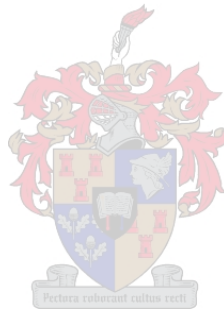


**Animal-assisted activities for adolescents with
autism spectrum disorder:
Teachers' and parents' perceptions**

Charis Hawkridge



*Thesis presented in fulfilment of the requirements for the degree of
Master of Arts (Psychology) in the Faculty of Arts and Social
Sciences at Stellenbosch University*

Supervisor: Dr. M.C. le Roux

March 2017

DECLARATION

By submitting this thesis electronically, I declare that the entirety of the work contained therein is my own, original work, that I am the solo author thereof (save to the extent explicitly stated otherwise), that reproduction and publication thereof by Stellenbosch University will not infringe any third party rights and that I have not previously in its entirety or in part submitted it for obtaining any qualification.

Date: March 2017

ABSTRACT

Autism spectrum disorder (ASD) is a developmental disorder which currently affects an estimated one percent of the international population and that percentage appears to be growing. There is currently no single intervention that has been found to improve all the symptoms of ASD, and the most effective form of intervention has been shown to be a combination of different interventions. Animal-assisted interventions (AAI) have shown promise as a complimentary intervention for ASD. This field, however, requires further research, as there is a dearth of research regarding AAI for individuals with ASD, particularly in South Africa. The aim of this study is, therefore, to contribute to the knowledge of the use of AAI for individuals with ASD by exploring the perceptions of the teachers and parents of adolescents with ASD who participated in classroom-based animal-assisted activities (AAA). Using a case study of a single class of adolescents, qualitative interviews were used to explore the insights of the participants and the transcribed interviews were then subjected to thematic analysis. The results of this study indicate that the participants perceived the AAA as beneficial for the adolescents. Many of these benefits were noted as immediate reactions to the presence of an AAA dog, and did not generalise to the adolescents' home settings, but some behavioural changes were noted at home. Participants also provided valuable insight regarding practical elements of the implementation of AAA. Participants were enthusiastic about AAA and indicated a desire for the programme to be continued and extended, suggesting the need for further research into this form of intervention.

Keywords: Animal-assisted activities, animal-assisted interventions, autism spectrum disorder, adolescents.

OPSOMMING

Outisme spektrum versteuring (OSV) is 'n ontwikkelingsversteuring wat tans nagenoeg een persent van die internasionale populasie beïnvloed. Die persentasie neem ook tans toe. Daar is tans geen enkele intervensie wat gevind is om al die simptome van OSV te verbeter nie en die mees effektiewe vorm van intervensie dui op 'n kombinasie van verskillende intervensies. Troeteldier-ondersteunde intervensie (TOI) toon belowende resultate indien en wanneer dit as 'n komplimentêre intervensie gebruik word. Die veld benodig steeds verdere navorsing, omrede daar nog tans nie genoegsame informasie rondom die intervensie van TOI vir individue met OSV, veral in Suid Afrika, is nie. Die doel van die studie is daarom om 'n bydrae te lewer tot die kennis van TOI vir individue met OSV, deur die persepsies van die onderwysers en ouers van adolessente met OSV wat aan die klaskamer gebaseerde, troeteldier-ondersteunde aktiwiteite (TOA) deelgeneem het, na te vors. Deur gebruik te maak van 'n gevallestudie is die insigte van die deelnemers deur die gebruik van kwalitatiewe onderhoude ondersoek. Die onderhoude is toe getranskribeer en ontleed deur die gebruik van tematiese analise. Die resultate van die studie dui aan dat deelnemers TOA as voordelig vir adolessente bespeur het. Baie van die voordele is as 'n onmiddellike reaksie op die TOA-hond opgemerk, maar het nie 'n algemene invloed op die huislewe van die adolessente gehad nie. Daar is wel sommige gedragsveranderinge by die huis opgelet. Deelnemers het ook waardevolle insig rondom die praktiese aspek van die gebruik van TOA gelewer. Deelnemers was entoesiasies oor TOA en het aangedui dat hulle verkies dat die program aangaan en uitgebrei word. Dit dui aan dat verdere ondersoek in dié vorm van intervensie nodig is.

Trefwoorde: Troeteldier-ondersteunde aktiwiteite, troeteldier-ondersteunde intervensie, outisme spektrum versteuring, adolessente.

ACKNOWLEDGEMENTS

This research would not have been possible without the help of many different people.

Although I cannot mention them all, I am very grateful to everyone who has helped me in any way during this journey. I would particularly like to thank the following:

- My supervisor, Dr Marieanna le Roux, for her patience and guidance during the research process.
- The kind individuals who assisted in proofreading and translating sections of this thesis.
- The staff at school for their encouragement and enthusiasm.
- The learners at school for all they have taught me about autism and about living the best life you can, no matter your circumstances.
- The PAT volunteer and her dog for the joy they brought the learners and staff at school.
- The participants for their time, and their willingness to share their experiences and perceptions with me.
- My family for their endless support and encouragement, as well as their advice and willingness to assist in any way I needed.
- My friends for their patience with my complaining and their encouragement and understanding.
- My Heavenly Father, for giving me strength and wisdom throughout this challenge.

TABLE OF CONTENTS

DECLARATION	ii
ABSTRACT.....	iii
OPSOMMING	iv
ACKNOWLEDGEMENTS.....	v
TABLE OF CONTENTS.....	vi
LIST OF APPENDICES.....	xii
LIST OF TABLES	xiii
LIST OF ABBREVIATIONS.....	xiv
CHAPTER 1: INTRODUCTION.....	1
1.1 INTRODUCTION	1
1.2 MOTIVATION AND CONTEXT OF STUDY	2
1.3 RESEARCH AIM AND QUESTION	3
1.4 IMPORTANCE OF RESEARCH.....	3
1.5 DEFINITIONS OF IMPORTANT TERMS AND CONCEPTS.....	4
1.5.1 Animal-assisted intervention (AAI).....	4
1.5.2 Animal-assisted therapy (AAT).....	4
1.5.3 Animal-assisted activities (AAA)	4
1.5.4 Autism spectrum disorder (ASD).....	4
1.6 OUTLINE OF RESEARCH PROJECT	4
CHAPTER 2: LITERATURE REVIEW	6
2.1 INTRODUCTION	6

2.2	AUTISM SPECTRUM DISORDER	6
2.2.1	Clinical picture.....	6
2.2.2	Diagnosis	8
2.2.3	Cause.....	9
2.2.4	Prevalence	10
2.2.5	Cognitive models of ASD.....	11
2.2.6	Effects of ASD.....	13
2.2.6.1	<i>Effect on individual diagnosed with ASD.....</i>	13
2.2.6.2	<i>Effect on family of individual diagnosed with ASD.....</i>	14
2.2.7	Prognosis.....	16
2.2.8	Intervention options for ASD	16
2.2.8.1	<i>Medical intervention.....</i>	17
2.2.8.2	<i>Behavioural intervention.....</i>	17
2.2.8.3	<i>Schooling</i>	19
2.2.8.4	<i>Change in intervention focus.....</i>	20
2.3	ANIMAL-ASSISTED INTERVENTION	20
2.3.1	Introduction to human-animal interactions.....	20
2.3.2	History of HAI.....	21
2.3.3	Description of AAA and AAT.....	22
2.3.4	Risks and concerns regarding AAI.....	23
2.3.4.1	<i>Concerns regarding animal welfare.....</i>	23
2.3.4.2	<i>Concerns regarding participant and volunteer or therapist safety.....</i>	24
2.3.5	Benefits of AAI.....	25
2.3.5.1	<i>Physiological benefits.....</i>	25
2.3.5.2	<i>Psychological benefits.....</i>	25

2.3.5.3 <i>Social benefits</i>	26
2.3.5.4 <i>Benefits for youth and children</i>	27
2.3.5.5 <i>Benefits of AAI within the classroom</i>	28
2.3.6 Research into AAI in the South African context	29
2.4 ANIMAL-ASSISTED INTERVENTION AND AUTISM SPECTRUM DISORDER	30
2.4.1 Individuals with ASD and animals	30
2.4.2 Benefits of AAI for children and adolescents with ASD.....	32
2.4.2.1 <i>Benefits related to social interaction</i>	32
2.4.2.2 <i>Benefits related to language and communication</i>	33
2.4.2.3 <i>Benefits related to motivation</i>	33
2.4.2.4 <i>Benefits related to behaviour</i>	34
2.4.3 Reasons for limited use of AAI for ASD.....	35
2.5 THEORETICAL FRAMEWORK	35
2.5.1 Biophilia hypothesis	36
2.5.2 Social support theory	37
2.6 CONCLUSION.....	38
CHAPTER 3: METHODS	39
3.1 INTRODUCTION	39
3.2 RESEARCH DESIGN	39
3.3 RESEARCH PARTICIPANTS	40
3.3.1 Selection of participants.....	40
3.3.2 Participant information	41
3.3.3 Description of the adolescents	42
3.3.3.1 <i>Thom</i>	43

