). The continuous increase in number of cases reported can also be viewed in a study conducted by Finbonne (as cited in Taylor, 2006) which shows an increase in prevalence to 40-60 cases in every 10 000 individuals.

In 2010 the *Centre for Disease Control and Prevention* (CDC) in the United States of America noted that approximately 1 in 150 children are likely to be diagnosed with autism (Cubala-Kucharska, 2010). However, more recent statistics released by the CDC state that ASD now affects 1 in 88 American children (Landrigan et al., 2012). In recent year, the prevalence of ASD has substantially increased. In 2016, Abubakar et al. noted that one in 160 individuals are diagnosed with autism. As a result, in 2014, the World Health Organization called for a comprehensive and coordinated effort in the management of ASD (World Health Organization, 2015).

In Sweden it was found that 11,330 of individuals aged between 0-27 years were diagnosed with ASD and 25.6% of these individuals had other intellectual disabilities (Idring et al. 2015). Further reports noted that the prevalence of ASD was estimated to be at 1.7% in South Korea and 0.02% in Norway (Baxter et al., 2015). While, in India, research on ASD was largely restricted to the hospital setting or selective settings of autistic children Raina et al. (2015) found that was a 50% increase in the number of children who were diagnosed with autism.

In Africa the prevalence of ASD is still largely unknown as Chambers et al. (2017) explains that there are limited diagnostic tools that are applicable to the African population. Some studies conducted in North Africa found that 11.5% of children were diagnosed with autism with over 50% of cases being reported as non-verbal (Abubakar et al., 2016). Bakare and Munir (2011) noted that in Egypt and Tunisia the prevalence of ASD was reported at 33.6% and 11.5% respectively. In South Africa, Guler et al. (2017) found that a significantly higher number of Black children were diagnosed when compared to children of other race groups.

The Millennium Development Goals as set out by the United Nations (United Nations, 2015) and the Sustainable Development Goals (United Nations, 2017) saw a shift in focus from merely surviving to now thriving in an attempt to address the morbidity that is associated with development disabilities in children including those diagnosed with Autism Spectrum Disorder. In 2018 the global prevalence of ASD was estimated between 1 and 2% and Franz et al. (2018) noted that although there is limited knowledge on the prevalence of autism in Africa, particularly in South Africa, it is highly unlikely that these prevalence rates would be significantly less. Mental health policy in a country plays a vital role. Policies are designed to reflect the government's commitment to supporting mental health care services (Franz et al., 2018).

A lack of implementation of policy with regards to child and adolescent mental health in low- and middle-income countries such as South Africa results in many families and children being unable to secure effective treatment for ASD. Early access to treatment is essential for improving outcomes in children diagnosed with ASD. Despite the increasing prevalence in Autism Spectrum Disorders, both globally and nationally, access to care and treatment remains limited. Research conducted in the United States of America concluded that only 43% of children diagnosed with ASD had access to behavioural intervention (Cantor et al., 2020).

1.2. Problem Statement

Autism Spectrum Disorder is characterised as a lifelong disorder that hinders the ability to effectively communicate and interact with other individuals and often requires varying types and levels of support (Chambers et al., 2017). Applied behaviour Analysis (ABA) is a form of intervention that is primarily used in the treatment of Autism Spectrum Disorder. ABA is based on the premise that behaviours are caused by external stimuli resulting in the implementation of a reward and punishment system in order to discourage or encourage behaviours (Sandoval-Norton & Shkedy, 2019). There are several factors that pose as challenges to accessing early interventions such as Applied Behaviour Analysis. Intervention strategies have proven to cost a considerable amount and Sharpe and Baker (2007) noted that many interventions often require long hours of one-on-one interaction with a trained therapist in addition to the costs of diet specific foods and medication.

Although there has been a significant amount of research exploring the effectiveness of the ABA model, it must be noted that majority of this research is conducted in Europe and in North America (Eikeseth, 1999). Little research has explored the effectiveness of the ABA model as a method of treatment for Autism Spectrum Disorders within a South African context.

1.3. Purpose of the Study

Mental health policies are designed to reflect the government's commitment to supporting mental health care services (Franz et al., 2018). A lack of implementation of policy with regards to child and adolescent mental health in low- and middle-income countries such as South Africa results in many families and children being unable to secure treatment for ASD. The apartheid system resulted in an extreme neglect and lack of provision for the majority of learners, including learners with special needs. Legislation and national policy which focused on education were developed on the basis of racial segregation and inequality (Muthukrishna & Schoeman, 2000). The aftermath of the policies implemented during the apartheid regime resulted in the majority of children being excluded from the education system and Muthukrishna and Schoeman (2000) noted that approximately only 6050 of the estimated 195 150 children with physical and mental disabilities in KwaZulu-Natal are able to access formal education and interventions.

Little research has reviewed the effectiveness and applicability of the ABA mode of intervention within a South African context. For the purpose of this study, the researcher aimed to review the Applied Behaviour Analysis method of early intervention used for South African learners at the foundation phase in order to determine the most effective method of intervention for the treatment of Autism in South Africa.

1.4. Objectives of the Study

- To review the ABA mode of early intervention as a form of treatment for Autism in foundation phase learners in South Africa.
- To understand the impact of ABA as a mode of intervention for Autism in foundation phase learners in South Africa.
- To understand the ABA model's strengths and limitations as a treatment method for Autism in foundation phase learners in South Africa.

1.5. Research Questions

- What domains of functioning does the ABA model target for learners with Autism in the foundation phase in South Africa?
- How does the ABA model target each functioning domain for learners with Autism in the foundation phase in South Africa?
- How is the ABA model applied to Autism in foundation phase learners in South Africa?
- How does the ABA model target behavioural management of Autism in foundation phase learners in South Africa?
- What assessment methods are used to assess the ABA model of Autism in foundation phase learners in South Africa?

1.6. Significance of the Study

The findings from this study may be useful in creating platforms to assist and support families of children diagnosed with autism in accessing treatment for the autistic child. Lastly, the findings can be used to create awareness surrounding the shortfall of the ABA mode of intervention within a South African context with the hopes of address these shortfalls.

1.7. Assumptions of the Study

- The ABA model targets development across all eight domains of functioning.
- The lessons administered within each domain of functioning will be dependent on the learner's capabilities and level of development.
- Lessons will be administered in a manner that allows for learning to occur naturally.
- The ABA model will be effective in the treatment of Autism Spectrum Disorders in foundation phase learners.

1.8. Scope and Delimitations of the Study

There are several factors that may have delayed or hindered the completion of the research study. Some of which included a delay in obtaining ethical clearance, a delay in obtaining the case files, an insufficient amount of case files that meet the inclusion and exclusion criteria in addition to the researcher being unable to complete the research study within the given time frame due to inadequate time management. Similarly, there are various factors that posed as limitations to this research study. The limited number of case files may not serve as a true representation of the ABA model. Given that this review analysed secondary data, the researcher was unable to determine if any errors occurred in the tracking of the primary data. Likewise, the duration of ABA therapy may have posed as a possible limitation as the researcher was unable to guarantee that a minimum of forty hours of therapy per week was administered for the full duration of the two-year requirement.

Furthermore, the research study was conducted amidst the Covid-19 pandemic which may impacted the reliability and validity of the primary data. Due to the social limitations of the Covid-19 pandemic, the primary data may not be an accurate representation of the effectiveness of the ABA model. Similarly, the restrictions of the Covid-19 pandemic had resulted in the researcher being unable to physically access the primary data and subsequently resorted to the online analysis of the data which resulted in the researcher having limited access to the data. Lastly, the analysis of the data is subjected to the researcher's interpretation which may have also posed as a limitation to the study.

1.9. Operational Definition of Terms

Aggression: Behaviour that is threatening or likely to cause harm and may be verbal (eg, threatening or cursing at another person) or physical (eg, hitting, biting, or throwing objects at another person) (Anderson & Bushman, 2002).

Applied Behaviour Analysis: The application of principals of behaviourism to promote the improvement of human behaviour whereby all behaviours consist of antecedents and consequences (Axelrod et al., 2012).

Basic Maanding: The process teaching the learner to request for desired items or actions (Tincani et al., 2006).

Behavioural Intervention Plan: A step-by-step guide on how to manage problem behaviours (Killu, 2008).

Blocking and Redirecting: An ABA behaviour reduction technique used to distract the child from a problematic behaviour or lead them to engage in a more appropriate behaviour than the one they are currently engaging in (Hagopian & Adelinis, 2001).

Demand Fading: The process of initially removing all demands placed on the learner and systematically re-introducing demands, provided that the rate of problem behaviour remains low (Piazza et al., 1996).

Discrete Trial Training: A specific method of instruction in which a task is isolated and taught to an individual across multiple trials (repetition teaching). A specific opportunity to respond is presented, and a specific response from the learner is expected (Eikeseth et al., 2014).

Echoics: The process of being able to vocally imitate upon request (Neimy et al., 2020).

Echolalia: "Echoing" or imitating what is heard, can be immediate or delayed (Prizant & Duchan, 1981).

Extinction: The withholding of reinforcement for a previously reinforced behaviour, resulting in reduction of that behaviour (Bouton & Todd, 2014).

Functional Communication Training: The process of teaching the child to verbally communicate his/her needs (Tiger et al., 2008).

Generalisation: Term used to describe the ability to learn a skill in one situation and be able to apply it, flexibly, to other similar but different situations (Caha, 2017).

Natural Environment Training: Type of ABA where learning occurs incidentally and often playfully in natural environments (Hall, 1982).

Non-Compliance: Any occurrence of the learner refusing to follow through on a demand which is laced on them (Rortvedt & Miltenberger, 1994).

Picture Exchange Communication System (PECS): A method of communication that is used to assist the learner in developing expressive communication skills (Sulzer-Azaroff et al., 2009).

Random Rotation: A method of differentiation and integration of previously learnt skills (Turnbull & Knapp, 2014).

SD Modification: The process of altering the manner in which a stimulus is presented to the learner in an attempt to reduce instances of problematic behaviour (Koegel et al., 1977).

Tacting: The process of being able to label or describe an item with stimuli present (Bak et al., 2021).

Tantrum: An unplanned outburst of anger or frustration (Repp & Karsh, 1994).

Task and Environmental Manipulation: The process of modifying the demand and/or the environment in an attempt to reduce instances of problematic behaviour from occurring (Tud, 2018).

Vocal Protestation: The act of saying no, no thanks or yelling out, following the placement of a demand on the learner (Pelaez et al., 2011).

1.10. Summary, and Overview of the Study

Although there has been a significant amount of research exploring the effectiveness of the ABA model, it must be noted that majority of this research is conducted within the Northern hemisphere. Little research has reviewed the effectiveness and applicability of the ABA mode of intervention within a South African context. This research study aimed to evaluate the effectiveness of the ABA model as a method of treatment for Autism Spectrum Disorders in foundation phase learners. This research study has attempted to understand the relevant literature that is related to Autism and the Applied Behaviour Analysis model of treatment. A research methodology which details the process of evaluation has been outlined followed by the findings from the evaluation of the model of treatment. Lastly, the evaluation findings were discussed in relation to the Theory of Learning and Development. Although there are several factors that may have delayed or hindered the completion of the research study, it is hoped that the findings from this study may be useful in creating platforms to assist and support families of children diagnosed with autism in accessing treatment for the autistic child.

CHAPTER TWO: REVIEW OF RELATED LITERATURE

2.1. Introduction

This section aims to review the literature that explores Autism and the methods of early intervention for Autism in foundation phase learners. The review will attempt to understand the history and breakdown of Autism. In addition, the review will study the epidemiology of Autism from a global and South African perspective. The review will also take a closer look at the causes of Autism and how the proposed causes have changed and developed over time. Furthermore, various methods of interventions for Autism, precisely the concept of Applied Behaviour Analysis, will be reviewed. In addition, the review will discuss the theoretical framework that was used as a guide throughout the study. Lastly, a rationale for the proposed research study will be provided following the review of the abovementioned topic.

2.2. History

Autism Spectrum Disorders (ASD) are complex and pervasive neurodevelopmental disorders (Masi et al., 2017). According to the Autism Association of South Africa, Autism is a developmental disability that prevents individuals from making sense of what they see or hear (Autism SA, 2018). Autism originates from the Greek word *autos* which means self (Exkorn, 2005). Although the term autism is synonymous with Leo Kanner, it was first used in 1911 by a Swiss Psychiatrist, Eugene Bleuer, who used the term to describe patients whom he perceived to be socially isolated and withdrawn (Exkorn, 2005; Kita & Hosokawa, 2011).

Since the first description of Autism, the definition and diagnostic criteria have significantly changed. During the 1940s, Kanner (as cited in Cook & Willmerdinger, 2015) described Autism as the inability to relate in an ordinary way to individuals and situations from the beginning of life and subsequently separated Autism from a subtype of Schizophrenia into its own category known as Infantile Autism.

In 1943, the term Early Infant Autism was used to describe eleven child cases that displayed disturbances of affective contact and a delay in language development (Kita & Hosokawa, 2011). In 1981 autistic behaviours were classified into three clusters, namely, (1) the absence of social interaction; (2) the absence of the understanding or use of appropriate language, and (3) restricted stereotypic interests or behaviours in 1988; these clusters formed the basis of the autism spectrum (Kita & Hosokawa, 2011).

2.3. Diagnostic History of Autism

The diagnostic standards and practices have changed considerably since the disorder was first diagnosed in 1943. Autism, at first, was considered to be an early form of Schizophrenia (childhood Schizophrenia); however, this theory was abandoned in 1979, and Autism was formally recognised as a disorder in the Diagnostic and Statistical Manual of Mental Disorders (DSM), third edition (DSM-III; Wolff, 2004; McPartland et al., 2012; Verhoeff, 2013). However, the DSM-III contained different diagnostic criteria for Infantile Autism and Childhood Onset Pervasive Development Disorder (Mazurek et al., 2017). In comparison to the DSM-III, which required an onset of symptoms before 30 months of age, the DMS-III-R noted that Autistic disorder could be diagnosed during infancy and also during childhood when more social interaction and communication developmental delays became evident (Verhoeff, 2013).

Pervasive Developmental Disorders (PDDs) were viewed as an umbrella term that categorised disorders which consisted of pervasive impairments in communication, social reciprocity, and repetitive and ritualistic patterns of behaviour (Young & Rodi, 2014). The DSM-IV-TR placed ASD within the category of Pervasive Developmental Disorders, which applied to Autistic disorder, Asperger's disorder and Pervasive Developmental disorder-not otherwise specified. However, ASD excluded Rett's syndrome and Childhood Disintegrative disorder. McPartland et al. (2012) noted that the inclusion of Asperger's disorder within the DSM-IV contributed towards the increase in the prevalence of Autism due to the identification of higher-functioning children with significant social and language disabilities, who are less impaired than in children diagnosed with Autism.

Furthermore, McPartland et al. (2012) explained that confusion and misdiagnosis arose as Asperger's disorder was considered identical to autistic disorder regarding the presence of a minimum of two symptoms from the social domain and one stereotypical behaviour. However, the disorder differed from that of Autistic disorder in relation to the age of onset, the omission of diagnostic criteria within the communication, the absence of a language delay and deficits in cognitive development and non-social adaptive functioning (McPartland et al., 2012).