3.3.3.2 <i>Skimpy</i>	44
3.3.3.3 <i>Janey</i>	45
3.3.3.4 <i>David</i>	45
3.3.4 Description of the class.....	46
3.3.5 Description of the AAA programme	46
3.4 DATA COLLECTION	47
3.5 DATA ANALYSIS.....	49
3.6 ENSURING TRUSTWORTHINESS IN THE RESEARCH.....	50
3.6.1 Credibility	50
3.6.2 Transferability.....	51
3.6.3 Dependability.....	51
3.6.4 Confirmability.....	52
3.6.4.1 <i>Reflections on the researcher’s relationship with participants</i>	52
3.6.4.2 <i>Reflections on feelings and experiences during research process</i>	53
3.7 ETHICAL CONSIDERATIONS AND PROCEDURES	54
3.8 CONCLUSION.....	55
CHAPTER 4: RESULTS	56
4.1 INTRODUCTION	56
4.2 THEMES AND SUB-THEMES.....	56
4.2.1 Perceived benefits of AAA at school.....	57
4.2.1.1 <i>Communication benefits</i>	57
4.2.1.2 <i>Engagement and motivation benefits</i>	60
4.2.1.3 <i>Social interaction benefits</i>	63
4.2.1.4 <i>Emotional benefits</i>	65

4.2.1.5 Behavioural benefits.....	67
4.2.2 Opinions regarding the implementation of AAA	69
4.2.2.1 Teachers' recollection of activities	70
4.2.2.2 Assumptions regarding the role of the AAA dog	72
4.2.2.3 Impact of scheduling and preparation	74
4.2.3 Teachers' and parents evaluation of AAA.....	77
4.2.3.1 Prior knowledge about AAA.....	77
4.2.3.2 Factors which influenced the learners' experience of AAA	78
4.2.3.3 Impressions and future use.....	80
4.3 CONCLUSION.....	82
CHAPTER 5: DISCUSSION	83
5.1 INTRODUCTION	83
5.2 SUMMARY OF STUDY	83
5.3 DISCUSSION AND INTERPRETATION OF RESULTS.....	84
5.3.1 Perceived benefits of AAA at school.....	84
5.3.1.1 Communication benefits	85
5.3.1.2 Engagement and motivation benefits	86
5.3.1.3 Social interaction benefits.....	87
5.3.1.4 Emotional benefits.....	88
5.3.1.5 Behavioural benefits.....	89
5.3.2 Opinions regarding the implementation of AAA	90
5.3.2.1 Teachers' recollection of activities	90
5.3.2.2 Assumptions regarding the role of the AAA dog	91
5.3.2.3 Impact of scheduling and preparation	92

5.3.3 Teachers’ and parents’ evaluation of AAA	94
5.3.3.1 <i>Prior knowledge about AAA</i>	94
5.3.3.2 <i>Factors which influenced the learners’ experience of AAA</i>	94
5.3.3.3 <i>Impressions and future use</i>	96
5.4 LIMITATIONS.....	96
5.4.1 Size and homogeneity of sample	96
5.4.2 Selective memory	97
5.4.3 Limited intervention time	97
5.4.4 Single volunteer and dog	97
5.5 RECOMMENDATIONS.....	97
5.5.1 Multiple volunteer and dog teams	97
5.5.2 Multiple case study method	98
5.5.3 Duration of AAA intervention.....	98
5.5.4 Exploration of different styles of intervention.....	98
5.5 CONCLUSION.....	98
REFERENCES.....	99
APPENDICES	123

LIST OF APPENDICES

A. Information form for teachers	124
B. Information form for parents	127
C. Biographical questionnaire for teachers	130
D. Biographical questionnaire for parents	131
E. Informed consent form for teachers	132
F. Informed consent form for parents	135
G. Semi-structured interview guide for teachers	138
H. Semi-structured interview guide for parents	139
I. Ethical clearance.....	140
J. Permission letter from school.....	142

LIST OF TABLES

Table 3.1: <i>Biographical Information of Parents and Adolescents</i>	42
Table 4.1: <i>Themes and Sub-themes Identified</i>	57

LIST OF ABBREVIATIONS

AAA: Animal-assisted activities

AAI: Animal-assisted interventions

AAT: Animal-assisted therapy

ABA: Applied Behaviour Analysis

ADHD: Attention deficit hyperactivity disorder

APA: American Psychiatric Association

ASD: Autism spectrum disorder

CDC: Centres for Disease Control and Prevention

DIR: Developmental, Individual difference, Relationship-based model

DSM-5: Diagnostic and Statistical Manual, 5th edition

EAP: Equine-assisted psychotherapy

HAI: Human-animal interaction

PAT: Pets as Therapy

PECS: Picture Exchange Communication System

QoL: Quality of Life

TEACCH: Treatment and Education of Autistic and Related Communication Handicapped
Children

THR: Therapeutic horse-riding

ToM: Theory of Mind

WCC: Weak Central Coherence

CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

A dramatic increase in the prevalence of Autism Spectrum Disorder (ASD) to an estimated 1% of the population has led to increased interest in ways to help individuals to cope with this disorder (Centre for Disease Control and Prevention [CDC], 2014). Statistics regarding ASD prevalence in South Africa are lacking, and therefore the international statistic of 1% is used (Malcolm-Smith, Hoogenhout, Ing, Thomas, & De Vries, 2013). ASD is a pervasive developmental disorder, which is characterised by deficits in social and communication skills, as well as restrictive and repetitive behaviours and thought patterns (American Psychiatric Association [APA], 2013). Some features that are often recognisable in individuals with ASD include a lack of speech and an apparent lack of desire to connect with other people (Johnson, Myers, & The Council on Children with Disabilities, 2007). Obsessive and compulsive behaviours that are disruptive and can lead to self-injury are also common features (Johnson et al., 2007).

The families of individuals with ASD are also affected by the disorder due to the increase in stress on the family structure (Myers, Mackintosh, & Goin-Kochel, 2009). Parents report feeling isolated and often feel they lack the support needed to help their child reach his or her full potential (Myers et al., 2009). A feeling of being judged by others was also noted (Ludlow, Skelly, & Rohleder, 2011). Anxiety emerged as a common feeling among parents, particularly with regard to education and therapy for their child (Ludlow et al., 2011). Another area of concern was the well-being of the siblings of the child with ASD, as the siblings can feel neglected or embarrassed because of the ASD (Myers et al., 2009).

There are currently many treatments available, such as applied behaviour analysis (ABA), Developmental, Individual difference, Relationship-based model (DIR)/Floortime and Pivotal Response Treatment, among others (Odom, Boyd, Hall, & Hume, 2010). Due to the variability of symptoms in ASD, no single treatment is applicable or effective for every individual (Lai, Lombardo & Baron-Cohen, 2014). Presently there is no standardised way to compare the different treatments available and it is therefore difficult to choose which treatment will be the most effective (Matson, Adams, Williams, & Rieske, 2013). Adding to the complexity of the situation is the fact that treatments are not always accessible due to lack of financial resources or distance from centres that offer that form of treatment (Matson et al., 2013). It is important, therefore, to find ways to make interventions more effective. One such

complementary intervention that is currently beginning to show promise is animal-assisted intervention (AAI) (O’Haire, 2013a).

AAI refers to the intentional incorporation of an animal as part of an intervention (Kruger & Serpell, 2010). AAI includes animal-assisted therapy (AAT) and animal-assisted activities (AAA) (Kruger & Serpell, 2010). While both involve the use of animals to enhance people’s well-being, AAT makes use of explicit goals in therapy and must be performed by an individual qualified in the field, whereas AAA does not have individualised goals and can be performed by volunteers with a variety of people in the same format (O’Haire, 2010).

In O’Haire’s (2013a) literature review of AAI for ASD, initial studies into the use of AAI for ASD showed promising outcomes. There has been particular interest in whether the social skills of individuals with ASD can be improved through the use of AAI (O’Haire, McKenzie, Beck, & Slaughter, 2013). When considering the usefulness of any form of intervention for ASD, it is important to explore the perceptions of the teachers and parents of the individual with ASD as they are often the main source of information on the behaviour and general affect of the individual (Bowker, D’Angelo, Hicks, & Wells, 2011).

1.2 MOTIVATION AND CONTEXT OF STUDY

Current research indicates that there is already a high prevalence of ASD and the percentage of individuals diagnosed with ASD continues to grow (Elsabbagh et al., 2012; Fombonne, 2009). With the increase of ASD comes an increase in the number of interventions suggested for improving the symptoms of ASD (Matson et al., 2013). There is currently no single intervention that is suited to every individual with ASD (Green, 2007). Therapies must therefore be carefully considered and chosen, an important decision considering limits to resources and time (Matson et al., 2013). This is particularly relevant in South Africa, due to the expenses involved in ASD intervention and the lack of financial resources of the average South African household, as well as lack of availability of ASD resources in this country (Malcolm-Smith et al., 2013). These factors make it very important to provide information on an intervention that can be financially viable and is easily available, and can make other intervention styles more effective. A review by O’Haire (2013b) suggests that AAI shows promise as an intervention that can fulfil these requirements.