The DSM-5 saw the implementation of a single broad category of Autism Spectrum Disorders, replacing the term Pervasive Developmental Disorders. Additionally, the diagnostic construct of ASD was adjusted, firstly the symptoms from the social and communication domain were combined and are thus viewed as social and communicative deficits; secondly, restricted, and repetitive behaviours that were previously omitted from the DSM-IV-TR were included as part of the diagnostic criteria of ASD (McPartland et al., 2012). The DSM-5 further requires meeting all social-communicative symptoms, with only two out of four symptoms required for repetitive and ritualistic behaviour patterns (McPartland et al., 2021).

2.4. Aetiology

A substantial amount of research has been conducted on the causes of ASD. Although the aetiology of ASD is unclear, research does indicate that genetics, biological and environmental factors are some of the causes of Autism Spectrum Disorder (Rutter, 2005; Zhang et al., 2010). According to Landrigan et al. (2012), genetic studies of ASD have revealed a vital hereditary component. The disorder is found to be linked to a series of genetic anomalies (Landrigan et al., 2012). Genetic factors such as mutations, deletions and other anomalies are all linked to Autism and only account for approximately 7-8% of all ASD cases (Sutcliffe, 2008). The rate of ASD diagnosed in siblings with Autism averages 6%, and Rutter (2005) further explains that there are between 3-12 susceptibility genes for ASD; however, most siblings only have some of the genes present and therefore do not present with ASD. Furthermore, studies on twins have concluded that there is a vital genetic component in monozygotic when compared to dizygotic twins, with monozygotic twins displaying a 36% concordance (Lauritsen & Ewald, 2001; Ronald & Hoekstra, 2011).

According to Ronald and Hoekstra (2011), twin studies can be a vital source for identifying the environmental risk factors in Autism. Prenatal foetal stress and exposure to environmental or psychosocial stressors can increase the child's risk of developing Autism. The developing brain is extremely susceptible to injury caused by environmental toxic chemicals (National Research Council, 1993). In 1956 Kanner (Cubala-Kucharska, 2010) proposed that the cause of ASD is predominantly neuropsychological. Exposure to toxic chemicals such as Organophosphate insecticides is likely to cause injury to a developing brain, and Landrigan et al. (2012) note that environmental causes of ASD can be attributed to the exposure of the developing human brain to toxic chemicals, particularly during the Window of Vulnerability prior to birth. This window exists in early development, with the vulnerability being at its greatest during embryonic, foetal life (National Research Council, 1993). Furthermore, the council (1993) found that toxic chemicals such as organophosphates can produce neurodevelopmental disorders, including Autism. An increased number of cases of ASD were reported amongst children who were prenatally exposed to Thalidomide, Misoprostol and Valic acid, which resulted in neural tube defects and cardiac malformation (National Research Council, 1993).

Childhood immunisation, specifically Thimerosal (ethyl mercury) within the mumps-measles-rubella (MMR) vaccine, was considered a potential cause of Autism; however, it has received much scrutiny. In 1998, a series of ASD cases were reported to result from the MMR vaccine (Timothy et al., 2013). This was first investigated by a British Gastroenterologist, Andrew Wakefield, and colleagues, whose study revealed that symptoms of ASD emerged shortly after children had received the MMR vaccine (Lilienfeld & Arkowitz, 2007). However, upon further research, the results of several studies conducted in America, Europe and Japan revealed that the rate of ASD diagnoses continued to increase whilst the rate of MMR vaccines administered remained constant or declined (Lilienfeld & Arkowitz, 2007). This resulted in the conclusion that there is little evidence supporting the theory that the administration of MMR vaccines caused ASD (Lilienfeld & Arkowitz, 2007). Additional environmental and psychosocial factors may include maternal depression during gestation. The fluctuation in the mood of the mother may result in a hormonal imbalance within the developing foetus and can impact its development (Zhang et al., 2010).

2.5. Comorbidity

Comorbidity can be defined as the occurrence of two or more forms of mental or physical illnesses in the same individual. The DSM-5 estimates that approximately 70% of individuals diagnosed with autism spectrum disorder may display evidence of at least one comorbid mental disorder, with 40% displaying evidence of two or more comorbid disorders (American Psychiatric Association, 2013). Comorbid disorders can cause significant impairment and an additional burden of illness on the families and children diagnosed with Autism (Leyfer et al., 2006). The identification of mental and health-related medical comorbid disorders is integral to the treatment of autism diagnosis as many of the medical conditions are treatable, which results in an improved level of participation in treatment interventions (Bauman, 2010).

Seizure disorder is a common comorbid disorder often diagnosed in individuals with Autism, with the most frequently reported seizures being complex partial seizures. The prevalence of seizures in children with Autism is approximately 7-14%, with the onset before age 12 and the peak period of risk occurring during early childhood and adolescence (Bauman, 2010). Common indicators of complex partial seizures include extended periods of staring, cessation of activity, fluttering or deviation of the eyes and behavioural changes associated with confusion followed by sleep or fatigue (Bauman, 2010). Furthermore, Bauman (2010) notes that identifying seizures may be challenging due to the presence of atypical body movements and behavioural patterns, all of which may not be seizure related but attributed to other medical conditions.

Attention-deficit and hyperactivity disorder (ADHD) is another disorder that commonly presents as a comorbid disorder to Autism. The prevalence rate of children diagnosed with Autism who also meet the criteria for ADHD averages 59% (Antshel et al., 2013). The majority of children diagnosed with Autism often present with symptoms of inattention, hyperactivity, or impulsivity (Antshel et al., 2013). The diagnosis of ADHD varies with age; the number of children diagnosed with Autism displaying symptoms of hyperactivity decreases with age as opposed to the number of children who meet the criteria for inattention which remains stable (Antshel et al., 2013).

According to the DSM-5, if an individual meets the diagnostic criteria for both ADHD and autism spectrum disorder, consequently, both diagnoses should be made (American Psychiatric Association, 2013). Mood disorders such as depression and bipolar disorder are often comorbid conditions that can be associated with Autism. Mood disorders are more likely to occur in adolescents and adults diagnosed with Autism and only affect approximately 2% of children diagnosed with Autism (Matson & Nebel-Schwalm, 2007). Similarly, to ADHD, the DSM-5 notes that if an individual meets the diagnostic criteria for autism and mood disorders, both diagnoses will be given to the individual (American Psychiatric Association, 2013). According to Matson and Nebel-Schwalm (2007), depression in an individual with Autism is likely to place the individual at a greater risk for suicide in addition to higher levels of non-compliance and aggression.

2.6. Interventions for Autism

2.6.1. Psychodynamic Therapy

The psychoanalytic study of ASD was considered a unique means of developmental theory (Hoffman & Rice, 2012). The use of psychodynamic therapy in the treatment of ASD was propagated by Eveloff and Bettelheim (as cited in Matson & Minshawi, 2006). During the 20th century, healthcare practitioners perceived ASD as a result of inadequate or inappropriate parenting, especially from the mother (Drucker, 2009). Eveloff and Bettelheim concluded that ASD resulted from mothers who were cold, impersonal, and ritualistic and fathers who were perfectionists, detached and failed to protect the child from the mother (as cited in Matson & Minshawi, 2006). Furthermore, Bettelheim elaborated that cold and unloving mothers who raised children with social and developmental delays were the cause of these children developing ASD and thus coined the term "refrigerator mothers" (as cited in Matson & Minshawi, 2006). This can be viewed as an unwarranted burden on the family.

In 1976, Bettelheim proposed that neurodevelopmental psychopathology resulted from toxic parenting styles and could be viewed as a psychological fixation or regression (as cited in Drucker, 2009). However, this belief was shortly refuted and was replaced with the view that parents serve as the autistic child's strongest advocate and form an integral part of developing an intervention (Drucker, 2009).

2.6.2. Sensory Integration Therapy

Sensory processing abnormalities are relatively high in individuals diagnosed with ASD, with the level of disturbance of sensory processing being higher during infancy and early childhood compared to adulthood (Dawson & Watling, 2000). Children who present with a dysfunction of sensory processing often have trouble in regulating responses to sensations and specific stimuli. Pfeiffer et al. (2011) explain that self-stimulation is often used to compensate for the limited sensory input and an attempt to avoid overstimulation. Dawson and Watling (2000) noted that to reduce repetitive, rigid, or stereotyped behaviours, sensory processing abnormalities should be addressed through sensory integration. Dysfunction in sensory integration often results in the impairment of vestibular and tactile systems, which provide the brain with sensory information about the body's unusual movement (Smith et al., 2015).

Sensory Integration therapy (SI) was introduced in 1972 by Anna Ayres and placed emphasis on the relationship between sensory experiences and behavioural performance (Dawson & Watling, 2000). Ayres defined SI as a neurological process that categorises sensation from the body and the environment, resulting in the body's ability to function within an environment effectively (Smith et al., 2015). Through the use of controlled sensory experiences such as deep pressure, rolling and tactile stimulation, Sensory Integration therapy aims to restore neurological processing in an attempt to increase an individual's ability to functionally integrate sensory information (Dawson & Watling, 2000; Smith et al., 2015). This is carried out by sensory modulation specific to the behaviour displayed. The activities provided to the child aim to assist the nervous system in integrating information received from the environment to produce appropriate responses (Pfeiffer et al., 2011).

2.6.3. Picture Exchange Communications System

One of the most common developmental delays displayed by children diagnosed with Autism Spectrum Disorder is an impairment of language. The traditional method of communication for an autistic child includes sign language, the imitation of speech and a picture point system. The Picture Exchange Communication System (PECS) was developed to assist children with Autism in acquiring functional communication skills (Sulzer-Azaroff et al., 2009). PECS is an alternative method of communication which teaches the autistic child to spontaneously comment and make requests within a social context (Bondy & Frost, 1998). PECS requires the child to point to an image of the desired object or action to communicate their wants and needs, commonly known as manding and forms an integral part of an ABA intervention plan (Bondy & Frost, 1998). In a review of the picture exchange system conducted by Sulzer-Azaroff et al. (2009), the data revealed that PECS had become a popular alternative form of communication where the development of speech and language is delayed.

PECS has limitations, as Bondy and Frost (1998) note that the ability to match a picture to an object is a prerequisite to using the picture communication system. A second limitation noted by Bondy and Frost (1998) is that some autistic children may also experience fine motor deficits and may therefore experience difficulty in isolating a finger in order to point. This may result in the child touching several pictures with their whole hand, thus being unable to communicate their needs effectively.

2.6.4. Psychopharmacology

The treatment for ASD is complex and may include a form of psychopharmacological intervention (Bachmann et al., 2013). Psychopharmacology may be employed when the symptoms of ASD result in maladaptive behaviour. Although research on the effectiveness of pharmacological intervention in the treatment of ASD is limited, the use of medication in the treatment of ASD has significantly increased (Bachmann et al., 2013; Oswald & Sonenklar, 2007).

Antipsychotic medications have been used in the treatment of ASD, particularly in an attempt to decrease levels of aggression, stereotypic behaviour and impulse control (Bryson et al., 2003). In a study conducted in Germany, Bryson et al. (2003) noted that psychopharmacological treatment was at 16.3% for children aged 0-4 years and at 55.1% for adults aged 20-24 years.

Other causes of medication may be used in the treatment of comorbid symptoms of Attention Deficit and Hyperactivity Disorder (ADHD), anxiety and depression in higher-functioning individuals (Bachmann et al., 2013).

Bachmann et al. (2013) explained that early pharmacological intervention could be used during the Window of Vulnerability in order to enhance brain plasticity and in an attempt to correct neurotransmission. Antidepressants such as selective serotonin reuptake inhibitors (SSRIs) are commonly used to decrease repetitive behaviours and anxiety in individuals diagnosed with ASD (Hsia et al., 2014). Atypical antipsychotics such as risperidone (Risperdal) can be viewed as the most commonly used medication in the treatment of severely disruptive behaviour such as temper tantrums, aggression, and self-injurious behaviour (Accordino et al., 2016). The use of risperidone is not without side effects, such as weight gain, sedation, and an increased appetite (Accordino et al., 2016).

2.7. Behavioural Interventions

Behavioural interventions are known as the predominant method of treatment in children diagnosed with Autism as in aim to promote social, behavioural, and adaptive functioning (Ospina et al., 2008). Behavioural interventions aim to develop procedures that can target specific behavioural problems and are implemented at an early age (Matson & Minshawi, 2006). Reports of intensive behavioural interventions from an as early age as 2-3 years proved that 47% of children improved their intellectual and educational functioning (Magiati, Charman & Howlin, 2007). The concept of Applied Behaviour Analysis is a method of behavioural intervention that is used in the treatment of Autism, and therefore, a review of this method of intervention will follow.

2.7.1. Behaviour Analysis

Behaviourism can be viewed as a psychological state that places emphasis on the concept of reward and punishment (Staddon, 2014). Although the term behaviourism is renowned for the work of BF. Skinner, the origins of the concept were initially coined by John Watson in 1913 (Schneider & Morris, 1987). The concept of behaviourism proposes that human (and animal) interactions can be understood in conjunction with the mental state of an individual (Watson, 1979).

The term is synonymous with Ivan Pavlov, John Watson and BF. Skinner developed theories of learning based on the process of reaction and response of an organism (Baum, 2016). In 1937 Skinner coined the term operant conditioning, which was then used to describe behaviour as determined by consequence (Staddon & Cerutti, 2003). Skinner based his work on the concept of classical conditioning as developed by Pavlov in 1897 (Staddon & Cerutti, 2003). Behavioural analysis interventions for children diagnosed with Autism commenced during the 1960s and were pioneered by Ivar Lovaas (Rosenwasser & Axelrod, 2001). The foundation of Applied Behaviour Analysis, although based on the work of Skinner, is synonymous with the work of Lovaas (O'Donohue, & Ferguson, 2006).

2.7.2. Applied Behaviour Analysis

The work of Skinner frequently applied experimental analysis to behaviours encountered in real-life scenarios, such as applying the theory of operant conditioning to teaching environments, thus prompting the start of ABA. (O'Donohue, & Ferguson, 2001). The Journal of Applied Behaviour Analysis defines ABA as the application of principles of behaviourism to the improvement of human behaviour whereby all behaviours consist of antecedents and consequences (Axelrod et al., 2012). ABA aims to (1) provide an understating of everyday development, (2) provide an understanding of the development and maintenance of abnormal behaviours, and (3) offer a solution on how to effectively intervene in problem situations (O'Donohue, & Ferguson, 2001). Specifically, ABA attempts to aid in the development of cognition, communication skills, and physical and motor skills, in addition to adaptive and social skills (Tiura et al., 2017).

ABA therapy aims to decrease problematic behaviours through the use of concepts such as positive and negative reinforcement, extinction, and generalisation (Foxx, 2008). Based on the premise of behavioural and cognitive theory, ABA utilised a reward system in an attempt to encourage correct behaviours and in the acquisition of new skills (Tiura et al., 2017).

The famous Lovaas study of 1987 (Lovaas et al., 1987) demonstrated that children with Autism are more likely to make social and intellectual improvements when treated with the appropriate behavioural intervention (Rosenwasser & Axelrod, 2001). Similarly, Hayward, Eikeseth, Gale and Morgan (2009) explained that children receiving ABA treatment are more likely to show significant improvement in adaptive functioning, development of intelligence and language development. In addition, the use of ABA in the treatment of Autism has allowed a greater number of children to transition to mainstream learning with minimal facilitation required (Harris & Delmolino, 2002). However, Opsina et al. (2008) further explain that these improvements can only occur in instances where the child receives therapy for a minimum of forty hours a week.

In the 1990s, the demand for ABA treatment significantly increased in the United States of America and in the United Kingdom. Over the past sixty years, the field of ABA has been viewed as the primary mode of treatment for brain injury, autism spectrum disorders, along with other developmental disabilities (Axelrod et al., 2012). In countries such as Australia, Canada and the United States of America, ABA is considered to be the preferred method of treatment for Autism and has even gained the support of the national government (as cited in Welch & Polatajko, 2016). In South Africa, the majority of support services to families and children living with ASD are offered by non-profit organisations where treatment includes ABA, the PECS system and Makaton, which is a language programme that makes use of signs and symbols to aid communication (Franz et al., 2018).

ABA can be implemented by using two different approaches. The first method of implementation is understood as home-based intervention. The home-based intervention consists of an instructional programme that is administered and implemented within the home environment (Harris & Delmolino, 2002). In contrast, the second form of intervention is known as centre-based intervention and consists of an instructional programme which is implemented within a therapy centre or school setting (Harris & Delmolino, 2002). In home-based intervention, there is a significant level of involvement and interaction from the parent in contrast to centre-based intervention, where parent involvement is limited (Harris & Delmolino, (2002).

2.8. Techniques used within ABA

2.8.1. Discrete Trial Training

Discrete trial training (DTT) is a technique that is utilised within the ABA framework and is designed to improve the developmental and educational outcomes of individuals diagnosed with Autism or other significant developmental delays (Eikeseth, Smith & Klintwall, 2014). It can be understood as the reinforcement of behaviour in relation to a specific stimulus (Smith et al., 2006). As one of the foremost training procedures within the early intervention, DTT is a highly structured technique that aims to assist learners in developing skills that could not be spontaneously acquired (Eikeseth et al., 2014). DTT can only be implemented during one-on-one teaching and cannot be utilised in a group setting (Eikeseth et al., 2014). In addition, DTT is a highly beneficial method of teaching as the duration of each trial is extremely small; therefore, approximately 10-15 trials can be implemented within one minute, therefore, allowing for an increased number of trials per stimulus (Eikeseth et al., 2014).

Discrete trial training utilises the techniques of prompting and fading. Prompting allows the therapist to guide the individual in selecting the correct response; in contrast, fading is understood as the systematic removal of a prompt in an attempt to allow the individual to achieve an independent response. (Eikeseth et al., 2014). Lastly, and in addition to prompting and fading, DTT consists of the systematic use of repetition of trials until such time when mastery is obtained (Eikeseth et al., 2014). According to Smith et al. (2006), discrimination trial training plays a vital role in the acquisition of systematic instructional skills, which serve as a prerequisite for pre-academics, academics, language, and social skills. Furthermore, DTT may result in avoidance or incorrect responses and the development of a connection between the desired response and the reinforcer (Smith et al., 2006).

2.8.2. Natural Environmental Teaching

In contrast to discrete trial training, Natural Environmental Teaching (NET) is viewed as a more organic method of teaching whereby teaching occurs as the opportunity presents itself and is reliant on the interest of the individual. NET reduces the transfer of stimuli as trials are implemented as and when the stimuli become available (Halle, 1982; Kates-McElrath & Axelrod, 2006). In addition, NET provides an opportunity for the facilitation of interactions that are outside of the formal training setting, therefore, allowing for the generalisation of stimuli and training (Halle, 1982). A primary goal of behavioural interventions is to increase the level of independence; NET allows for this increase by encouraging spontaneous teaching (Bergstrom et al., 2012). Lastly, the process of natural environmental teaching creates a platform whereby teaching occurs in a functional capacity, therefore, resulting in the practical use of reinforcers (Halle, 1982). Natural environmental training is not without limitations, and according to Halle (1982), NET limits the opportunity for prompting and fading.

2.9. Effectiveness of ABA

2.9.1. Client Characteristics

Several studies have examined the characteristics of the child that are likely to impact the child's ability to benefit from ABA therapy adequately. These factors included the pre-treatment level of cognitive and social functioning (Tiura et al., 2017). Additional factors such as age, language abilities and social skills at the time of diagnosis are also likely to affect the outcomes of interventions (Ben-Itzhak & Zachor, 2007). Additionally, Anderson et al. (2007) concluded that the age of entry into ABA therapy, the child's gender, addition to the severity of the diagnosis and the duration of ABA therapy should be taken into consideration when determining the effectiveness of ABA therapy.

Recent studies conducted by Tiura et al. (2017) and Harris and Handleman (2000) found that younger children with higher cognitive functioning are associated with a better prognosis following the commencement of ABA therapy. Similar studies concluded that children who commenced ABA therapy at a younger age demonstrated the ease of transition to mainstream education classrooms four to six years later in addition to an increased likelihood of the acquisition of skills in contrast to their older counterparts (Harris & Handleman, 2000; Granpeesheh et al., 2009).

Although research supports the notion that individuals diagnosed with ASD benefit from an intervention that is administered as early as possible, Granpeesheh et al. (2009) note that the success of the intervention is also dependent on the degree to which the disorder can be detected at a very young age. Furthermore, several other studies concluded that higher levels of cognitive functioning in older learners diagnosed with Autism are viewed as predictive of greater progress upon the implementation of the intervention (Ben-Itzhak & Zachor, 2007).

The severity of the ASD diagnosis serves as an additional predictive factor in determining the effectiveness of ABA therapy. Studies conducted by Ben-Itzhak and Zachor (2007) concluded that children with a more severe ASD diagnosis are likely to acquire fewer language and play skills. In addition, the child's language abilities at the onset of ABA therapy are also likely to influence the child's progress throughout treatment. Szatmari et al. (2003) noted that children who display higher language skills at the onset of ABA therapy are likely to acquire greater adaptive skills throughout the course of treatment. Similarly, Ben-Itzhak and Zachor (2007) stated that the acquisition of language skills before the age of five (5) years old serves as a predictor of better outcomes when undergoing early intervention.

2.9.2. Treatment Hours

The duration and frequency of the ABA therapy received are also noted as a determining factor in understanding the effectiveness of applied behaviour analysis. According to Granpeesheh et al. (2009), children who received frequent and more intensive ABA therapy demonstrated an increased acquisition of skills during the course of treatment. This notion was first proposed by research conducted by Lovaas (1987), which suggested that children receiving approximately 40 hours of intervention per week demonstrated robust treatment outcomes in comparison to children who received approximately 10 hours of treatment per week. Research conducted by Granpeesheh et al. (2009) suggests a linear relationship between the number of treatment hours and the child's age.

2.9.3. Long-Term Impact

Lovaas (1987) highlighted that approximately 47% of children with ASD required long-term ABA therapy in order to compensate for delays encountered in relation to adaptive and intellectual functioning. Meta-analyses conducted by Harris and Handleman (2000) noted that children with a higher IQ (mean: 78) at intake were able to successfully transition to mainstream classrooms following the administration of ABA therapy, and in contrast, children with a lower IQ (mean: 46) at intake were able to attend remedial school following the administration of ABA. This was confirmed by later studies conducted by Ben-Itzhak and Zachor (2007), which concluded that children with higher IQ levels displayed a stronger acquisition of both receptive and expressive language in addition to playing skills. Similarly, Szatmari et al. (2003) noted that children with a higher IQ and those who have developed functional, spontaneous language prior to six years of age have a better outcome than children without these factors when receiving ABA therapy.

2.9.4. Impact on Emotional and Physical Development

As described within the DSM-5, children diagnosed with Autism Spectrum Disorder may experience difficulties in communication and social interactions (American Psychiatric Association, 2013). According to Balch and Ray (2015), these difficulties include social-emotional reciprocity, non-verbal communication, and peer relationships, in addition to emotional regulation. Historically, social, and emotional delays were treated through the use of behavioural interventions, which include play-based interventions (Balch & Ray, 2015). The lack of focus on interpersonal dynamics poses a gap in the treatment of children with ASD. Balch and Ray (2015) note that significant emphasis should be placed on interpersonal dynamics in an attempt to nurture consistent interpersonal interactions and relationships.

2.10. Limitations of ABA

Trembath and Vivanti (2014) suggested that the behavioural features of children with Autism should be taken into consideration when attempting to understand treatment outcomes. In addition, individual characteristics of the child which are not related to the ASD diagnosis should also be taken into account (Trembath & Vivanti, 2014). Likewise, many children may be taught the same skills over several years using the same conditioning techniques without mastery being met (Sandoval-Norton & Shkedy, 2019). Furthermore, individuals with ASD only qualify for ABA therapy until the ages of 18-21 years, which may result in the individual being forced to discontinue treatment without mastery of behaviours (World Health Organization, 2020).

2.11. Debate

The intensive use of ABA has proven beneficial in the acquisition of skills in young children diagnosed with Autism. However, Harris and Handleman (2000) noted that this is subject to controversy, specifically in relation to the benefits of the techniques utilised within ABA. Likewise, Granpeesheh et al. (2009) questioned the intensity of treatment in relation to the child's age. Significant research suggests that the intensive use of ABA can lead to prompt dependency, a sense of learned helplessness, in addition to low self-esteem, which may be a result of the use of an external reward system (Sandoval-Norton & Shkedy, 2019). Specifically, Sandoval-Norton and Shkedy (2019) note that the introduction and then the removal of a reward is likely to lead to a reduced level of motivation in carrying out desired acts or behaviours in addition to a reduced intrinsic interest and quality of behaviours, which is likely to result in a decrease in the generalisation of actions and behaviours. Furthermore, prompt dependency in children has been found to hinder the development of age-appropriate social and interpersonal skills (Sandoval-Norton & Shkedy, 2019). Additionally, spouses and families of individuals who are prompt dependent noted that the lack of self-motivation has resulted in an added source of stress within the family system (Wilson et al., 2014). Likewise, Sandoval-Norton and Shkedy (2019) argue that withholding items such as food, toys, and other objects in an attempt to elicit a desired response is likely to result in the child experiencing feelings of helplessness, anxiety, and stress.

According to Sandoval-Norton and Shkedy (2019), ABA has been viewed as the "gold standard" in the treatment of ABA; however, significant research indicates that ABA is only effective in individuals who display a measurable Intelligence Quotient (IQ) of 70 or higher. Furthermore, many studies excluded non-verbal individuals as they were deemed to be lower-functioning (Sandoval-Norton & Shkedy, 2019). Therefore although a vast amount of ABA research has been conducted, a significant portion of this research is not holistically representative of individuals with ASD (Sandoval-Norton & Shkedy, 2019). In addition, the design of review studies has previously posed a challenge in understanding the effects of treatment, as assessing the amount that a child learns is difficult to gauge (Granpeesheh et al., 2009).

Moreover, the psychological impact on an external reward system is likely to lead to detrimental effects following the removal of the reward and is likely to lead to a reduced motivation to complete tasks, a decreased level of intrinsic interest in addition to a decrease in the quality of performance in the completion of daily tasks and activities (Sandoval-Norton & Shkedy, 2019). Lastly, Sandoval-Norton and Shkedy (2019) argue that continuous use of the external reward system is likely to result in individuals who are compliant and conditioned to obey others irrespective of the task. These individuals are said to lack intrinsic motivation, display a low level of self-confidence and are reluctant to engage in tasks.

2.12. Conceptual Framework

Childhood development is viewed as the progression from one developmental period to the next, and these changes can be viewed as a result of new emerging mental functions and a restructuring of the mind (Bodrova, 1997). Vygotsky noted that a child's development cannot solely be attributed to their biological maturation. Rather, the development is dependent on the acquisition of the newly formed behaviours and the manner in which these were shaped (Bodrova, 1997). Kozulin (2004) states that Vygotsky's model of education is not aligned with a child's development; instead, psychological functioning is developed in relation to the next level of educational enhancement. The theory of learning and development, developed by Lev Vygotsky, states that social interactions are fundamental in a child's development and that these are socially guided and constructed (Kozulin, 2004).

The Zone of Proximal Development can be defined as the distance between the level of development as noted during instances of problem-solving and the level of potential development that can occur under the guidance of adults or by collaborating with other peers (as cited in Wertsch, 1979). The Zone of Proximal Development was proposed in an attempt to explain the relationship between learning and mental development and placed significant emphasis on the attribution of genetics and social interaction to a child's development and mental functioning (Wertsch, 1979). Lastly, Vygotsky noted that cognitive development, which stems from social interactions, is guided by the construction of knowledge within the Zone of Proximal development (McLeod, 2014). Therefore, indicating that the child's environment impacts their construction of knowledge.

Vygotsky's theory of learning and development is based on the premise that lower mental functioning, such as associated memory and sensation, are assumed to be present at birth, and the development of these functions is established through maturation and the accumulation of life experiences. Whereas higher mental functioning is viewed as being influenced by culture and may vary amongst individuals (Bodrova, 1997). The theory of learning and development proposes that learners are initially more dependent on individuals with more experience; however, over time, the learner becomes responsible for their own learning and participation in an activity (John-Steiner & Mahn, 1996). In addition to this, Vygotsky proposed that higher mental functioning is first witnessed on an inner psychological level, otherwise known as a social level, and only later in the child's development can the higher mental functioning process be witnessed within the in the psychological level, individual level (Wertsch, 1979). According to Wertsch (as cited in John-Steiner & Mahn, 1996), the interdependence of individual social processing and the construction of knowledge can be understood by examining the individual's development, social and individual actions and, lastly, by an analysis of the individual's genetic history.

Vygotsky proposed that cognitive development and the development of language originate from social interactions between children and their parents and peers, therefore, emphasising the impact of the child's environment on their thinking and development (McLeod, 2014).

In addition, the theory of learning and development states that a child's learning and development occurs through the interaction between the child and the teacher or parent, whereby the parent or teacher models the desired behaviour or provides verbal instruction, which the child then attempts to demonstrate. Over time, the child internalises this behaviour or instruction and begins to demonstrate the desired action (McLeod, 2014) independently.

Children with Autism display significant deficits in both higher and lower mental functioning. The Applied Behaviour Analysis mode of early intervention administered at The Star Academy aims to compensate for and develop these areas of functioning. Following the guidelines of the theory of learning and development, this study aims to assess the impact and effectiveness of the Applied Behaviour Analysis mode of intervention in the treatment of Autism.

2.13. Summary

This section aims to review the literature that explores Autism and the methods of early intervention for Autism in foundation phase learners. Autism is understood as a developmental disability resulting in learning and behavioural deficits. In addition, the review concluded that the global prevalence of individuals diagnosed with Autism is on the increase, therefore, proving an increased need for early intervention. Various methods of intervention can be utilised in the treatment of Autism. Applied behaviour analysis is the most commonly utilised intervention method, which aims insight into the effective intervention and management of problem situations through specifically tailored concepts of behaviourism. The theory of learning and development by Lev Vygotsky aims to understand a child's development through their interactions and will be used as the theoretical framework to guide the researcher in undertaking the proposed study, which aims to review the effectiveness and applicability of the Applied Behaviour Analysis method of early intervention within the South African context in the hopes that the findings can be used to support families of children diagnosed with Autism in accessing treatment for the autistic child.