O’Haire (2013b) notes the need for more investigation into how AAI can affect different individuals with ASD, as this form of intervention may not be effective for everyone with ASD. Stern and Chur-Hansen (2013), who indicate that such studies can provide

important insight into the mechanism of AAI, also point out the lack of qualitative studies regarding the experiences of individuals involved in AAI. The differences between individuals with ASD can cause them to react in different ways when exposed to AAI, which makes it important to use research methods, which provide a platform for discussion of individual reactions and effects. As difficulty with social skills is one of the core symptoms of ASD, it is important to consider the effects within a group, as this will provide important information on group dynamics and effects on group interaction.

1.3 RESEARCH AIM AND QUESTION

The aim of this research was to expand and improve our understanding of the use and effect of AAA for children with ASD, by considering the perceptions of teachers and parents of adolescents who had taken part in a school-based animal-assisted activities programme.

The research question can therefore be articulated as follows:

What are the perceptions of the teachers and parents of a class of adolescents with ASD when these adolescents are exposed to AAA at school?

1.4 IMPORTANCE OF RESEARCH

Research indicates that an estimated 1% of the international population is diagnosed with ASD and this percentage appears to be increasing (CDC, 2014). In light of this, research into the effectiveness of proposed interventions for ASD becomes very important. In order to make the best possible use of time and resources available to an individual with ASD, it is necessary to have a good understanding of how an intervention works and which individuals will benefit the most from it (Matson et al., 2013). This is particularly true of individuals with ASD, as the presentation of the disorder varies so greatly (Johnson et al., 2007).

It is also important to explore the effect of an intervention in different populations within the classification of ASD. Early intervention has shown important benefits and is therefore an important area of focus within ASD research (Rogers & Vismara, 2008). In order to further understand an intervention, it is also necessary to consider effects of any intervention on other age groups, such as adolescents.

Due to the limited communicative skills and expressive capabilities of individuals with ASD, teachers and parents form a very important source with regards to the effect of any intervention (Karst & Van Heck, 2012). They spend the most time with the individual and this relationship enables them to provide useful, discerning insight into the individual and their behaviour and reactions. This research provided teachers and parents with an

opportunity to express their experiences and perceptions of the use of AAA for adolescents with ASD.

1.5 DEFINITIONS OF IMPORTANT TERMS AND CONCEPTS

The following terms and concepts are defined to ensure a thorough understanding of the research presented.

1.5.1 Animal-assisted intervention (AAI)

Animal-assisted intervention refers to the intentional incorporation of an animal as part of the intervention, including AAT and AAA, among other forms of AAI (Kruger & Serpell, 2010).

1.5.2 Animal-assisted therapy (AAT)

Animal-assisted therapy refers to the use of a carefully chosen animal by a professionally trained individual for interventional purposes in order to obtain predetermined goals, with progress monitored throughout the intervention (Kruger & Serpell, 2010).

1.5.3 Animal-assisted activities (AAA)

Animal-assisted activities refer to the inclusion of an animal into a programme implemented by volunteers, aimed at enhancing lives through education, motivation and recreation (Kruger & Serpell, 2010).

1.5.4 Autism spectrum disorder (ASD)

ASD refers to a neurodevelopmental disorder in which daily living is impaired by social communication and interaction deficits and rigid and repetitive thought patterns and behaviours (Azeem, Imran, & Khawaja, 2016).

1.6 OUTLINE OF RESEARCH PROJECT

Chapter 1 introduced the area of study with a brief description of the elements involved. The aim of the research and the theoretical framework were also discussed, as well as definitions of important terms and concepts.

Chapter 2 comprises a review of the literature pertaining to the subject in order to place the research within its appropriate context. This entails a description of the features of ASD including the diagnosis and prevalence, and the prognosis and treatment of the disorder.

This is followed by a description of AAI, including the history, the risks and concerns and the benefits. Finally research regarding the use of AAI for individuals with ASD will be discussed, including the description of the perceived affinity between individuals with ASD and animals, as well as research describing of the benefits of the use of AAI for individuals with ASD. The theoretical framework of this research will also be discussed.

Chapter 3 provides a description of the methods employed in this research. This will include a description of the participants, a description of the data collection and analysis, as well as a consideration of the trustworthiness of the research and the ethical considerations and procedures involved.

Chapter 4 is a presentation of the results revealed by this investigation. These include the themes and sub-themes that emerged, as well as the supporting quotes.

Chapter 5 presents a discussion of the results described in Chapter 4, with reference to previous research and the theoretical framework. Finally, the limitations of this study and recommendations for future research will be discussed.

CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

This chapter provides an overview of the research pertaining to ASD, AAI and a combination of this disorder and this intervention. In order to assess the usefulness of an intervention for a particular population, it is necessary first to establish whether there is a need for research regarding interventions within that population. It is also necessary to consider the theoretical possibility of that intervention being effective, as well as the theoretical reasons for that efficacy. Further, it is necessary to consider the present body of research pertaining to that intervention and the particular population under consideration. Therefore, this chapter will discuss what ASD is and its prevalence, as well as factors pertaining to interventions for this disorder. This chapter will also include a description of AAI and the benefits thereof. Finally, this chapter will discuss current and previous research regarding the use of AAI for individuals with ASD.

2.2 AUTISM SPECTRUM DISORDER

2.2.1 Clinical picture

According to the Diagnostic and Statistical Manual, 5th edition (DSM-5) the two core symptoms evident in ASD are deficits in social interaction and communication; and repetitive and restrictive thought patterns and behaviours (CDC, 2015). ASD is a spectrum disorder and therefore it can occur with differing levels of severity (Kasari, 2002). The presentation of the disorder can also vary greatly as each symptom can be more or less apparent in one individual and the symptoms themselves can display differently in each individual (Mandy & Skuse, 2008).

The social deficits associated with ASD can range from no apparent interest in social interaction to an enthusiasm for social interaction but a lack of ability to maintain a conversation (CDC, 2005). The social deficits stem in part from a lack of social skills. Social skills are the observable manner in which an individual adapts to the people and objects in his or her environment and are therefore the skills necessary to connect with others and live in a self-sufficient manner (Matson & Wilkens, 2007) This includes elements such as lack of ability to understand non-verbal behaviours, and lack of emotional reciprocity (Cotugno, 2009). It is often observable as a lack of eye-contact and an avoidance of human interaction, even with familiar individuals (Camargo et al., 2014).

These social deficits therefore lead to difficulty in developing or maintaining relationships, particularly outside the immediate family circle. Knott, Dunlop and MacKay (2006) found that when children with ASD are able to make friends, they have dramatically fewer friends than typically developing children and the friendships they do form tend to be initiated and maintained only with help from their parents.

Although individuals with ASD often appear to ignore the presence of other people, Bauminger, Shulman, and Agam (2003) found that children with ASD experience loneliness and desire social contact with others. According to White, Koenig, and Scahill (2006), lack of properly developed social skills also has an adverse effect on achievement in academic or occupational fields. Limited social skills will become more evident as the child gets older, as social relationships tend to become more complicated with age (White et al., 2006). Children with ASD are often victims of bullying or shunning in social situations, which can lead to further avoidance of interacting with others (Knott et al., 2006).

The restrictive and repetitive behaviour associated with ASD presents as a combination of repetitive motor behaviours, like spinning, tapping, flapping or rocking, and restrictive routines (Leekam, Prior, & Uljarevic, 2011). The restrictive behaviours lead to inflexibility and a desire for sameness, particularly with reference to food and clothes, and a dislike of any change in environment (Leekam et al., 2011). Also noticeable is either increased or decreased reaction to sensory stimulation, which can increase restrictive and repetitive behaviour as the individual seeks or tries to avoid particular stimuli (CDC, 2015). This inflexibility is one of the factors which contributes to the maladaptive behaviours which cause anxiety and stress in the lives of individuals with ASD and those that care for them (Hartley, Sikara, & McCoy, 2008).

The restrictive and repetitive thought patterns and behaviours are also evident in a lack of ability to generalise a new skill or behaviour from one setting to another (Brown & Bebko, 2012). Many individuals with ASD find it difficult to apply a newly learnt concept or behaviour to a broader context, such as if a child learns to eat with a knife and fork at school, this new skill may not occur at home spontaneously, but must be taught there as well. This inability to generalise makes learning more difficult, as a concept must be taught in a variety of contexts and in a variety of ways in order to generalise the understanding of the concept (Brown & Bebko, 2012). This is an important feature to consider in interventions, as many interventions, particularly interventions targeting social skills, show poor generalisation results for the skills learnt (Bellini, Peters, Brenner, & Hopf, 2007).