CHAPTER THREE: METHODOLOGY

3.1. Introduction

A research methodology can be viewed as a step-by-step guide a researcher uses when conducting a research study. Twining, Heller, Nussbaum and Tsai (2017) explain that the research methodology describes the logic behind the research methods and techniques chosen for a particular study. This section outlines the research design the researcher adhered to when collecting data. It seeks to describe the study's objectives, the study's location, and the sampling technique followed when selecting participants. This section will also explain the researcher's data collection and analysis method when collecting and analysing the data. Lastly, the section will discuss the possible limitations and ethical considerations encountered in this study.

3.2. Research Design

A research design is a plan in which the researcher obtains participants and collects data. The research design describes how participants will be selected, what procedures will be adhered to during data collection, and how the data will be analysed while also considering any ethical issues that may arise during and throughout the study (Welman et al., 2005; Twining et al., 2017). When considering the research design, it is essential to state the research methodology that will be adhered to, the type of participants the study will be conducted on, how the participants will be selected, a method of data collection, a method of data analysis and lastly any ethical considerations that need to be accounted for (Welman et al, 2005; Twining et al., 2017).

3.2.1. Type of Research

Qualitative research can be understood as how individuals construct meaning from their experiences. A qualitative research study aims to understand an aspect of social life where the research data is generated as soft data, in the form of words, as opposed to a quantitative research study which generates complex data in the form of numbers. Specifically, qualitative research can be viewed as a detailed examination of a specific phenomenon (Neuman, 2014; Twining et al., 2017).

This research method is considered a wide array of interpretive techniques that describe, decode, and translate a phenomenon (Welman et al., 2005; Twining et al., 2017). The qualitative research design can be used to describe and understand subjective data. When undertaking qualitative research, data collection methods such as observations, interviews and focus groups are used (Welman et al., 2005; Twining et al., 2017).

A descriptive research design aims to portray the characteristics of people, situations, or the frequency with which a specific phenomenon occurs and can be considered an attempt to answer questions based on ongoing events (Kim et al., 2017). The purpose of a research design can be to describe one or more variables to determine if there is a relationship among the variables (Kim et al., 2017). The above-mentioned research study adhered to the principles of a descriptive research design as the systematic review consisted of describing and comparing variables to determine the effectiveness of Applied Behaviour Analysis as an intervention method.

This study employed a qualitative research methodology and a descriptive research design, as the results were based on daily events and people's behaviour. The researcher aimed to acquire an in-depth understanding of the chosen early intervention mode for treating Autism. The review of the data collected was open to the researcher's subjective understanding whilst considering the researcher's personal biases and insider knowledge.

3.3. Location of the Study

The location of a research study is critical to success of the research study. The ABA programme conducted at The Star Academy, South Africa, was reviewed. The Star Academy is located predominantly in the urban areas of Gauteng (Johannesburg and Pretoria) and KwaZulu-Natal (Durban). This review was conducted using secondary data in the form of case files, supervisor notes, clinical notes, and personal reflection notes from The Star Academy. All data that was collected for the review was accessed online. Due to the onset of the Covid-19 pandemic, the researcher relied on online access and online communication with the gatekeepers. This hindered adequate access to the research study as the researcher required more contact with the gatekeepers, which resulted in specific time delays pertaining to the access to the data within the research study.

3.4. Study Population

The target population for this research study was ABA intervention cases files from The Star Academy, South Africa, and the cases files consisted of the intake assessment notes, case files and relevant case notes (referred to as case files from hereon) from The Star Academy. The study population focussed on foundation phase learners who were diagnosed with Autism Spectrum Disorders and were receiving ABA intervention as the primary method of intervention.

3.4.1. Inclusion and Exclusion Criteria

In an attempt to ensure that a high standard quality of data was obtained, an inclusion and exclusion criteria was adhered to when selecting the case files. The inclusion and exclusion criteria were as follows:

- The case files were of learners whose primary location of therapy was The Star Academy therapy centres and not the home environment.
- The case files were for learners between the ages of three years and nine years old.
- The case files were for learners residing in South Africa who had to receive intervention for 40 hours a week for a minimum of two years.
- The case files must have contained data for a minimum of two years.
- The case files consisted only of primary data that is tracked via the online tracking system known as the *Skills Logbook*.
- The case files selected for the review only consisted of data from learners who received ABA treatment in English.
- The case files selected for the review did not consist of any cases in which the researcher previously worked on, as a fixed member on the case.

There were various challenges that were encountered during the selection of the case files in accordance with the inclusion and exclusion criteria. Due to the research study being completed amidst the Covid-19 pandemic and online communication being the primary method of communication with the gatekeepers, the researcher had limited control over how strictly the inclusion and exclusion criteria were being adhered to during the process of selecting the case files. Likewise, there was a limited number of case files which met the complete inclusion and exclusion criteria therefore resulting in the researcher only having access to ten case files. Similarly, the age range of the case files were adapted to include case files of learners who were two years old. This was done to ensure that there were a sufficient number of case files which met to inclusion/exclusion criteria. Additionally, due to the social restrictions of the Covid-19 pandemic, it was unclear if all case files received a minimum of 40-hours of intervention every week for the complete two years as stipulated in the inclusion/exclusion criteria above.

3.5. Sampling Techniques and Sample Size

Sampling is a technique used to create a group of participants representative of a larger population (Neuman, 2014; Twining et al., 2017). Sampling methods can be clustered based on whether the method of sampling can determine the chance that each participant has of being selected. Therefore, sampling methods can be distinguished as probability sampling methods or non-probability sampling methods.

Probability sampling indicates that the likelihood of a participant being selected can be calculated. Probability sampling methods can be highly accurate, especially when sampling from large populations (Neuman, 2014; Twining et al., 2017). Contrastingly, in non-probability sampling methods, the likelihood of a participant being selected cannot be determined (Neuman, 2014; Twining et al., 2017). Convenience sampling is a method of non-probability sampling which allows the researcher the freedom to select participants based on easy accessibility, geographical location, and willingness to participate, provided that members of the target population meet the inclusion and exclusion criteria (Etikan et al., 2016; Flick, 2017). However, the convenience sampling method has been criticised for failing to consider the ultimate goal of the study (Flick, 2017).

During the selection of case files, purposive sampling was employed. Purposive sampling is a technique whereby the research uses a specific criterion when selecting participants (Etikan et al., 2016). According to Tongco (2007), purposive sampling occurs when participants are chosen based on inclusion and exclusion criteria set out by the researcher. The study sample consisted of 10-15 case files of learners who have completed or were undergoing ABA therapy for at least two years. The primary data within each case file was downloaded from the Skills Logbook site. Although the technique of convenience sampling was employed, the researcher still faced the challenge of obtaining case files containing sufficient data for the minimum two years. This resulted in the number of applicable case files being limited.

3.6. Research Instrument

3.6.1. Observations

Observation is a method of data collection that is widely used in qualitative research and is primarily used when the researcher intends on understanding an explicit concept (Walshe et al., 2012). The process of observation can be employed in the study of primary or secondary data collection. Secondary data is defined as data that was previously collected for another primary purpose. Observations conducted using secondary data are considered to require less time and resources, and Smith et al. (2011) note that secondary analysis has proven to be useful in instances when limited time and resources may be available. However, the process of observation is not without limitations as familiarity with the setting may influence the manner in which the researcher views and interprets the setting and primary data obtained (Walshe et al., 2012).

The researcher collected secondary data from The Star Academy. The data was collected through the analysis of case files, supervisor case notes, clinical notes in addition to personal reflection notes. The data collected was recorded according to an observation schedule (see appendix E). In order to access the data, The Star Academy provided the researcher with access to the online data tracking system, namely the Skills Logbook, in order for the data to be retrieved. In addition to retrieving the data, it was requested that The Star Academy provide the researcher with a copy of the supervisor case notes, the initial intake assessment, details of any additional assessments or interventions that were previously conducted or were currently being conducted.

There were several challenges that were encountered during the process of data collection. Firstly, the researcher was granted limited access to the primary data (14 days) which resulted in the researcher being unable to review the process of data collection to account and rectify errors that may have occurred during the process. Secondly, due to the primary data accessed via Skills Logbook, this meant that previous primary data could not be assessed. This limited the researcher's ability determine the level of progress made through receiving intervention via the ABA model. Lastly communication challenges were encountered during the process of scheduling follow up interviews with the case supervisors and therefore, it is unknown whether the learners had received additional forms of intervention which may have impacted the effectiveness of the ABA model.

3.6.2. Credibility, Dependability, Confirmability and Transferability

In qualitative research, reliability and validity are often reviewed together. Joppe (as cited in Golafshani, 2003) defines reliability as the extent to which the results consistently and accurately represent the total population of the study. In contrast, validity aims to determine whether a study truly and accurately measures what the study intended to measure.

Morrow (2005) notes that credibility, transferability, dependability, and confirmability in qualitative research can be equated to validity, reliability and generalizability in quantitative research. Credibility can be understood as the consistency of the research and can be achieved through prolonged engagement with the participants, persistent observation within the field and thick descriptions.

In addition, dependability can be understood as the consistency of a research study over time, researchers, and techniques (Morrow, 2005). Furthermore, transferability refers to generalising the research findings to the specific population (Morrow, 2005). Lastly, confirmability is based on the assumption that the researcher is never fully objective and can be defined as an attempt to represent the target population as closely as possible (Morrow, 2005). The data was reviewed according to a structured observation schedule during the data collection process. This was an attempt to ensure that data was observed without any form of manipulation. The consistency of the results was verified by referring back to the raw data obtained.

For this research study, the data was collected using an observation schedule. All case files were reviewed to ensure that any significant data was not omitted from the review. The researcher attempted to ensure that the research supervisor made the original case files and relevant notes available. This allowed the supervisor to gauge their understanding and interpretation of the data obtained. Furthermore, this would have allowed the supervisor to assess the accuracy and consistency of the data collected. In addition, the researcher would have ensured that all interview recordings and transcriptions were made available, allowing the supervisor to access the transcription accuracy whilst deriving their interpretation of the data.

All data collection procedures were stipulated, ensuring that the research study could be replicated if needed. This was achieved through an observation schedule and a semi-structured interview schedule. Following the data collection, all necessary steps undertaken during the data analysis were also stipulated. In an attempt to compensate for the researcher's subjective biases, the researcher recorded all personal reflection notes, which were included as part of the data collection and analysis. As previously mentioned, the Skills Logbook account allowed access to the primary data for a limited period. As a result, this impacted the researcher's ability to effectively verify the data. Additionally, this limited the researcher supervisor's ability to verify the data collection process.

3.7. Data Analysis

Qualitative research describes and interprets experiences and perceptions within a particular context (Maguire & Delahunt, 2017). Data analysis is viewed as a central component of qualitative research.

During the process of data analysis, it is vital that the researcher exercise their judgement when generating codes and themes (Nowell et al., 2017). The identification of themes is said to be one of the most fundamental tasks of qualitative research.

Thematic analysis is a widely used yet rarely acknowledged method of qualitative analysis. It is used to identify and report on themes identified upon analysing the data collected (Braun & Clarke, 2006). It is a method of analysis that allows the researcher to discover themes that are embedded throughout the interview transcriptions (Braun & Clarke, 2006). Thematic analysis is a flexible method of analysis which consists of six steps, namely, (1) familiarisation of data collected, (2) generating initial codes, (3) searching for themes, (4) reviewing themes, (5) defining and naming themes and lastly (6) producing a report (Braun & Clarke, 2006).

The data obtained were analysed using Braun and Clarke's thematic analysis. The findings from the review were first analysed according to each domain of functioning. This comprised of the social, motor, language, play, adaptive, executive, academic and cognitive domains of functioning (Valsiner, 2021). This allowed the researcher to understand how the ABA method of intervention was used to enhance development within each specific domain of functioning. This proved somewhat challenging as the lessons administered to the learners were not the same for each case. This was due to the learners' capabilities and level of learning within the ABA model. Therefore, caution was exercised when analysing the data collected.

Thereafter, the assessment of each domain of functioning, the initial assessment and the type and consistency of the intervention provided over the two years. This was achieved by analysing the data obtained from the Skills Logbook and case notes. Where applicable, descriptive statistics and graphical data were employed to document the change in the functioning domain, allowing for more nuanced details to emerge from the data analysis to demonstrate the impact of the ABA or lack thereof for learners with Autism.

Likewise, the effectiveness of behaviour management was assessed similarly. The researcher analysed the most commonly presented behaviours, and the methods in which each behaviour was being targeted were analysed. Graphical data was utilised to assess the frequency of the instances of the behaviours following the implementation of the behavioural intervention plan was assessed. This was supplemented with information from the case supervision notes, which provided insight into the effectiveness of each form of replacement behaviour. Lastly, the maintenance of newly acquired skills was analysed. This occurred through the analysis of the general method of maintenance assessment in addition to analysing the maintenance and review schedules of each case file. The analysis of the maintenance of newly acquired skills is in contrast to the review schedules; maintenance is conducted annually. Therefore, only one data set was present for the maintenance analysis.

3.8. Ethical Considerations

Ethical clearance was obtained from the University of KwaZulu Natal's Human Social Science Research Ethics Committee. According to Neuman (2014), a gatekeeper can indirectly shape the direction of the research. Gatekeepers' permission has been obtained from the director of The Star Academy (see Appendix B). Once ethical clearance and gatekeeper's permission had been obtained, the case files were purposively selected based on the inclusion and exclusion criteria. Upon obtaining the case files from The Star Academy, all case files were first meant to be stored via an online platform such as Google Drive or Dropbox. Secondly, it was hoped that a copy of the case files would be given to the research supervisor for storage. Lastly, the researcher stored the case files. Storing the primary data was not needed as this could only be viewed online.

The secondary data that was collected via the observation schedule was stored in accordance with the above-mentioned options. Before analysing the data, the researcher ensured that the anonymity of the individuals in the case files was maintained. This was achieved through the allocation of a code (e.g., CF#1) to each case file. Thereafter, the code was utilised as a pseudonym when making reference to the case files. Due to the sensitive nature of the research topic, all personally identifiable data from the case files was held in confidentiality and pseudonyms were used. Upon completion of the study, all data collected was stored on Dropbox, and a copy of the data was given to the research supervisor for storage. Post the 5-year data preservation and data management policy, all digital copies of the data will be permanently deleted.

3.9. Summary

The proposed study was carried out as a descriptive qualitative study. Approximately 10-15 case files were reviewed to determine the effectiveness of ABA as an early intervention for Autism in foundational phase learners. Thereafter, a follow-up interview was hoped to be conducted in the form of semi-structured interviews via an online communications platform. Before the interviews were conducted, the case supervisor was briefed on the details of the study, and the researcher ensured that all participants signed an informed consent form. Lastly, the data obtained were analysed using Thematic Analysis.

CHAPTER FOUR: RESULTS OF THE STUDY

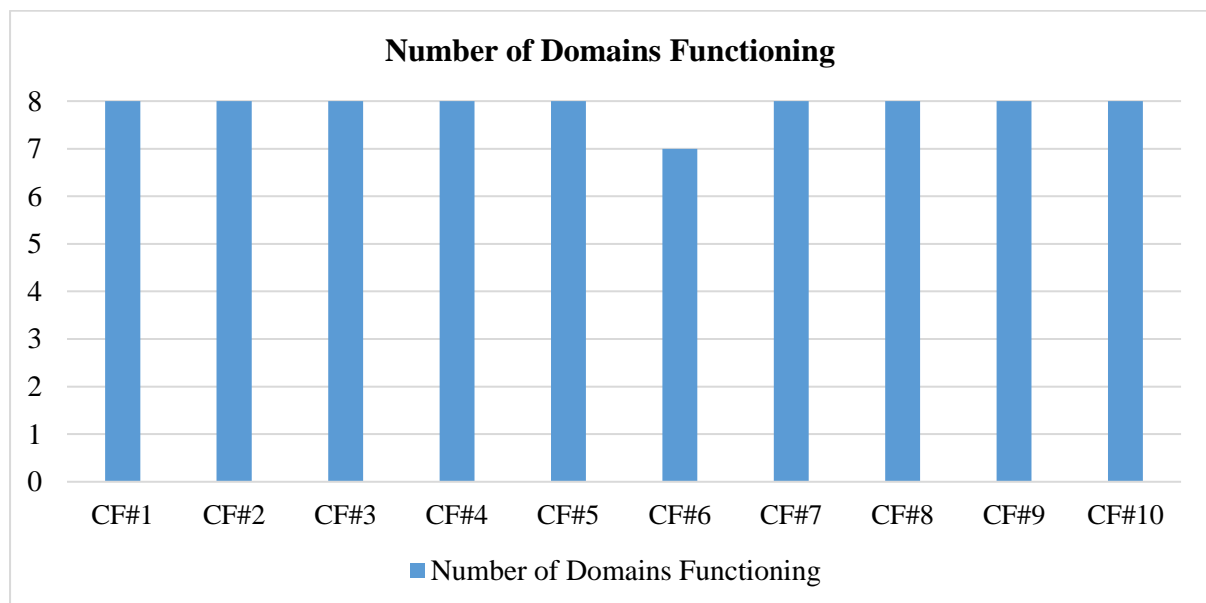
4.1. Introduction

This study aimed to review the Applied Behaviour Analysis method of early intervention as a form of treatment for Autism in foundation phase learners in South Africa. The study focused on analysing case files from The Star Academy, with a sample of 10-15 case files of learners between the ages of 3 and 9 years old. Each case file consisted of intake assessment notes, progress data, and relevant case notes (referred to as case files from hereon). In this section, the researcher has analysed the data collected using thematic analysis. Following the analysis of all case files obtained, four themes emerged, with several themes consisting of several subthemes. The themes identified include the following: Domains of functioning, Administration of lessons, Behaviour Management and Progress Management. The themes and sub-themes will be discussed in greater detail. The data has been coded according to a key found in this report's appendix (see appendix E).

4.2. Targeting of Domains of Functioning

The researcher aimed to ascertain which domains of functioning did the ABA model target for learners with Autism in the foundation phase in South Africa. This theme was aimed at determining which domains of functioning were being targeted by the ABA model.

Figure 1: Number Domains of Functioning



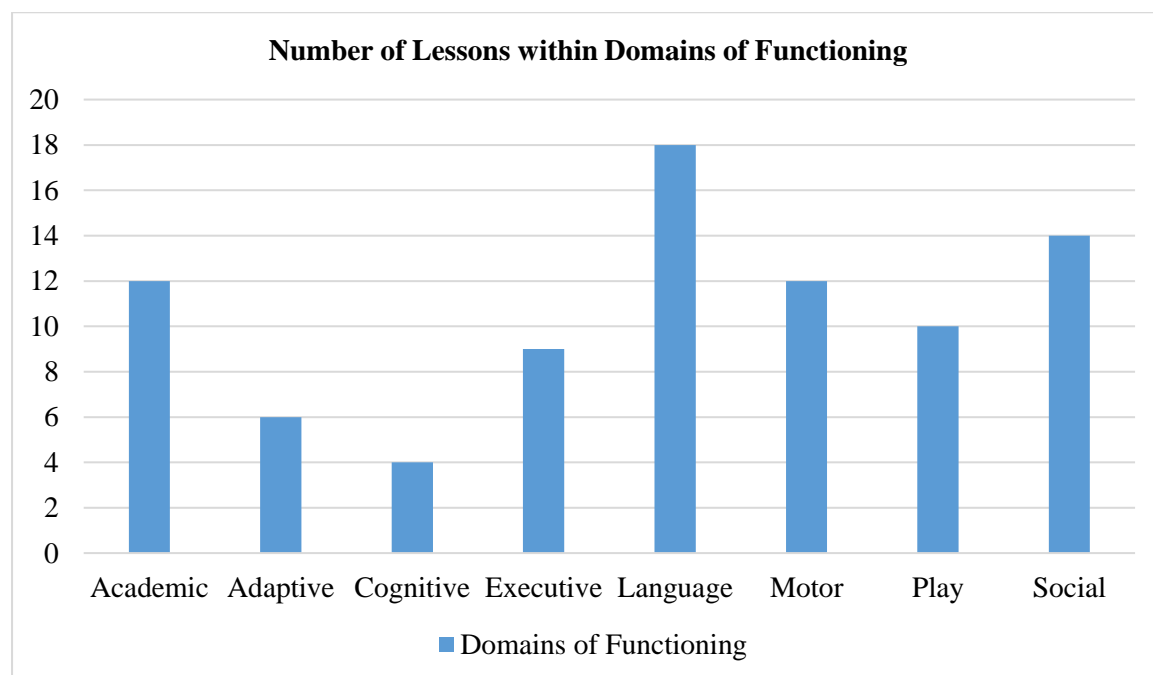
From the data collected, it was revealed that 90% of the total case files targets functioning across all eight domains of functioning. Likewise, it was found that 10% of the case files targeted functioning across seven of the eight domains of functioning with the *Cognitive* domain of functioning being omitted. This may be attributed to no difficulties being detected within the *Cognitive* domain of functioning during the period of intervention.

Additionally, it was found that the number of lessons that were targeted within each domain of functioning varied across the case files as this was dependant on the learner's capabilities and level of functioning.

4.2.1 Targeting of Functioning within Domains of Functioning

This theme was aimed at understanding how the ABA model had targeted the acquisition of missing skillsets within each domain of functioning. The researcher aimed to understand how did the ABA model target functioning within each domain of functioning for learners with Autism in the foundation phase in South Africa.

Figure 2: Number of Lessons within Domains of Functioning



The data revealed that an array of lessons were simultaneously targeted within each domain of functioning. From the data collected, it was found that within the ABA method of intervention, significant emphasis was given to the *Language* and *Social* domain of functioning. 21.18% of lessons administered were from the Language domain with the most prominent lessons including *Basic Manding*, *Echoics* and receptive lessons such as *Body Parts*, *Locations*, *Prepositions* and *Actions*. Likewise, 16.47% of lessons were administered within the Social domain, the most prominent lessons comprised of gaining *Compliance*, making *Eye Contact*, *Non-Vocal Imitation*, the utilisation of *Basic Social Cues*, and *Gaining Attention*.

Contrastingly, little emphasis was placed on the *Cognitive* and *Adaptive* domains of functioning. Within the Cognitive domain (4.71%), *Emotions* was the only lesson administered. Similarly, lessons which were emphasised within the Adaptive domain (7.06%) included *Dressing*, *Feeding*, *Toilet Training*, and *Personal Care* lessons.

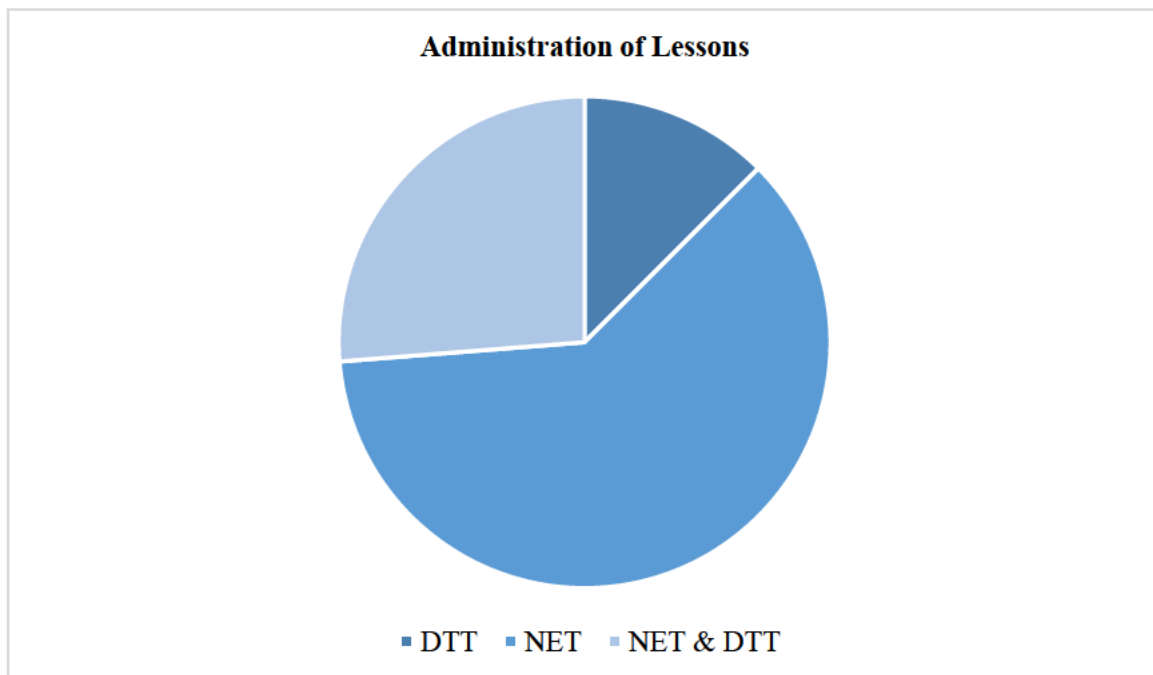
Lastly, it was found that lessons were categorised as either receptive lessons, matching, or naming of lessons. Depending on the nature and capabilities of the learner, lessons were conducted in either a two-dimensional or three-dimensional format. It was found that the degree of difficulty of the lessons being administered was dependant on the child's capabilities.

The above analysis suggests that within the ABA model, preference is given to communication and enhancing the child's range of vocabulary in addition to enabling the child to be able to engage across multiple social contexts.

4.3. Application of the ABA Model

In this theme, the researcher aimed to understand how the ABA model was applied to learners diagnosed with Autism in foundation phase learners in South Africa. This theme was aimed at ascertaining how lessons were implemented across the various domains of functioning.

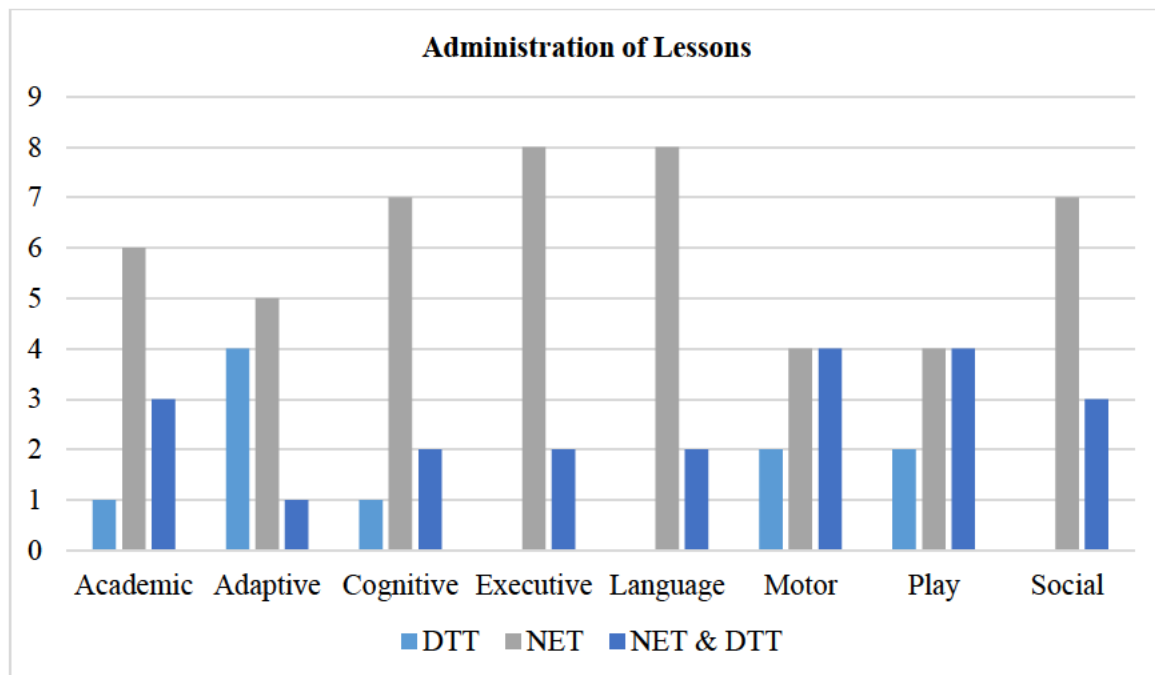
Figure 3: Administration of Lessons



From the data collected, it became evident that 61.25% of lessons were administered as per Natural Environmental Training (NET) which occurs as and when the opportunity presents itself therefore, providing an opportunity for natural interactions. Contrastingly, only 12.5% of all lessons were administered as per Discrete Trial Training (DTT) which is a highly structured technique that can only be implemented in a one-on-one teaching environment and cannot be utilised in a group setting. Furthermore, the data revealed that 26.25% of all lessons were administered as a combination of NET and DTT which also allows for learning to occur in a manner which is structured yet presents as a natural form of learning.

Therefore, the data indicates that the preferred method of the implementation of the ABA model was in a natural manner therefore allowing for learning to occur as naturally as possible and was dependant on the learner's capabilities in addition to the type of lesson being targeted within each domain of functioning.

Figure 4: Administration of Lessons



From the data collected it was found that NET emerged as the preferred method of administration of lessons within 75% of all domains of functioning. Specifically, the data revealed that NET was predominantly utilised in the *Executive, Language, Cognitive* and *Social* domains of functioning. This suggests that the development of skills which are required for daily functioning are taught in a natural manner therefore allowing for the learner to understand the how such skills are utilised.