Comorbidity is also common in individuals with ASD (Charman et al., 2011). Among the disorders that co-occur with ASD are attention deficit hyperactivity disorder (ADHD), anxiety, as well as child psychiatric disorders (Charman et al., 2011). ASD can be further complicated due to the presence of intellectual disability with the ASD (Constantino & Charman, 2016). Where possible, the comorbid disorders are treated with medication (Levy, Mandell & Schultz, 2009).

2.2.2 Diagnosis

The complex presentation of ASD makes the diagnostic process difficult (Cauffield, 2013; Hare, 2009). The diagnosis must rely on interviews with caregivers, clinical observation, medical examination and exclusion of other possible disorders (Lai et al., 2014). Several standardised instruments, such as the Autism Diagnostic Observation Schedule and the Revised Autism Diagnostic Interview, have been developed to assist in the diagnostic process (Baird, Cass, & Slonims, 2003; Levy et al., 2009). A comprehensive assessment is necessary to confirm an ASD diagnosis and this is best done by a multidisciplinary team, skilled in a variety of domains, including neurology, speech and language therapy and occupational therapy (Baird et al., 2003; Levy et al., 2009).

A diagnosis of ASD is based on the diagnostic criteria laid out in the DSM 5 (APA, 2013). The two important criteria are difficulties in the social domain and restrictive and repetitive patterns of behaviour and thought (APA, 2013). If the symptom presentation of the individual meets the two criteria, the severity of each of these criteria must be specified separately, as they present at the time of the assessment (APA, 2013).

The deficits in social interaction and social communication must persist in different settings and include deficits in social-emotional reciprocity, deficits in understanding and utilising nonverbal communication within a social interaction and deficits in ability to develop and maintain relationships (APA, 2013). The individual must also present with at least two of the criteria related to restrictive and repetitive behaviour and thoughts. These include stereotypical motor movements, use of objects or speech, insistence on routine and sameness or ritualised patterns of speech or behaviour, severely restricted interest with abnormal focus, as well as under- or oversensitivity to sensory stimuli or an unusual interest in sensory stimuli (APA, 2013).

In addition to presenting with symptoms to fulfil these criteria, the symptoms must have been present during the early life of the individual, although they may not have presented at a clinical level in early life (APA, 2013). The symptoms must also cause clinical

impairment for the current functioning of the individual (APA, 2013). Further, a diagnosis of ASD can only be given if the presentation is not better accounted for by intellectual impairment or global delay (APA, 2013).

The diagnosis is made based on clinical assessment and standardised rating scales which rely on interviews with the parents, as well as on reports from those who interact regularly with a child, such as teachers (Constantino & Charman, 2016). The parents form an important part of the diagnostic process, as they are often the first to notice any abnormal development in their child and seek help (Saint-Georges et al., 2011). They also provide an essential source of information in the on-going assessment and intervention for their child (Lai et al., 2014).

The symptoms of ASD are present and stable before the age of two (Guthrie, Swineford, Nottke, & Wetherby, 2013). Diagnoses, however, are generally only made between the ages of 3 and 5 years old (Goin-Kochel, Mackintosh, & Myers, 2006; Latif & Williams, 2007). This is important as there are indications that early intervention yields good results (Azeem et al., 2016; Constantino & Charman, 2016). A precise and considered diagnosis of ASD is therefore important as it is the initial step towards deciding on how to proceed with intervention and treatment.

2.2.3 Cause

Since Kanner first wrote about noticing the symptoms of ASD in 1943, the disorder has been extensively researched (Wolff, 2004). In spite of this research, no single cause for ASD has been found and current research suggests that a combination of factors contribute to the development of ASD (Sealey et al., 2016).

The apparent increased risk of ASD in twins led to the hypothesis that ASD might have a genetic base and may be an inheritable disorder (Sealey et al., 2016). This has been confirmed through twin studies and studies of relatives of individuals with ASD, although the variable nature of the results suggest that the heritable nature may be a risk, rather than a determining factor (Matelski & Van de Water, 2016). Research into genetics has revealed no single gene, which is responsible for ASD, and it is predicted that there may be over 1000 genes linked to ASD (Sealey et al., 2016).

While there is evidence for the heritable element in the development of ASD, there are also certain environmental factors during conception and pregnancy that may contribute to the risk of ASD (Matelski & Van de Water, 2016). These represent an important area of

consideration as they represent the modifiable factors in the cause of ASD (Kalkbrenner et al., 2014).

Advanced maternal and paternal age at conception have been shown to be risk factors associated with ASD, as has a large difference in age between mother and father (Matelski & Van de Water, 2016). Prenatal exposure to a variety of chemicals has also been shown to be associated with an increased risk of ASD (Sealey et al., 2016). These include certain medications taken by the mother, particularly during the first trimester of pregnancy, such as anti-depressants (Matelski & Van de Water, 2016). Risk of ASD has also been associated with exposure to certain pesticides, as well as air pollution (Matelski & Van de Water, 2016).

The heterogeneity of ASD has complicated the search for the cause of ASD, as no single gene has been found that can be considered responsible and no environmental factor can be singled out as the cause (Sealey et al., 2016). This is further complicated as environmental factors can have an impact on the development of genes themselves, as well as the expression of those genes (Matelski & Van de Water, 2016). Research is currently focused on the interaction between genetics and the environment, and how genetic risk factors such as ASD-associated copy number variants may predispose individuals to sensitivity to environmental factors such as exposure to certain chemicals (Matelski & Van de Water, 2016).

2.2.4 Prevalence

When discussing the prevalence of ASD, it is difficult to ascertain exact figures. In a review of research dealing with international prevalence, Saracino, Noseworthy, Steiman, Reisinger, and Fombonne (2010) found that in studies done since 2000, results varied from 7.2 to 40.5 per 10000 people, without a consistent reason such as time or location to explain these differences. While there is great variation in these results, research does show an increase in the number of individuals diagnosed with ASD (Elsabbagh et al., 2012). The CDC (2014) indicates that in the United States, numbers have increased from 1:88 in 2012 to 1:68 in 2014.

Fombonne, Quirke, and Hagen (2009) discuss two proposed causes for this increase. One possible cause is that there is a dramatic increase in the actual number of children who develop ASD each year and that the disorder is becoming more prevalent. The other suggested cause is that the apparent increase in the number of individuals diagnosed with ASD is in fact due to changing definitions and diagnostic criteria for ASD, as well as more awareness of the disorder among medical practitioners, therapists, teachers and parents,

which leads to improved recognition of the disorder in children. Whether there is an actual increase in numbers or if the increase is due to improved diagnostic criteria and awareness, statistics for ASD remain alarming, with a generally-accepted ratio of 1:100 individuals or 1% of the population being diagnosed with ASD internationally (CDC, 2014).

A large proportion of the research into the prevalence of ASD has been done in the United Kingdom and the United States and other similarly developed countries (Elsabbagh et al., 2012). There are, however, some studies from less developed countries that show that the disorder occurs regardless of nationality, race or socio-economic status (Bakare & Munir, 2011). According to research by Malcolm-Smith and colleagues (2013), there is little or no information available on the prevalence of ASD in South Africa, as no epidemiological studies have been completed. Some ASD-organisations in South Africa, such as South African Association for Autism (Association for Autism, 2012) make use of the international statistic of 1 in every 100 children is diagnosed with ASD, while others, such as Autism Western Cape (Autism Western Cape, 2015), make use of the American statistic (CDC, 2014) of 1 in every 68 people affected by ASD.

2.2.5 Cognitive models of ASD

A number of theories have been developed to explain the observable symptoms of ASD (Williams et al., 2013). The hope is that a better understanding of the underpinnings ASD will help to refine and improve methods of intervention for ASD. One hypothesis is that people with ASD have a deficit in Theory of Mind (ToM).

ToM refers to the ability to understand and predict the actions and behaviours of other people, as well as understand their intentions (De Villiers, 2007). This ability is necessary in social interaction as it facilitates shared attention and the ability to understand the world from someone else's perspective (Tager-Flusberg, 2007). Because of this, individuals who lack ToM have difficulty with understanding the intentions of others and predicting their behaviours, which affects their capacity for social reciprocity (Tager-Flusberg, 2007). There also appears to be a link between the development of ToM and the development of language, and often a delay in the development of ToM is accompanied by a delay in language development (De Villiers, 2007).

Initially introduced by Baron-Cohen, Leslie and Frith (1985), the ToM hypothesis of ASD suggests that the social and communication difficulties associated with ASD can be explained by a delayed development in ToM. It is important to note, however, that it does not attempt to explain the other important symptom of ASD, the restrictive and repetitive

thoughts and behaviours (Tager-Flusberg, 2007). A concern regarding ToM in ASD is the lack of universal results. While much of the research done in the area does show a deficit or delay in ToM in many individuals with ASD, most studies showed that a proportion of ASD individuals are able to pass ToM tests, meaning that deficit in ToM cannot be used to explain ASD symptoms in all individuals (Rajendran & Mitchell, 2007).

The Weak Central Coherence (WCC) theory was developed with a focus on the non-social, as well as the social impairments associated with ASD (Rajendran & Mitchell, 2007). WCC suggests these may be due to the way in which individuals with ASD process information (Rajendran & Mitchell, 2007). Frith and Happé (1994) initially theorised that individuals with ASD have a deficit in their ability to process parts of information within their context as part of a larger picture. The results of research into the validity of WCC have proven contradictory as, while some research suggests that individuals with ASD have difficulty with the tests for WCC, other studies indicate that there was very little difference between the results of the group of individuals with ASD and the typically developing group (Hoy, Hatton, & Hare, 2004). The mixed results from research have helped to change and define this theory, and the focus of WCC is now better explained as improved processing of local information, rather than a deficit in processing the larger picture (Rajendran & Mitchell, 2007). As such, it is now understood to be a cognitive style, rather than a dysfunction.

A theory that is beginning to gain interest and acceptance in the academic community is the theory of social motivation (Chevallier, Kohls, Troiani, Brodtkin, & Schultz, 2012). The interest in this theory indicates the beginnings of a shift from the focus on the cognitive impairments of ASD to the motivational aspects of the disorder (Chevallier et al., 2012). The theory of social motivation proposes that the social deficits that form one of the core symptoms of ASD stem from a lack motivation, rather than a lack of ability (Chevallier et al., 2012). Social motivation theory is based on the idea that typically developing individuals find social interaction rewarding in itself and are therefore motivated to develop and maintain social relationships (Kohls, 2012). In individuals with ASD, this motivation is lacking from a very early age, and without the motivation, the individual does not develop the social skills necessary for successful social interaction (Schultz, 2005).

This theory does not attempt to explain the non-social symptoms of ASD, but rather focuses on the social symptoms (Schultz, 2005). Currently there is no single widely accepted theory that is able to explain both the social and the non-social aspects of ASD (Rajendran & Mitchell, 2007). Due to this difficulty, it might become less important to develop one

explanation for all ASD symptoms, but rather to focus on understanding the disorder as consisting of multiple deficits (Chevallier et al., 2012).

2.2.6 Effects of ASD

2.2.6.1 Effect on individual diagnosed with ASD

When discussing ASD, it is important to note not only the clinical presentation of the disorder, but also how the individuals themselves, as well as those closest to them, experience the disorder.

ASD has been found to have a negative effect on Quality of Life (QoL) throughout the life span (De Vries & Geurts, 2015). Adults with ASD were found to experience poorer QoL than adults with other childhood psychiatric disorders (Barneveld, Swaab, Fagel, Van Engeland, & Sonnevile, 2014). A review by Ikeda, Hinckson and Krägeloh (2014) shows that children and adolescents with ASD have significantly poorer QoL than their general population counterparts. In addition to this, De Vries and Geurts (2015) found that severity of ASD symptoms was associated with lower QoL for children with ASD.

In research considering the views of adults with a diagnosis of high-functioning ASD, a general sense of isolation and alienation emerged, as the individual feels that they do not fit in with their peers (Jones, Zahl, & Huws, 2001). Individuals with ASD therefore often experience loneliness and feelings of exclusion. In a study of adolescent boys with ASD, Lasgaard, Nielsen, Eriksen and Goossens (2010) found that just over one fifth of the participants with ASD often or always felt lonely, and 38 % reported feeling lonely sometimes (Lasgaard et al., 2010). This was compared to 4% of typically developing adolescent boys who reported feeling lonely often or always, and 19% of typically developing adolescent boys who reported feeling lonely sometimes. Loneliness was also found to be more prevalent in children with ASD in research performed by Baugminger, Shulman and Agam (2003). The feelings of isolation are often accompanied by feelings of depression and frustration (Jones et al., 2001).

In addition to loneliness, young adults with ASD often experience anxiety (Trembath, 2012). The anxiety is often caused by social factors, such as making small talk (Trembath, 2012). White and Roberson-Nay (2009) found that higher levels of anxiety in youth with ASD was associated with greater feelings of social loneliness. There is also anxiety related to being watched and judged by others (Jones et al., 2001). Apart from anxiety related to social situations, young adults with ASD also experience heightened anxiety caused by their environment, such as crowds or unexpected delays (Trembath, 2012).

Individuals with ASD, however, do not see the disorder in a purely negative light. People with ASD often show strengths, such as ability to work with numbers or an improved ability to learn languages (O'Neil, 2008). These strengths are only useful to them, however, if they are able to function well enough in society to communicate these strengths (O'Neil, 2008).

2.2.6.2 Effect on family of individual diagnosed with ASD

Due to the social difficulties, and the behaviour problems associated with ASD, the disorder affects not only the individual, but also those who care for the individual. Parents of children with ASD reportedly experience higher levels of stress than other parents, including parents of children with other disabilities (Pisula, 2007). Research into the experience of raising a child with ASD reveals the challenges these parents face.

Isolation is one of the most important struggles (Ludlow et al., 2011; Myers, Mackintosh, & Goin-Kochel, 2009; Woodgate, Ateah, & Secco, 2008). Parents often feel disconnected from their normal social network of friends and family, as many people don't understand the needs of a child with ASD and are unable or unwilling to accommodate the difficult behaviours or needs of the child (Woodgate et al., 2008). This problem is compounded as where they can go and what they can do is restricted by the behaviour of the child with ASD (Myers et al., 2008). Many families of children with ASD very seldom take vacation or go on family outings, such as watching sporting matches or movies or visiting restaurants or even going shopping as a family, as these may trigger disruptive behaviour in the child (Myers et al., 2008).

The isolation does not occur only on a personal level, as parents of children with ASD also experience isolation from official support systems, such as the health care system and the education system (Woodgate et al., 2008). This is particularly true in South Africa, where there are very few ASD-specific schools and access to assistance for those with ASD is limited both geographically, as the limited number of schools ensure that most people do not live close to one, and financially, as private ASD intervention is prohibitively expensive (Dawson, 2011).

Raising a child with ASD can also increase the strain on the parents' relationship. Due to the increased needs of the child, including the need for almost constant supervision, the parents have very little privacy and spend very little time as a couple (Myers et al., 2009). In addition to the relationship strain, there is also personal strain on the parents, as they report grief, guilt and depression associated with the child with ASD (Myers et al., 2009). The

relentless nature of caring for a child with ASD also leads to feelings of desperation and hopelessness (Ludlow et al., 2011).

There are, however, constructive aspects associated with the personal effect of raising a child with ASD. Some parents note that they have learnt to focus more on their own emotional fulfilment and that of their family, than on material gain (Myers et al., 2009). Another aspect is the acknowledgement of the importance of the development goals associated with ASD, as opposed to the usual developmental milestones (Woodgate et al., 2008). Importantly, parents relate their recognition of raising a child with ASD as an opportunity to improve themselves and their view of the world, by increasing their patience and tolerance and compassion (Myers et al., 2009).

In addition to the effect on the parents, another concern of parents of children with ASD is the effect on the siblings of that child (Ludlow et al., 2011). They express concerns regarding the possibility of the sibling feeling neglected due to the increased demands of the child with ASD (Myers et al., 2009). These feelings of neglect can cause the sibling to resent the child with ASD (Myers et al., 2009). The unpredictable behaviour of the child with ASD can lead to embarrassment for the sibling, due to tantrums or abnormal behaviour in public settings (Myers et al., 2009). Apart from the emotional stress of having a brother or sister with ASD, the child with ASD is often destructive and will take or break possessions and possibly even physically harm the sibling (Myers et al., 2009).

A further concern regarding parenting a child with ASD is the financial implication (Myers et al., 2009). The specialised schooling and therapies, as well as supplements or medication required for a child with ASD are very expensive (Bishop & Lord, 2010). In addition to the expenses related to ASD, raising a child with ASD also has an effect on the careers of the parents (Myers et al., 2009). The energy and time required to care for a child with ASD can impact the parent's productivity and availability at their place of employment (Myers et al., 2009). In some cases, a parent of a child with ASD will quit his or her job in order to care for the child (Myers et al., 2009). In the South African context, Dawson (2011) noted a perceived impact of social-economic status on the quality of intervention and assistance for a child with ASD. This is particularly important to acknowledge within the context of the historical social-economic inequality in this country, as a lack of financial assets has a direct effect on the accessibility of resources for those diagnosed with ASD (Dawson, 2011).

2.2.7 Prognosis

ASD is a pervasive disorder and as such, will remain with the individual throughout his or her life (Seltzer, Shuttuck, Abbeduto, & Greenberg, 2004). Due to the nature of the disorder and the impact on life skills and functioning, the parents of an individual with ASD are likely to be much more involved in decisions across the lifespan than parents of typically developing children would be (Hartley, Barker, Seltzer, Greenberg, & Floyd, 2011; Matson & Williams, 2015). There is some indication that the stress associated with parenting a child with ASD increases as the child becomes an adolescent (Seltzer et al., 2004). While some improvement in symptoms often occurs between childhood and adulthood, this is not true of all individuals with ASD (Seltzer et al., 2004). When symptom improvement does occur, it is often not across all the symptoms and the improvement is not to such an extent that the individual can function within normal levels (Seltzer et al., 2004). The majority of individuals with ASD will therefore remain dependent throughout their lives (Levy & Perry, 2011).