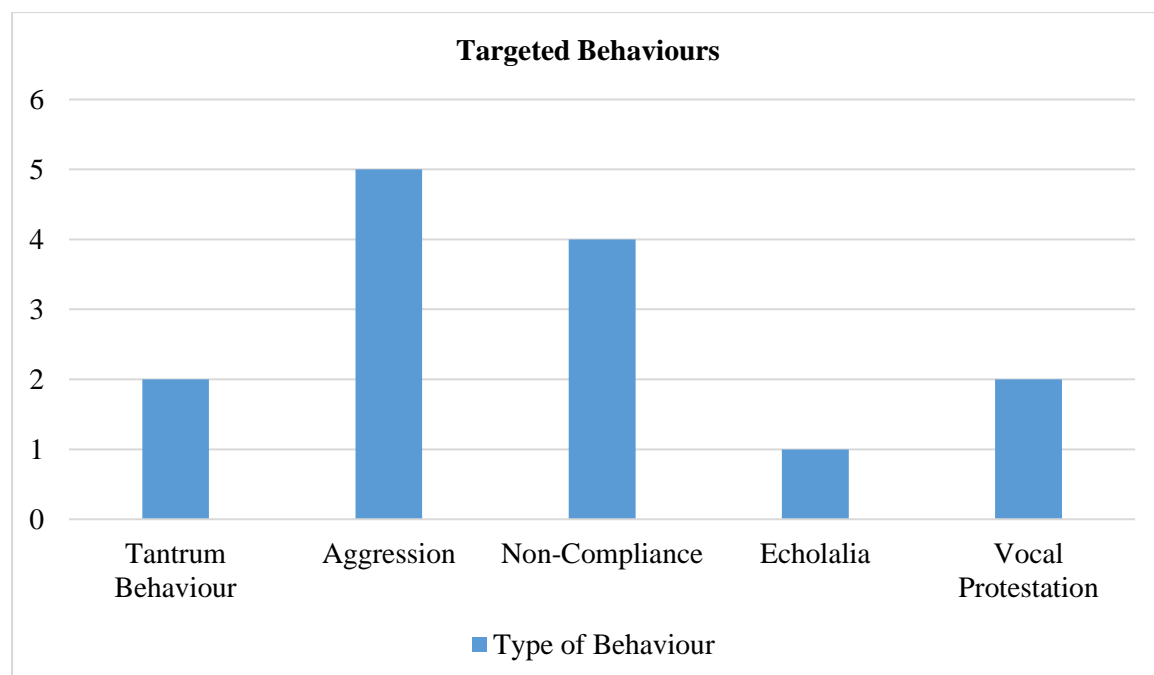
Additionally, it was found that within the *Motor* and *Play* domains of functioning, preference was given to a combination of NET and DDT in comparison to the sole NET administration of lessons. This allowed for the development of skills which required multiple steps however could still be targeted in a natural setting.

Lastly, the data revealed that targeting of lessons in a sole DTT manner was the least preferred method when administering lessons and subsequently the acquisition of skills.

4.4. Targeting of Behaviour Management within the ABA Model

The researcher aimed to understand how did the ABA model address behaviour management of Autism in foundation phase learners in South Africa. This theme was aimed at understanding what behaviours are targeted by the ABA model in addition to how the ABA model was utilised to decrease the occurrence of the targeted behaviours. An array of behaviours was targeted within the ABA model. Within this sub-theme, the researcher attempted to determine the most frequently targeted behaviours.

Figure 5: Targeted Behaviours

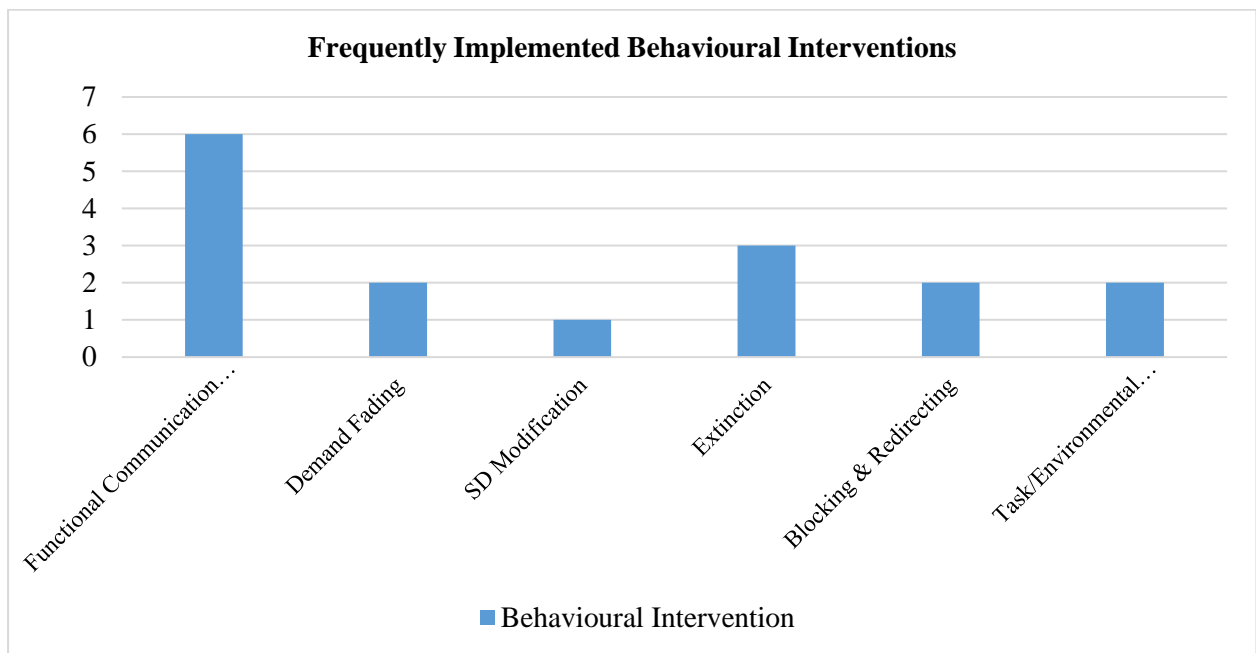


From the data collected it became evident that an array of behaviours were targeted and this was dependant on the learner's behavioural interventions in addition to the manner in which the behaviours presented itself. The most commonly targeted behaviours included Aggression and Non-Compliance. Approximately 38.46% of all behaviours were Aggression type behaviours with Non-Compliance consisting of 30.77% of all behaviours. The least occurring behaviours included Echolalia which consist of 7.69% of all behaviours. Tantrum behaviours and Vocal Protestation comprised of 15.38% of all behaviours. Behaviours such as Tantrum behaviours, Aggression and Vocal protestation were the most commonly targeted behaviours. These either targeted in response to escape behaviour or in relation to desired objects.

4.4.1. Behaviour Management

This sub-theme is aimed at determining how behaviour is managed in addition to the most frequently used method of behavioural intervention. Semi-structured behavioural intervention plans were viewed as the preferred method of intervention in relation to behaviour management as this allowed of the behavioural intervention plan to be tailored to the needs of each child.

Figure 6: Frequently Implemented Behavioural Interventions



The most preferred method of behavioural intervention is Functional Communication Training, this comprised of 37.5% of all behavioural intervention plans. From the data collected it became evident that Functional Communication Training was often implemented in conjunction with the Extinction behavioural intervention which consisted of 18.75% of all behavioural interventions. Demand Fading, Blocking & Redirecting and Task or Environmental Modification were equally utilised (12.5%) however this was viewed as being less preferred in contract to the alternate methods of behavioural intervention. Likewise, SD Modification only comprised of 6.25% of all behavioural interventions. Lastly, the data further revealed that in most instances, behavioural interventions are implanted in conjunction with each other rather than in isolation.

4.5. Assessment of the Maintenance of Progress Achieved as a result of the ABA Model

The researcher aimed to determine what assessment methods were utilised to assess the progress attained as a result of the ABA model of Autism in foundation phase learners in South Africa. This theme is aimed at determining how the progress attained as a result of the ABA therapy is being maintained by the child. It was revealed that upon mastery of a lesson, the maintenance is tracked through a structured review schedule which is faded into an annual maintenance schedule.

4.5.1. Mastery of New Skills

The data revealed that a mastery criterion was required to be fulfilled in order for the acquisition of a new skill to be considered as being mastered. In order for a newly acquired skill to be viewed, the follow criteria had to be adhered to.

From the data collected it was noted that a skill was considered mastered when the learner is able to execute the skill twice independently. This was understood as the child receiving a score of 80 - 100% on a newly acquired skill in two different locations, with two different instructors. Additionally, the data revealed that should the child be unable to independently execute the skill on the second attempt, the skill was returned to being considered as a current target with several steps being prompted to enhance an independent execution.

The data revealed that this process was repeated until a skill was considered as being mastered as per the abovementioned mastery criteria.

4.5.2. Review of Newly Acquired Skill

The data collected revealed that once a new skill has been acquired and the learner has fulfilled the mastery criteria, the maintenance of the newly acquired skill is reviewed per a review schedule. The review of new skills was followed in accordance with a structured review schedule. It became evident that the interval between the review of newly acquired skills increased over time.

Upon mastery of the newly acquired skill, it was found that the maintenance of the skills is assessed twice a week for two weeks. Thereafter, the maintenance faded to being reviewed once every two weeks for two successful reviews. Following the successful completion of this review, whereby the acquired skill is being maintained, the review is further faded to once every three weeks for two successful reviews. Thereafter, the maintenance of the new skill was reviewed monthly for successful months.

Following the successful completion of the abovementioned review schedule, all acquired skillsets were further reviewed annually. This was conducted during the first week of resuming therapy every year. The data revealed that targets not maintained as mastered targets were returned to current teaching targets, whereby the acquisition of the skill was reintroduced and retaught.

4.6. Conclusion

This study aimed to review the Applied Behaviour Analysis method of early intervention as a form of treatment for Autism in foundation phase learners in South Africa. The study focused on the analysis of case files from The Star Academy, with the sample consisting of 10-15 case files of learners between the ages of 3 years old and 9 years old. In this section, the researcher has analysed the data collected using thematic analysis. The themes identified include the following: Domains of functioning, Administration of lessons, Behaviour Management and Progress Management.

The researcher aimed to ascertain what areas of functionality were being targeted within each functioning domain. It was found that preference is given to communication and enhancing the child's range of vocabulary in addition to enabling the child to be able to engage across multiple social contexts. In relation to the Administration of lessons, the researcher aimed to understand how lessons were administered within each domain of functioning. The data revealed that NET was utilised across all eight domains of functioning, therefore, emerging as the prominent method of Administration of lessons.

In relation to behaviour management, the researcher attempted to determine the most frequently targeted behaviours. From the data collected, it became evident that an array of behaviours were targeted, which was dependent on the learner's behavioural interventions and how the behaviours presented themselves. The most commonly targeted behaviours included Aggression and Non-Compliance; the least occurring behaviours included Echolalia, which comprises 7.69% of all behaviours. Likewise, and in relation to the management of challenging behaviours, it was revealed that Semi-structured behavioural intervention plans were viewed as the preferred intervention method as this allowed the behavioural intervention plan to be tailored to the needs of each child. Specifically, Functional Communication Training emerged as the most preferred method of behavioural intervention. It was often implemented in conjunction with Extinction behavioural interventions, whereas SD Modification was noted as the least preferred method of behavioural intervention.

Lastly, the review aimed to determine how the child maintains the progress attained as a result of the ABA therapy. This was conducted to allow the newly acquired skill to be stored within the child's long-term memory. A target was considered to be mastered once the mastery criteria had been fulfilled. Thereafter, the maintenance of mastery was assessed according to a review and maintenance schedule, which was aimed at increasing the duration between the repetition of targets.

CHAPTER FIVE: DISCUSSION OF RESULTS

5.1. Introduction

The results of the study which was aimed at reviewing the ABA mode of early intervention as a form of treatment for Autism in foundation phase learners in South Africa will be discussed in reference to the Theory of Learning and Development by Lev Vygotsky. This discussion will be presented under the dominant themes as guided by the theory of learning and development will be discussed below. The dominant themes that will be discussed are the Targeting of the Domains of functioning within the ABA model; Application of the ABA model; Targeting of Behaviour Management within the ABA model in addition to the Assessment of Progress Achieved as a result of the ABA Model.

5.2. Targeting of Domains of Functioning

Findings from the study revealed that the ABA model targets the acquisition of skills across all eight domains of functioning. In Vygotsky's model, education does not coincide with development. However, it is constructed in such a way as to develop those psychological functions that will be needed for the next educational step (Bodrova, 1997; Clarà, 2017). Similarly, the ABA model follows suit. The data revealed that emphasis was given to the *Language* and *Social* domains of functioning. Additionally, findings from this review found that lessons were targeted in a manner allowing the child to build on pre-existing skills whilst developing new skills to acquire optimal functioning.

Based on the data collected, it can be understood that the ABA model targets an array of skill sets within all eight domains of functioning. Therefore, allowing for the development of lower mental functions such as sensations, reactive attention, associate memory, or sensory-motor thinking which the child may be missing (Peltopuro et al., 2014). Lower mental functions form part of one's biological heritage and are already present at birth (Bodrova, 1997). The development of lower mental functions occurs through the maturation and accumulation of the individual experience following the same path for humans and for higher animals, and learning based solely on the lower mental functions has serious limitations (Bodrova, 1997; Peltopuro et al., 2014).

This is in contrast with the findings from this research study which indicated that the number and nature of lessons targeted within each domain of functioning depended on the learner's capabilities and level of functioning in addition to skills previously acquired across all domains of functioning. Specifically, these lower mental functions are targeted within the *Executive*, *Play* and *Social* domains of functioning. They are targeted through lessons such as *Sustained Attention*, *Sensory Motor and Manipulative Play* and *Gaining Attention*.

Additionally, the data revealed that within each domain of functioning, lessons and the newly acquired skills are dependent on the skillsets acquired by the child within other domains of functioning such as the social and, likewise, the language domains. This further reinforces the notion that achievement of a skillset due to the ABA model is further dependent on external factors and functioning within additional domains (Bodrova & Leong, 2003; Topçiu & Myftiu, 2015). Vygotsky notes that as long as humans only possess lower mental functions, they remain "slaves to the environment", completely dependent on the stimulation that comes from the external environment (Bodrova, 1997, p. 16 - 22; Toomela, 2016).

Findings from this research study indicated that whilst preference was given to the Language and Social domains of functioning, little emphasis was placed on the Cognitive and Adaptive domains of functioning. Therefore, the limited targeting of the Cognitive and Adaptive domains of functioning can be understood as being limitations of the ABA model's effectiveness in treating Autism in foundation phase learners. Similarly, the period of early childhood development also serves as a platform for the development of higher mental functions (Bodrova, 1997; Toomela, 2016). Higher mental functions include focused attention, deliberate memory, and logical thinking, which can be understood under continuous development, and mastery depends on specific cultural tools and human interaction (Bodrova & Leong, 2015).

Moreover, this research study indicated that the level at which these skill sets are taught depends on the child's pre-existing skills, with the intensity being increased in accordance with the child's biological age. This is further supported by Vygotsky's notion that childhood development incorporates various mediational means into their action (Curtis et al., 2019). Therefore, the child can incorporate the newly acquired skills into actions resulting in the organised action transformation (Shabani, 2016).

The *Law of the Development of Higher Mental Functions* posits that the development of higher mental functions occurs twice over during childhood development – in an intersubjective manner followed by an intrasubjective manner (Vygotsky, 1983; Toomela, 2016). Therefore, allowing for the acquisition of skills in other domains of functioning before acquiring higher mental functions via the ABA model.