Results of research differ with regards to what factors can improve the long-term prognosis, but Darrou and colleagues (2010) indicate that the two main risk factors for a more dependent life are the severity of ASD and the level of speech, while the protective factors found were communication ability and person-related cognition. Intervention research has shown the use of intervention can improve an individual's prognosis by improving their functioning (Howlin, 1997; Kasari, Shire, Factor, & McCracken, 2014; Klintwall, Eldevik, & Eikeseth, 2013).

As the individual with ASD is dependent on his or her parents, the parents are responsible for decisions regarding which ASD interventions are employed (Matson & Williams, 2015). The factors that contribute to decisions regarding which intervention is used include finances, availability of preferred intervention, advice and anecdotes from others and their own intuition and personal beliefs (Bowker et al., 2011; Carlon, Carter, & Stephenson, 2015).

2.2.8 Intervention options for ASD

There is currently no cure for ASD and the goal of intervention is to reduce symptoms and expand on the ability of the individual to live independently (Cauffield, 2013). Due to the complexity of the disorder and the variability in presentation, selecting the appropriate intervention for the individual is difficult (Matson et al., 2013, McLeod, Wood, & Klebanoff, 2015, Stephens, 2005). This is made more complicated by the large variety of intervention

methods suggested for ASD (Matson et al., 2013). These include medicinal treatments, both conventional and alternative, as well as many different behavioural interventions, which are supported by differing standards of scientific research (Azeem et al., 2016; Lai, Lombardo, & Baron-Cohen, 2014; McLeod et al., 2015). Due to the variable nature of ASD, no single intervention plan is appropriate for all individuals with ASD, and most intervention plans are a combination of different intervention methods (Matson & Williams, 2015; McLeod et al., 2015; Stephens, 2005).

2.2.8.1 Medical intervention

Despite the biological basis of ASD, no medication has reliably improved all core symptoms of the disorder (Baribeau & Anagnostou, 2014; Cauffield, 2013). Some individuals do respond to medications, which help to control certain elements of the disorder, such as the use of selective serotonin reuptake inhibitors for the reduction of repetitive behaviours (Cauffield, 2013). Drugs have also helped to treat comorbid symptoms, such as anxiety or hyperactivity (Baribeau & Anagnostou, 2014; Cauffield, 2013). By treating these symptoms, the individual is better able to cope with their other symptoms, thereby improving their quality of life (Cauffield, 2013). Results from these medications, however, tend to be inconsistent and will vary from person to person (Smile & Anagnostou, 2012).

In addition to prescribed medication, there are also alternative treatment options available, such as vitamins, supplements and special diets (Lai et al., 2014; Levy et al., 2009). The effectiveness of these treatments has not been established and while many of them may be harmless, some of the treatments promoted for ASD can pose a serious health risk and should therefore not be used without careful consideration and consultation with professionals (Matson et al., 2013).

2.2.8.2 Behavioural intervention

The most effective form of intervention for ASD has been found to be behavioural intervention, as this helps the individual to develop the skills necessary to interact with and thrive in his or her environment (Cauffield, 2013; Lai et al., 2014). Many different styles of intervention have been developed, as no single style works for all children (Stephens, 2005). It is therefore important to find the one best suited to the individual and his or her developmental needs.

Many of the comprehensive intervention styles currently used are based on ABA principles (Levy et al., 2009). ABA makes use of positive reinforcement by breaking up a

task into its smallest components and presenting each step of a task as a discrete trial (Tews, 2007). Behaviour and learning are then shaped by rewarding any desired responses (Tews, 2007). Initially, programmes based on ABA principles were very intensive and structured and required many hours of one-on-one therapy (Levy et al., 2009). These programmes tend to be extremely expensive and the individuals often have difficulty generalising the skills learnt in such a programme to other settings such as at home or in the community (Levy et al., 2009). More recently developed programmes include more natural teaching and are often less intensive (Levy et al., 2009).

Another intervention style, which is becoming more popular, is the Floortime approach (Levy et al., 2009). This style is a relationship-based development style, which emphasises the importance of relationships in helping a child to reach developmental milestones (Pajareya & Nopmaneejumrulers, 2011). The focus is on using interaction in the individual's normal environment to create opportunities to introduce language and concepts (Landa, 2007). The efficacy of this intervention style, however, currently lacks independent scientific research, and more evidence is needed (Lai et al., 2014).

Treatment and Education of Autistic and Related Communication Handicapped Children (TEACCH) is another intervention style that is widely used (Lai et al., 2014). TEACCH places emphasis on creating a structured environment for the individual with ASD by creating visual schedules to decrease anxiety, and using workstations or systems comprised of visually structured tasks for the individual to practice (Landa, 2007). The focus is on creating independence as the aim is for the individual to follow the schedule and complete the tasks without interference or help (Landa, 2007). This intervention style also lacks scientific research to support its efficacy (Maglione, Gans, Das, Timbie, & Kasari, 2012).

Apart from these comprehensive intervention styles, there are also more targeted approaches that can be used separately or in addition to the comprehensive interventions (Lai et al., 2014). As difficulties in speech and communication are a common feature in ASD, speech therapy is very often an important feature of the intervention programme (Azeem et al., 2016). Occupational therapy is also important to assist with the sensory integration or motor difficulties, which are often evident in ASD (Azeem et al., 2016). Other targeted interventions include social story intervention to help with frustration (Adams, Gouvousis, VanLue, & Waldron, 2004) and Picture Exchange Communication System (PECS), which helps with communication (Lai et al., 2014).

2.2.8.3 Schooling

Decisions regarding intervention are further complicated by the consideration of schooling for the individual with ASD. Various schooling options for ASD exist but these are not available everywhere, due to lack of resources (De Vries, 2016). This is particularly true in South Africa, where access to ASD-specific resources is limited (De Vries, 2016). Decisions must therefore be made according to what is available for each child.

Currently, there is an inclination towards inclusive schooling for children with ASD (Chamberlain, Kasari, & Rotherham-Fuller, 2007; Eldar, Talmar, Wolf-Zukerman, 2010; Norwich, 2005). This refers to the inclusion of the child into a mainstream classroom, with typically developing peers (Ravet, 2011). The children with ASD receive varying levels of support (Eldar et al., 2010). The theoretical advantages of this include exposure to modelling of typical social development and norms, which might help to improve the social functioning of the child with ASD (Eldar et al., 2010). Inclusion will also allow the child with ASD access to the curriculum and to other resources, which are available to their typically-developing peers (Reed, Osbourne, & Waddington, 2012).

There is some concern, however, that mainstream schooling might not be the most appropriate educational environment for all children with ASD, as their specific needs cannot always be accommodated (Reed et al., 2012). Due to the nature of the disorder, individuals with ASD are often not able to assimilate the social norms of their mainstream peers without help (Reed et al., 2012). The exposure to typical social behaviour often causes anxiety for the child with ASD and can cause feelings of isolation and the child will often start to avoid school and this will have an effect on academics (Humphrey & Lewis, 2008; Simpson, Mundscheck, & Heflin, 2011).

There is also concern that children with ASD in mainstream classrooms are not as educationally engaged as their peers or as children with ASD in specialised schools or specialised classes (Simpson et al., 2011). One of the difficulties of teaching any children with ASD is their lack of motivation with regards to academics (Koegel, Singh, & Koegel, 2010).

Some children with ASD, therefore, attend specialised schools, where they are able to access academics according to their own ability, as well as get the social and emotional support they need (Reed et al., 2012). Specialised schools for ASD often make use of one or more of the behavioural intervention styles designed for children with ASD in order to optimise the child's progress (Lambert-Lee et al., 2015).

Specialised ASD schools can also make use of strategies to increase the children's engagement with their education (Lytle & Todd, 2009). This can be done through the reduction of stress, as stress is often the cause of problematic and disruptive behaviour (Lytle & Todd, 2009). A structured schedule and preparation for any changes in that schedule are important methods to reduce stress, due to the dependence on sameness of children with ASD (Lytle & Todd, 2009).

2.2.8.4 Change in intervention focus

The focus of intervention has changed and more emphasis is now being placed on an individual's ability to function in his or her own environment, including home and school (Levy et al., 2009; Schreibman et al., 2015). Motivation has become an important element in intervention and there has, therefore, also been a shift towards an attempt to provide stimulus that will encourage the individual with ASD to engage with the environment willingly, rather than focus on specific skills that may be lacking (Levy et al., 2009, Schreibman et al., 2015; Steinbrenner & Watson, 2015). It has been found that an effective way of accomplishing this is to create a multidimensional treatment plan including complementary treatments (Lai et al., 2014). Although not a primary treatment, one area of study that is currently showing promise as a complementary intervention is the use of interaction with animals as a way to help individuals with ASD (Grandin, Fine, & Bowers, 2010).

2.3 ANIMAL-ASSISTED INTERVENTIONS

2.3.1 Introduction to human-animal interactions

Animals form an integral part of most people's lives as animals are used in a variety of ways for different populations (Fine & Beck, 2010; Serpell, 2010). The ways in which humans rely on animals include food, clothing, protection, law enforcement, search and rescue, as well as sport and entertainment (Fine & Beck, 2010; Walsh, 2009). Interaction between humans and animals is generally referred to as human-animal interaction (HAI) (Vitzum, 2013).

It is widely recognised that animals have the ability to help people, as shown by their use as assistance animals for more vulnerable members of society (Kruger & Serpell, 2010). Animals, however, also have the ability to improve the lives of many people just through interaction. Interaction with animals has been shown to have positive results on a variety of different populations and this has led to the creation of AAI (Walsh, 2009).

2.3.2 History of HAI

As humans, our earliest recordings of our experiences and thoughts depict our interaction with animals. Initially representing only a threat and a source of food, animals gradually became a more integral part of our lives (Walsh, 2009). Because of the increase in interaction with animals due to their domestication, a human-animal bond developed (Fine & Beck, 2010). This bond has developed and changed over time as our relationship with animals and the role they play in our lives changed (Serpell, 2010).

Historically, the belief in the power of animals is evident in the representation of animal features in the deity of most ancient cultures (Serpell, 2010). Many of these ancient cultures, as well as later cultures associated animals with healing and wellness (Serpell, 2010). In many early belief systems, such as animism, illness or injury were believed to be caused by insults to animal spirits that must be appeased to ensure healing or prevent further injury (Serpell, 2010). The spirits of animals were also seen as guardians and could prevent an individual coming to harm (Serpell, 2010). In many cultures, shamans, who were considered the healers of the people due to the relationship between illness and spirits, were closely connected with animal spirits and could, at times, take on animal forms to perform their duties more effectively (Serpell, 2010). In other cultures, animals in their corporeal forms were also believed to possess healing powers (Serpell, 2010).

This metaphysical view of the healing power of animals faded over time to become more focussed on the benefits of the companionship of animals (Serpell, 2010). As early as 1792, the companionship of pets was valued as enriching life and improving health (Altschiller, 2011). A mental asylum founded in England in that year made use of small animals and pets to encourage patients to engage with their environment (Altschiller, 2011). By the 1830s, the living conditions within mental asylums in Britain had become a concern for the authorities, who suggested that pets and small animals should be present (Altschiller, 2011). In 1867, a residential treatment centre for epileptics in Germany included pets in their therapy (Altschiller, 2011). It was also during the 1860s that author and nurse Florence Nightingale wrote about the benefits accruing from the companionship of pets (Altschiller, 2011). In 1944, the United States first documented the use of AAT, in a programme where veterans suffering from physical injuries or psychological trauma were encouraged to interact with various farm animals (Altschiller, 2011).

The idea of using animals in therapy gained scientific interest in 1961, when Dr Boris Levinson presented a paper detailing his use of a dog as part of an intervention for a disturbed child (Altschiller, 2011). His work created an interest in this phenomenon and more

programmes involving pet therapy were created (Altschiller, 2011). The growth of interest in the field led to the development of a number of foundations and societies, which provide certification and further the research into AAIs (Hines, 2003). One of the largest and most influential societies is the Delta Society (now known as Pet Partners) in United States of America (Kruger & Serpell, 2010). This society has been instrumental in standardizing definitions and terminology which has helped to bring clarity to the field, which is now widely referred to as AAI (Kruger & Serpell, 2010).

2.3.3 Description of AAA and AAT

Further distinctions regarding practice have been made within the field of AAI, as different ways of including animals have developed (Kruger & Serpell, 2010). This has led to the development of AAT and AAA, two related but different ways of using AAI (Kruger & Serpell, 2010). Much of the research concerning AAI, particularly with regard to the beneficial aspects of the presence of animals are applicable to both AAT and AAA, however, for the purposes of research, it is important to note the difference between the two, as the uses and outcomes are not identical (Kruger & Serpell, 2010).

According to Kruger and Serpell (2010), the difference is as follows: a qualified individual, who utilizes an animal as part of therapy in order to attain predetermined goals, performs AAT. Due to the goal-oriented nature of the therapy, the sessions are necessarily designed to suit a particular individual and cannot be used in a more general manner and the therapeutic aspect requires that session notes are kept and progress is monitored. While AAA also makes use of animals, volunteers can perform the sessions and, as there are no predetermined goals, the sessions are suitable for a variety of different people or for groups of people. AAA is also less restrictive in terms of monitoring and evaluation.

AAA is used widely in programmes that aim to educate and motivate individuals, such as in schools or in prisons, and also in programmes that aim to improve quality of life, such as in homes for the elderly or psychiatric hospitals (Walsh, 2009). The exact nature of the AAA may differ according to what is appropriate for the context, but AAA generally takes the form of a visit from the animal and the handler, with spontaneous interaction occurring as a result of the visit (Walsh, 2009).

A variety of animal species is used for AAA. Dogs are among the most common species selected due to their trainability and willingness to interact with people, as well as their availability and the ease with which they can be transported (Altschiller, 2011; Nimer & Lundahl, 2007). Horses are also popular and different programmes are available, some of

which involve therapeutic riding and others, which are more focused on interacting with the horse from the ground (Kruger & Serpell, 2010). Other animals, such as cats, guinea pigs and rabbits are commonly used for AAA, as are birds and fish (Altschiller, 2011; Mallon, Ross, Klee, Ross, & Fine, 2006). Animals that are more rarely used are llamas, lizards and snakes (Lefebvre et al., 2008; Sams, Fortney, & Willenbring, 2006) Dolphins have also been used in AAA, but the benefits of this are not universally accepted (Fiksdal, Houlihan, & Barnes, 2012). Each of these species has different needs and abilities that should be taken into account when considering the suitability of the animal for the context into which it will be introduced (Frederickson-MacNamara & Butler, 2010).

2.3.4 Risks and concerns regarding AAI

As with any form of intervention, it is important to consider the risks and concerns associated with that intervention, as these will impact the usefulness of the intervention, as well as being an important ethical consideration (Altschiller, 2011).

2.3.4.1 Concerns regarding animal welfare

The use of AAI has increased dramatically in recent years and this has led to growing concern over the welfare of the animals involved (Serpell, Coppinger, Fine, & Peralta, 2010). Animal welfare is defined differently by different organisations, but five basic elements are common to most definitions (Altschiller, 2011). These include access to water and appropriate food, a suitable and comfortable environment, prevention from and treatment of disease or injury, prevention of fear or distress and the freedom for normal behaviour (Altschiller, 2011).

While there is still very little regulation of AAI, many organisations, such as Pet Partners, have tried to establish standards of selection and training, as well as good guidelines for effective use of AAI, in an attempt to minimise risk to all involved (Serpell et al., 2010). Basic physical care issues which need to be considered are the safety of transportation, adequate food and water for the animal, adequate space for the animal to move around, temperature considerations, as well as the possibility of injury to the animal, should a participant be rough or violent with the animal (Altschiller, 2011).

It is also essential to consider the psychological and emotional health of the animal. AAI can cause the animal stress in a number of ways, including constant attention from strangers and restriction from normal behaviour in order to accommodate needs of participants (Serpell et al., 2010). As the animals cannot verbalise this stress, great attention

must be paid to behavioural and physiological indicators of stress (Serpell et al., 2010). One of the ways in which this stress can be mitigated is by careful selection of the appropriate animal (Fredrickson-MacNamara & Butler, 2010). Animals have different temperaments, as well as different needs and abilities and these must be carefully considered with regard to suitability for a particular setting (Fredrickson-MacNamara & Butler, 2010).

It is also important to note that often difficulties that arise are the result of a lack of knowledge, rather than a lack of concern over the welfare of the animals (Altschiller, 2011). The animals used for AAI require specialised care and monitoring, in order to keep them physically and psychologically healthy, and this requires knowledge of the needs and normal behaviours of the species involved (Altschiller, 2011). A necessary part of this knowledge is the ability to discern when the animal needs to be retired from AAI, due to age, stress or illness (Serpell et al., 2010).

2.3.4.2 Concerns regarding participant and volunteer or therapist safety

In addition to concerns regarding the welfare of the animal, the safety of the individuals participating in AAI must also be considered. In a review by Bert and colleagues (2016), allergies and infections were found to be major risks. These can be minimised by hygiene protocols and by selecting participants carefully to ensure that they are not allergic to animals (Bert et al., 2016).

There is also a possible risk of aggression on the part of the animal, but this risk can be minimised by preparation of both animal and participant before the intervention to ensure appropriate handling and to decrease anxiety (Friesen, 2010). Careful selection of the animal according to temperament (Fredrickson-MacNamara & Butler, 2010), as well as careful monitoring of the animal's behaviour to avoid a fear or stress response also help to avoid the risk of aggressive behaviour (Serpell et al., 2010).