Furthermore, the research findings suggested that as the child began to acquire high-order skillsets, the child began to function more independently. Vygotsky suggests that acquiring higher mental functions liberates individuals from relying exclusively on their environment and turns them into "masters of their behaviour" (Bodrova, 1997; Toomela, 2016). Instead of a dichotomy of cognitive functions and curricular content, Vygotsky proposed that external forms of activity, such as reading, writing and numerical operations, should be considered on equal footing with other higher cognitive functions (Kozulin, 2004; Stern, 2017). This is evident within the ABA treatment model whereby lessons such as *Foundational Literacy and Mathematical lessons* are integrated into the child's daily lesson plan following the mastery of basic daily functioning skillsets.

Lastly, the research findings highlighted that preference was given to developing language-based skillsets and that acquiring language skills through lessons such as *Echoics* are precursors for later language acquisition. For Vygotsky, the teaching and learning of existing mental tools and the generation of new ones eventually replace the process of biological adaptation as the major mechanism responsible for the evolution of humankind (Esteban-Guitart, 2018; McLeod, 2020). Thus, cognitive development is a process in which a language is a crucial tool for determining how a child will learn how to think because advanced modes of thought are transmitted to the child by employing words (Hung & Chen, 2001; Newman & Newman, 2022). Similarly, Vygotsky suggested that the functional capacity of speech occurs in a gradual manner whereby the speech becomes internalised (Wertsch, 1979; McLeod, 2020). Subsequently, the limited targeting of the Cognitive and Adaptive domains of functioning can be understood as being limitations of the ABA model's effectiveness in treating Autism in foundation phase learners.

5.3. Application of the ABA Model

The manner in which the ABA model is applied can be understood as being vital to the success or failure of the ABA as a method of intervention for Autism in foundation phase learners. Findings from this research study indicated that preference was given to natural learning methods and depended on the learner's capabilities and the type of skillset targeted.

Vygotsky notes that during the development period, the learner remains relatively passive, and the learning outcomes are determined by the nature of stimuli (Bodrova, 1997; Topçiu & Myftiu, 2015). Although it was common for researchers to separate perceived constituent elements of psychological phenomena in order to reduce complexity by isolating one element at a time, Vygotsky argued that doing so resulted in the loss of the relationships between elements, as well as potentially distorted the elements themselves (Vadeboncoeur & Collie, 2013). Of particular relevance here, Vygotsky advanced the unity of student, teacher, and social environment; the unity of affective and intellectual processes; the unity of social, cognitive, and emotional experience; and the unity of speech and thinking (Holzman, 2016; Vygotsky, 2016).

This view was further supported through the application of the ABA model, whereby learning and the acquisition of new skillsets occurs in a manner whereby the development of multiple skillsets is acquired simultaneously, allowing for the learner to remain an active participant throughout the learning process (Roane et al., 2016). By utilising Natural Environmental Training as the preferred method of application, the relationship between various elements or the acquisition of multiple skillsets allows the learner to understand the relationship that occurs across multiple skillsets, resulting in the learner developing the potential to utilise skillsets across domains (Curtis et al., 2019).

Specifically, this research study revealed that Natural Environmental Training emerged as the prominent application method instead of Discrete Trial Training. Vygotsky proposed that a child's behaviour is strongly influenced by their environment, specifically, the social context (Bodrova, 1997; Collado et al., 2017). *Discrete Trial Training* is a highly structured technique that can only be implemented in a one-on-one teaching environment, not in a group setting (Eikeseth et al., 2014).

In contrast, Natural Environmental Training occurs when the opportunity presents itself, providing an opportunity for natural interactions (Halle, 1982; Bergstrom et al., 2012; Atkinson, D., Churchill et al., 2018). Therefore, supporting Vygotsky's notion that social interactions are fundamental in the child's development and that these are socially guided and constructed (Kozulin, 2004; Elicker et al., 2016).

Both Natural Environmental Training and Discrete Trial Training aid in the acquisition of pertinent skills during childhood development (O'Neill et al., 2018). As depicted by the findings of this research study, a combination of both NET and DTT emerged as another prominent method of applying the ABA model. This further supports Vygotsky's notion that cognitive and learning skills are preconditions for educational learning (Kozulin, 2004; Hoque, 2016). Kozulin (2004) further states that Vygotsky's model of education is not aligned with a child's development. Instead, psychological functioning is developed in relation to the next level of educational enhancement.

Additionally, findings from this research study indicated that utilising a combination of NET and DTT allowed for the acquisition of skills to occur in a structured yet organic manner related to the child's interests and skillsets. Specifically, Vygotsky emphasised that initially, the child is more dependent on other individuals with more experience; however, over time, the child takes on increased responsibility for their learning and development (Lau & Lee, 2021). As a result, the child engages in various joint activities, which serve as opportunities for modelling responsibility and participation (Lau & Lee, 2021). Therefore, the combination of both NET and DTT allows the learner to develop an increased sense of responsibility and thus aids in the successful acquisition of missing skillsets.

Moreover, Discrete Trial Training is a repetitive teaching method with the research findings indicating that it is the least preferred method applying the ABA model (O'Neill et al., 2018). DTT can be viewed as being employed to further enhance the development of the Zone of Proximal Development (O'Neill et al., 2018). Specifically, from the data collected, DTT is predominantly used within the Language, Play and Social domains of functioning. Therefore, further contributing to the attribution of the child's mental functioning and social interactions.

The Zone of Proximal Development can be viewed as the distance between the level of development noted during instances of problem-solving and the level of potential development that can occur under the guidance of adults or by collaborating with peers (McLeod, 2019). Additionally, Vygotsky noted that the Zone of Proximal Development occurs under the guidance of adults in addition to the collaboration between more capable peers (Wertsch, 1979; McLeod, 2019). This view is further supported by the data collected whereby Natural Environmental Training emerged as the favourable method of training, allowing for childhood development to occur as a product of the child interaction between the adults and other children within their environment.

Findings from this research study revealed that although the ABA model is applied as naturally as possible, how the lessons are administered to the learner may differ. The data revealed that the learner acquires new skills by imitating the instructor and thereafter engages in the process of first imitating the instructor and followed by independently attempting to complete a lesson. Vygotsky stated that there are several ways in which learning is set to occur, namely, (1) *imitative learning*, where one person tries to imitate or copy another; (2) *instructed learning*, which involves remembering the instructions of the “teacher” and then using these instructions to self-regulate; and lastly (3) *collaborative learning*, which involves a group of peers who work together to learn a specific skill (Hung & Chen, 2001; Barnett, 2019). This indicates that imitative learning and collaborative learning emerged as the preferred learning methods within the ABA model. It became evident that the nature in which the lessons were administered depended on the learner’s capabilities and the type of lesson being targeted within each domain of functioning. Lastly, Vygotsky suggested that what a child can acquire with the assistance of others is more indicative of their mental development than what they can do alone (McLeod, 2019). This indicates Natural Environmental Training as the preferred teaching method within the ABA model – as depicted by the data collected.

5.4. Targeting of Behaviour Management within the ABA Model

According to DeVries (2000) Vygotsky suggested that all human behaviour finds its origin in reactions to stimuli coming from the external world. Findings from this research study indicate that behaviours such as Aggression, Non-Complains, Tantrum Behaviours, Vocal Protestation in addition to Echolalia are targeted via the ABA model. Vadeboncoeur and Collie (2013) highlighted the potential of education to foster the development of individuals with social, cognitive, and emotional competencies as well as a disposition toward ethical action. Behaviours such as tantrums, aggression, non-compliance in addition to vocal protestation were noted as the most prevalent behaviour.

Since the laws of stimulus-response connections are the basis of natural behavioural laws, it is impossible to control a response before controlling the stimulus (DeVries, 2000). Consequently, the key to the child's control of their behaviour lies in mastering the system of stimuli. But rather, a system of stimuli is a social force provided externally to the child (Chuang, 2021). For Vygotsky, self-regulation appears after and as a result of regulation by others in a specific task and is promoted by external regulators such as timers, schedules, etc. (Chuang, 2021). This is consistent with the data collected which indicates that external regulators such as task modification, environmental manipulation, demand fading in addition SD modification were utilised as successful behavioural interventions for behaviours such as tantrums for a tangible stimulus or for the escape from a stimulus.

Vygotsky noted that *Word Meaning* is a unit of analysis for the unity of speech and thinking and allows for a more nuanced understanding of the relationship between verbal thinking and the whole life of consciousness (Vadeboncoeur & Collie, 2013). It is an internal construct that reflects a unity of generalization and social interaction, a unity of thinking and communication, therefore, enabling the examination of the relationship between an individual's interests and thinking, as well as the relationship between thinking and participation in social practices (Vadeboncoeur & Collie, 2013).

The rewards, praises, and encouragements that follow a behaviour are like props or buttresses that strengthen each point of advance through the ZPD, preventing loss of ground (DeVries, 2000; Chuang, 2021). This evident in the data collected which indicated that behaviour management techniques whereby techniques such as functional communication training and environmental modification which were instrumental in the decreasing of problematic behaviour.

5.5. Assessment of the Maintenance of Progress Achieved as a result of the ABA Model

According to Vygotsky, organised learning can result in the development of various mental processes and functioning (John-Steiner & Mahn, 1996; Illeris, 2018). The research findings suggest that skillsets acquired through the ABA model were being maintained. Higher mental functions continue to be formed throughout our lifetime due to mastering specific cultural tools in cooperation with other humans. The higher mental functions include focused attention, deliberate memory, and logical thinking (Bodrova, 1997; Bodrova & Leong, 2015). This is further supported by the data collected, which indicates that through the ABA model, the autistic child is able to maintain the development of the newly acquired skills. After some time of "sharing" a mental function with other partners, the child will eventually internalise this new process and become a part of her mental repertoire (Bodrova, 1997; Bodrova, & Leong, 2015). Knowledge appears as a process of concept formation that shapes the students' cognition rather than being understood as information to be processed by students' pre-existent cognition (Kozulin, 2004).

Similarly, the data revealed that by engaging in a structured method of progress analysis, the child is able to maintain mastery of the newly acquired skills. Vygotsky highlighted that human mental activity is the result of social learning (Shabani, 2016). As the child masters tasks, they will engage in cooperative dialogues with others (Hung & Chen, 2001). It was found that within the ABA model, the structured method of progress analysis allows for continuous engagement with the newly acquired skills, developing cooperative dialogues as suggested by Vygotsky (Topçiu & Myftiu, 2015). This further reflects Vygotsky's notion that an individual's capacity for learning and cognitive development is a reflective, ongoing, and never-ending process (Devi, 2019).

Vygotsky posits that an essential feature of learning is that it alludes to a variety of internal developmental processes that can operate only when the child is interacting with people in their environment and cooperation with his peers (Hung & Chen, 2001). The notion of scaffolding within the theory of learning and development suggests that an individual's level of mastery changes with the assistance of another, resulting in the child being able to develop into an independent learner (Xi & Lantolf, 2021). Unfortunately, the ABA method of intervention does not accommodate the process of scaffolding. Scaffolding requires the therapist to allow students to extend their current skills and knowledge. The therapist engages the child's interest and motivates the child to pursue an instructional goal (Xi & Lantolf, 2021). Although the maintenance of newly acquired skills is monitored according to the review schedule, this does not allow for the natural extension of the skill unless initiated through another lesson (Hung & Chen, 2001).

5.6. Conclusion

The effectiveness of the ABA model as a treatment method for Autism in foundation phase learners was analysed under the banner of the theory of learning and development by Lev Vygotsky. Vygotsky noted that development can be understood as a process of qualitative changes and, as such, is influenced by the environment in which the child finds. Consequently, the manner in which the ABA model is currently administered results in the child spending insufficient time within the learning environment.

The ABA model targets a variety of skills within all eight domains of functioning, therefore allowing for the development of lower and higher mental functions which the child may be missing. Within each domain of functioning, lessons and the skills acquired depend on the skillset acquired by the child within other domains of functioning, emphasising that achievement of a skillset as a result of the ABA model is further dependent on external factors in addition to functioning within additional domains of functioning. In relation to the domains of functioning under which lessons are targeted, lessons are targeted in a manner that allows the child to build on pre-existing skills whilst developing new skills to acquire optimal functioning.

Vygotsky notes that during the development period, the learner remains relatively passive and largely depends on the unity of the student, teacher, and social environment. Imitative learning and collaborative learning emerged as the preferred learning methods within the ABA model. It became evident that the nature in which the lessons were administered depended on the learner's capabilities and the type of lesson being targeted within each domain of functioning.

The potential of education is to foster the development of individuals with social, cognitive, and emotional competencies and a disposition toward ethical action. Behaviours such as tantrums, aggression, non-compliance, and vocal protestation were noted as the most prevalent behaviour. Consequently, the key to the child's control of his/her behaviour lies in mastering the system of stimuli. External regulators such as task modification, environmental manipulation, and demand fading, in addition SD modification, were utilised as successful behavioural interventions for behaviours such as tantrums for tangible stimuli or the escape from a stimulus.

Organised learning can result in the development of various mental processes and functioning. Through the ABA model, the autistic child is able to maintain the development of newly acquired skills, which further contributes to the success of the ABA model.

CHAPTER SIX: CONCLUSION

6.1. Summary of Study

Minimal research has reviewed the effectiveness and applicability of the ABA mode of intervention within a South African context. This research study aimed to review the Applied Behaviour Analysis method of intervention for Autism in foundation phase learners in South Africa. Specifically, this study focused on the analysis of case files from The Star Academy with the sample consisting of 10-15 case files of learners between the ages of 3 and 9 years old. The proposed study was conducted as a descriptive qualitative study and the researcher has analysed the data collected using thematic analysis.

This research study had two objectives, firstly, to understand the impact of ABA as a method of intervention and, secondly, to understand the strengths and limitations of the ABA model. These research objectives were achieved by analysing what domains of functioning were being targeted by the ABA model in addition to how these domains of functioning were being targeted. Moreover, the research objectives were further met by analysing how the ABA model was applied, in addition to determining if and how behaviour was being managed through the model. Lastly, the maintenance of progress achieved as a result of the ABA was assessed within this research study.

The analysis of the data found that although functioning and the development of missing skillsets are being targeted across all eight domains of functioning, emphasis was placed on two of the eight domains of functioning (language and social domains) and in contrast little emphasis was given to one of the eight domains of functioning (cognitive). This concluded that the ABA model predominantly focuses on the development of language and social skills. Therefore, ensuring that the learner is able to adequately and appropriately express themselves and engage in across social contexts. Subsequently, it can be concluded that while the ABA model does aid in the development of cognitive and adaptive functioning, there is limited focus that is attributed to these areas of functioning. This can be further viewed as a shortcoming of the ABA method of intervention which may result in the underdevelopment of the problem solving and decision-making abilities in addition to daily functioning skillsets of the individual.

Moreover, this research study analysed how the ABA intervention method has targeted the acquisition of missing skillsets within each functioning domain. The findings revealed that in the ABA method of intervention, an array of lessons were simultaneously targeted within each domain of functioning, with the development of each domain of functioning being targeted in conjunction with each other. This provided the learner with an opportunity the implementation of pre-existing skillsets in order to assist in the development of missing age-appropriate skillsets. The transferability of skillsets within lessons and across domains of functioning can be viewed as a strength of the ABA intervention method, as it allows the learners to understand the application of a specific skill in conjunction with other skillsets.

Furthermore, the data analysis revealed that the ABA intervention method was predominantly applied in a natural (Natural Environmental Training) manner, whereby the facilitation of learning was viewed as an organic transfer of knowledge. This occurred when the development of missing skills was facilitated when the opportunity presented itself. Similarly, further analysis of the data revealed that during instances whereby a structured step-by-step guide is required to acquire a skill, a combination of a structured yet natural implementation compared to a highly structured and repetitive method of application of the ABA method of intervention. This can be viewed as a strength of the ABA intervention method as it allows for learning to be based on the learners' capabilities and for this process to occur as naturally as possible.

Likewise, this research study explored what sort of behaviours were being targeted in addition to how behaviour management was implemented through the ABA intervention method. Findings from this research study concluded that an array of behaviours were targeted and specific to the behaviours exhibited by the learners. Specifically, the most commonly targeted behaviours included Aggression and Non-Compliance type behaviours. Findings from this research study concluded that within the ABA intervention method, the preferred behavioural intervention method was Functional Communication Training. Behavioural interventions are often implanted in conjunction rather than in isolation. This indicates that preference is given to teaching the child to articulate their wants and needs verbally and non-verbally (PECS). Again, this can be viewed as a strength of the ABA intervention method as it allows the child to learn to regulate themselves by engaging in previously learnt social behaviours.

Lastly, the effectiveness of the ABA method of intervention was assessed by determining what sort of assessment tools were utilised to determine whether or not the progress achieved as a result of Applied Behaviour Analysis was being maintained. Findings from the research study concluded that for a skillset to be considered developed as a result of the ABA method of intervention, the learner was required to maintain the independent application of the skillset for a minimum of twelve months from the date of mastery. An analysis of the research data suggested that structured mastery criteria and review schedules were being adhered to when assessing the maintenance of progress.

6.2. Conclusion and Implications of Study

This research study concludes that Applied Behaviour Analysis is an effective method of interventions for the treatment of Autism in foundation phase learners in South Africa. This research study concluded that although an array of areas of functionality were targeted within each domain of functioning, further emphasis should be attributed to the equal development of all domains of functioning, therefore, allowing for the child to acquire a complete repertoire of skills.

6.3. Limitations of the Study

The degree to which the research findings are consistent with reality is referred to as credibility (Silverman, 2010; Mohajan, 2017). The researcher previously engaged with the Applied Behaviour Analysis intervention method as a behavioural therapist. This meant that the researcher had an insider's perspective on the workings of the method of intervention, which may have resulted in the findings being analysed more subjectively whilst at the same time allowing the researcher to have a more in-depth understanding of the inner workings to the method of intervention which may have assisted in enhancing the credibility of this research study. Moreover, due to the strict inclusion and exclusion criteria which were adhered to during the selection of the case files, a limited number of case files were available for the data collection process, which may have resulted in this study being an inaccurate representation of the effectiveness/ineffectiveness of the ABA method of intervention.

Given that this study was conducted amidst the Covid-19 pandemic, specifically concerning the social restrictions of the pandemic, it was unclear if all case files received a minimum of 40 hours of intervention every week for the complete two years as stipulated in the inclusion/exclusion criteria above. Additionally, it is unknown how the impact of the Covid-19 pandemic, specifically the closure of schools and learning centres, may have impacted the manner and pace at which the child was able to learn through the ABA model. As a result this may have impacted the that was collected. Moreover, it was unknown if the ABA method of intervention was being administered in conjunction with other forms of intervention which may have impacted the child's acquisition of skills. Lastly, even though the data reviewed was tracked via an online tracking system, it was unknown if any data-capturing errors occurred, which may have impacted this research study.

6.4. Recommendations for Future Studies

In order to gain a more holistic understanding of the effectiveness of the Applied Behaviour Analysis method of interventions, it is recommended that future studies focus on the intermediate and senior phase learners within the classroom. The extent of the study's findings' relatability to other settings and populations is referred to as transferability. (Mohajan, 2017). It is further recommended that comparative evaluations be conducted where data is collected from multiple settings where ABA is the primary intervention method. The study is also recommended to be conducted whereby the primary data is collected in a pre-Covid-19 environment. This will allow for a more accurate representation of the effectiveness of ABA as a method of intervention. The ability to maintain objectivity in data analysis is referred to as confirmability (Mohajan, 2017). Lastly, it is recommended that the study be repeated by a researcher who may have a more objective perspective in relation to the data collection and analysis perspective.

6.5. Recommendations for Practice

The development of early childhood self-regulation is often considered an early life marker for later life successes (Montroy et al., 2016). Vygotsky notes that as long as humans only possess lower mental functions, they remain "slaves to the environment", completely dependent on the stimulation that comes from the external environment (Bodrova, 1997, p. 16 - 22; Toomela, 2016). Therefore, this study recommends that further lessons be implemented to aid in developing cognitive and adaptive skillsets, as this will allow the child to function more independently. Likewise, it is recommended that the child should be made to understand the cause and effect of said behaviour in addition to implementing behaviour management techniques. This will eventually allow the child to self-regulate before engaging in disruptive behaviours. In addition, maintenance of the newly acquired skillsets should be integrated into everyday implementation. This will allow for the assessment, generalisation, and further enhancement of these skillsets across multiple settings and individuals.

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APPENDIX A: ETHICAL CLEARANCE



28 January 2022

Rivendri Govender (214529970)
School Of Applied Human Sc
Pietermaritzburg Campus

Dear R Govender,

Protocol reference number: HSSREC/00003755/2022

Project title: A review of the Applied Behaviour Analysis method of early intervention for Autism in foundational phase learners

Degree: Masters

Approval Notification – Expedited Application

This letter serves to notify you that your application received on 14 December 2021 in connection with the above, was reviewed by the Humanities and Social Sciences Research Ethics Committee (HSSREC) and the protocol has been granted **FULL APPROVAL**.

Any alteration/s to the approved research protocol i.e. Questionnaire/Interview Schedule, Informed Consent Form, Title of the Project, Location of the Study, Research Approach and Methods must be reviewed and approved through the amendment/modification prior to its implementation. In case you have further queries, please quote the above reference number. PLEASE NOTE: Research data should be securely stored in the discipline/department for a period of 5 years.

This approval is valid until 28 January 2023.

To ensure uninterrupted approval of this study beyond the approval expiry date, a progress report must be submitted to the Research Office on the appropriate form 2 - 3 months before the expiry date. A close-out report to be submitted when study is finished.

All research conducted during the COVID-19 period must adhere to the national and UKZN guidelines.

HSSREC is registered with the South African National Research Ethics Council (REC-040414-040).

Yours sincerely,



Professor Dipane Hlalele (Chair)

/dd

Humanities and Social Sciences Research Ethics Committee

Postal Address: Private Bag X54001, Durban, 4000, South Africa

Telephone: +27 (0)31 260 8350/4557/3587 Email: hssrec@ukzn.ac.za Website: <http://research.ukzn.ac.za/Research-Ethics>

Founding Campuses: Edgewood Howard College Medical School Pietermaritzburg Westville

INSPIRING GREATNESS

APPENDIX B: GATEKEEPERS PERMISSION



Little Stars Early Intervention Centre t/a
The Star Academy www.thestaracademy.co.za
Phone: +27 (0)11 440 7796
Email: info@thestaracademy.co.za 2007/021599/08

112 Athol Street,
Highlands North,
Johannesburg

Dear Ms Govender,

RE: Gatekeepers Letter of Permission

I, Ilana Gerschlowitz, director of The Star Academy, acknowledge that Ms Rivendri Govender is completing a dissertation which aims to review the *Applied Behaviour Analysis (ABA) mode of early intervention in the treatment of Autism in foundation phase learners* in partial fulfilment of the requirement of a Masters in Social Science, Educational Psychology, degree.

I hereby grant Ms Govender gatekeepers permission to conduct her research via The Star Academy. This includes access to five of the case files, supervisor notes, clinical notes in addition to potentially interviewing supervisors to obtain any further information should the need arise. Ilana reserves the right to withdraw permission if for any reason she feels it necessary.

Yours Sincerely,

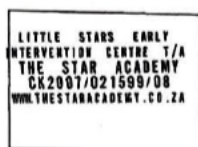
Ilana Gerschlowitz Director

The Star Academy

Yours sincerely



Ilana Gerschlowitz



Official company stamp

Waverley

Highlands North

Douglasdale

Pretoria

Durban

APPENDIX C: LETTER OF CUSTODIANSHIP



Little Stars Early Intervention Centre t/a
The Star Academy www.thestaracademy.co.za
Phone: +27 (0)11 440 7796
Email: info@thestaracademy.co.za 2007/021599/08

112 Athol Street,
Highlands North,
Johannesburg

26/01/2022

Dear Sir/Madam

This letter serves to confirm that I am the director of The Star Academy and the custodian of the information pertaining to the cases that we manage at The Star Academy.

Yours Sincerely,

Ilana Gerschlowitz Director

The Star Academy

Yours sincerely



Ilana Gerschlowitz



Official company stamp

Durban

Waverley

Highlands North

Douglasdale

Pretoria

APPENDIX D: CONFIDENTIALITY AGREEMENT

Insert Letterhead

Confidentiality Agreement

Parties

1. The Star Academy – referred as the Gatekeeper from hereon.
2. Ms Rivendri Govender – referred to the Student from hereon.

Background

1. The Student has made contact with the Gatekeeper in lieu of conducting research through the Organisation as part of fulfilment of a Masters degree from the University of KwaZulu-Natal, Pietermaritzburg campus.
2. The Gatekeeper has granted the Student permission to complete her research as part fulfilment of a Masters degree from the University of KwaZulu-Natal (UKZN), Pietermaritzburg campus.
3. The Gatekeeper has granted the Student permission to access up to 15 Case Files via the Skills Logbook systems in order to conduct the research.

The abovementioned parties agree that the nature of the relationship shall be stipulated by the terms agreed upon in this agreement.

Confidential Information

1. The Student agrees not to disclose, clone, or modify any information within the case files.
2. The Student agrees not to use any information from the case files for any purpose besides the agreed upon terms between the Gatekeeper and the Student.
3. The Student agrees to omit any confidential and personally identifiable information when utilising data from the case files.
4. The Student agrees to handle all case files with care and shall inform the Gatekeeper upon termination of this agreement.

Dissolution

1. Failure of any party to adhere to any of the above-mentioned points will see the termination of the agreement.
2. Should the Student engage in unethical behaviour will result in the termination of the agreement.

Insert Letterhead

Undertaking

I, **Rivendri Govender**, agree to abide by the terms as agreed upon in the abovementioned confidentiality agreement.



26 January 2022

Date

Ms Rivendri Govender
Student Number: 214529970
214529970@stu.ukzn.ac.za

I, **Ilana Gerschlowitz**, agree to abide by the terms as agreed upon in the abovementioned confidentiality agreement.



26/01/2022

Date

Ms Ilana Gerschlowitz
Managing Director
ilana@thestaracademy.co.za

APPENDIX E: OBSERVATION SCHEDULE

Case File Number							
Logistic Data							
Hours of Therapy per Week							
Frequency of Therapy received per week							
Domains of Functioning							
Name of Domain of Functioning being Targeted							
Specific Areas being Targeted within each Domain							
Social Domain							
Motor Domain							
Play Domain							
Language Domain							
Adaptive Domain							
Executive Domain							
Academic Domain							
Cognitive Domain							

Breakdown of Lessons (Name & Explanation of Lessons per domain)							
Social Domain							
Motor Domain							
Language Domain							
Play Domain							
Adaptive Domain							
Executive Domain							
Academic Domain							
Cognitive Domain							
Administering of Lessons							
How are lessons targeted (Naturally vs Intense training)							
How are lessons targeted (Independently vs In a Group)							
Behavioral Intervention Plans							
Behaviours currently being targeted							
Frequency of behaviour per session (start of ABA programme)							
Intervention for Each behaviour displayed							

Duration of Intervention plan being implemented							
Frequency of behaviour per session (at present)							
Comment of the Behavioural Interventional Plan data obtained							
Additional Observations							

APPENDIX F: TURNITIN REPORT



Digital Receipt

This receipt acknowledges that Turnitin received your paper. Below you will find the receipt information regarding your submission.

The first page of your submissions is displayed below.

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File name: Rivendri_Govender_Final_Thesis_Edited_03_June_2023_Turnit...
File size: 373.61K
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CHAPTER ONE: INTRODUCTION

1.1 Background of the Study

Neurodevelopmental disorders are conditions that manifest in the early stages of development and are characterized by developmental deficits that produce impairments in personal, social, academic, or occupational functioning (American Psychiatric Association, 2013). Initially, autism was classified as a subtype of schizophrenia and it was not until 1980 when the disorder was reclassified in the Diagnostic and Statistical Manual of Mental Disorders (DSM), third edition, as *Infantile Autism* (Calkins & Willmsdinger, 2015). Following numerous changes to the classification of the disorder, the various subcategories were consolidated into an umbrella category, namely Autism Spectrum Disorder (ASD) and was published in the DSM-5 (Calkins & Willmsdinger, 2015).

Autism or Autism Spectrum Disorder refers to a range of conditions and is primarily defined by (1) a persistent deficit in social communication and (2) restrictive and/or repetitive behaviour patterns (American Psychiatric Association, 2013). Over the last few decades, global autism awareness and research on Autism Spectrum Disorders has increased considerably (Daniels et al., 2017). An overview of epidemiological studies as reviewed by Taylor (2006) concluded that Autism is more likely to be diagnosed in males as opposed to females (ratio of 4:1). During the 1970s, autism was estimated to be prevalent in 2 in every 10,000 children (Sax & Allison, 2010). In a more recent review, it was revealed that approximately 6-10 cases of autism were reported in every 10,000 children (Taylor, 2006). The continuous increase in number of cases reported can also be viewed in a study conducted by Fishman which shows an increase in prevalence to 40-60 cases in every 10,000 individuals (as cited in Taylor, 2006).

In 2010 the Centers for Disease Control and Prevention (CDC) in the United States of America noted that approximately 1 in 150 children are likely to be diagnosed with autism (Chakrabarti, 2010). However, more recent statistics released by the CDC were that ASD now affects 1 in 36 American children (Lundberg et al., 2012). In more recent years, the prevalence of ASD has substantially increased. In 2014, the World Health Organization called for a comprehensive and coordinated effort in the

1

APPENDIX G: EDITOR'S CERTIFICATE



CERTIFICATE OF EDITING

This certificate confirms that the below listed dissertation was edited by one or more English experts with a Masters in English

A review of Applied Behaviour Analysis (ABA) as a method of early intervention for foundation phase learners living with Autism in South Africa.

Manuscript Title

Govender R

Author

Neither the research content nor the author's intentions were altered.
The following items were corrected: grammar, language, spelling, punctuation, sentence structure and referencing.

Muhammed Y Cassim
Director

May 2023

Date Issued