The risks involved with AAI can also be minimised by the use of animals registered with governing organisations (Fredrickson-MacNamara & Butler, 2010). These organisations ensure that the animal is sound in both health and temperament and is suitable for the population it will be expected to visit (Fredrickson-MacNamara & Butler, 2010). In South Africa, examples of such organisations are Pets as Therapy (PAT) (Pets as Therapy, n.d.), Paws for People Therapy Dogs (Paws for People Therapy Dogs, 2014) and Touch our Pets – Therapy Dogs (Touch our Pets – Therapy Dogs, n.d.).

2.3.5 Benefits of AAI

The growing interest in AAI has led to an increase in research investigating the effects of AAI (Kruger & Serpell, 2010). A review of AAI research by Bert and colleagues (2016) indicates that a number of benefits are associated with the use of AAI. While many benefits are described, it is important to note that some studies did not find any improvement, suggesting the need for further, more standardised research (Bert et al., 2016).

2.3.5.1 Physiological benefits

One of the physiological benefits of AAI is a reduction in the physical indicators of stress and anxiety. Odendaal and Meintjies (2003) found that positive interaction with a friendly dog led to a decrease in blood pressure, and an increase in endorphins, oxytocin and prolactin. This suggests that the interaction decreased both anxiety and the arousal of the sympathetic nervous system of healthy adults. A decrease in blood pressure was also noted in institutionalised, but cognitively intact, elderly patients after receiving weekly animal visits (Stasi et al., 2004). Barker and Dawson (1998) further found that AAT was associated with decreased anxiety in hospitalised psychiatric patients. A reduction in stress and anxiety has important health implications, as stress and anxiety can increase the risk of serious illness, such as heart disease, as well as impede recovery from illnesses or operations (Friedmann, Son, & Tsai, 2010). A reduction in stress and anxiety can also improve quality of life (Friedmann et al., 2010).

In addition to reduced anxiety and stress, AAI has also been found to decrease the perception of pain. In research carried out by Braun, Stangler, Narveson and Pettingell, (2009) the use of AAI was positively associated with pain relief for children in acute paediatric care. Similarly, Sobo, Eng and Kassity-Kritch (2006) found that perceived pain in children in hospital was reduced by visits from a dog. A reduction in pain associated with AAI was also noted in adult patients who had recently undergone joint-replacement surgery (Harper et al., 2014).

2.3.5.2 Psychological benefits

Research into the use of AAI has also revealed associated psychological benefits, particularly for certain vulnerable populations, such as the elderly (Hart, 2010). Moretti and colleagues (2011) found that pet visitation decreased depression symptoms and improved cognitive functioning to some extent among elderly patients affected by dementia. This was supported by Le Roux and Kemp (2009), who found that AAA visits can improve the

depression of residents in long-term care. Quality of life in the elderly patients with dementia was similarly improved by animal-assisted intervention (Nordgren & Engstrom, 2014).

In addition to this, Mossello and colleagues (2011) found that for patients with Alzheimer's disease, interaction with animals can improve the emotional status of these patients by decreasing negative emotions such as sadness and anxiety, and increasing positive emotions, such as alertness and pleasure. Menna, Santaniello, Gerardi, Di Maggio and Milan (2016), who found that depressive symptoms among elderly Alzheimer's disease patients were improved through animal-assisted intervention, supported this. They further found that there was a slight improvement in cognitive function among these patients.

Another vulnerable group of individuals for whom AAI has shown encouraging results is those individuals living with mental illness. Individuals suffering from depression have shown a significant reduction in the symptoms of depression when exposed to AAA (Souter & Miller, 2007). AAA has also been shown to be associated with an improvement in individuals struggling with anxiety (Berget, Ekeberg, Pedersen, & Braastad, 2011). Individuals with other psychiatric disorders, such as schizophrenia, also show decreased anxiety when exposed to AAI (Barker & Dawson, 1998). Patients with schizophrenia have also shown improved quality of life and increased responsiveness to treatment through AAA (Nathans-Barrel, Feldman, Berger, Modai, & Silver, 2005). Initial research into the use of AAI for individuals who have suffered trauma, including those who develop post-traumatic stress disorder, shows positive outcomes, particularly about reduced anxiety and depression (O'Haire, Guérin & Kirkham, 2015).

2.3.5.3 Social benefits

Social interaction and support are very important in human health and well-being (Hart, 2010). Isolation and loneliness contributes to mental and physical illness (Hart, 2010). Various factors can contribute to feelings of loneliness and isolation, including advanced age, infirmity and mental illness (Hart, 2010). It is therefore important to consider the social benefits associated with AAI.

Research has shown that people walking with a dog are more likely to be approached and engaged in social interaction than people walking alone (McNicholas & Collis, 2000). This indicates the ability of dogs to act as social catalysts, as they encourage increased social interaction. An animal's ability to increase social interaction is particularly important for populations which tend to withdraw or become isolated, including individuals living in institutions, such as the elderly or those suffering from mental illness (Hart, 2010).

As people age, they tend to withdraw from society and lose some of their quality of life (Hart, 2010). The presence of animals can reduce this tendency, as animals promote social behaviour among people and encourage social interaction (Baun & Johnson, 2010). Berry and colleagues (2012) found that visits from animals decreased apathy and increased social interaction among the elderly living in institutions. An increase in attempts at social behaviours as a result of AAI was also found in elderly patients suffering from dementia (Sellers, 2008).

In addition to increasing social interaction between elderly institutionalised patients, AAI has also been found to have beneficial effects on the social functioning among adolescents with acute mental disorders (Stefanini, Martino, Allori, Galeotti, & Tani, 2015). In the study by Stefanini and colleagues (2015), it was found that adolescents with serious mental disorders, such as eating disorders and mood disorders, showed improved social functioning and integration after participating in weekly AAT sessions.

2.3.5.4 Benefits for youth and children

Animals are generally thought to have a beneficial effect on children's development (Melson & Fine, 2010). Animals are thought to help children develop empathy and encourage a sense of responsibility (Melson & Fine, 2010). Much of the research into the developmental benefits of animals pertains to only to pets within the home, but the benefit for children and youth is also applicable to AAIs such as AAA and AAT (Melson & Fine, 2010).

AAI for children has been found to be useful in therapeutic settings (Friesen, 2010). In a case study by Lubbe and Scholtz (2013), the inclusion of a dog in the therapeutic context facilitated an improved relationship between the therapist and patient. Sentoo (2003) found that including animals in play therapy helped to enhance the self-esteem of adolescents with special needs. Rinquest (2005), who found that the inclusion of animals in play therapy helped children with ASD to connect more with their environment, also noted the value of animals in play therapy. These findings suggest that AAI can help to improve the effectiveness of other intervention forms in different populations, as well as improve the relationship between therapist and patient.

AAI has shown useful benefits for certain vulnerable groups of children and youth, such as those who present with behaviour problems and those with developmental disorders. Boshoff, Grobler and Nienaber (2015) found that participation in equine-assisted therapy improved the subjective wellbeing and ability to adapt of a group of adolescent boys living in custodial care, thus preventing problem behaviours. Burgon (2011) who found that at-risk

youth participating in equine-assisted therapy reported improvements in self-esteem and self-efficacy, as well as developing a more positive attitude to life supported this. In addition to the benefits noted in youth facing emotional and behavioural challenges, there are also benefits for children facing learning challenges. Limond, Bradshaw and Cormack (1997) found that the use of AAI for children with Down's syndrome increased cooperation and improved focus. According to O'Haire (2013a), AAI has also shown important benefits for children with ASD, as discussed later in this chapter.

2.3.5.5 Benefits of AAI within the classroom

The presence of animals in the classroom is becoming more common, as contact with animals is believed to encourage children to develop empathy, as well as improve their self-esteem (Beetz, 2013; Endenburg & Van Lith, 2011). Friesen (2010) suggests that the non-judgemental nature of animals contributes greatly to the usefulness of animals in the classroom.

Kotrschal and Ortbauer (2003) found that visits from a dog improved behaviour, as well as socialization and communication between the children in an elementary school classroom and improved the cohesion of the group. Kotrschal and Ortbauer (2003) also noted a difference in reactions between the genders in their study, with boys showing more reaction than girls. Hergovich and colleagues (2002) found similar effects on a group of learners within a classroom as a result of the presence of a dog.

Zasloff and Hart (1999) found that the presence of a visiting dog helped to stimulate motivation and interest and teach responsibility and respect. A dog in the classroom can also help to improve students' attitude towards school and learning and increase their desire to attend school (Beetz, 2013). Dogs are also used to assist in specific academic lessons with positive results. Le Roux, Swarts and Swart (2014) found that an animal-assisted reading programme improved the reading abilities of grade 3 students. Esteves and Stokes (2008) propose the value of dogs in the classroom to assist in lessons, but caution that the presence of dogs in class on a continual basis is not advisable due to the distraction for the children and the exhaustion that will be experienced by the dog.

In addition to the benefits experienced by the learners in classrooms into which animals were introduced, teachers and other staff were also able to benefit. Zents, Fisk and Lauback (2016) found that teachers felt that they also benefitted from the use of therapy dogs in schools.

2.3.6 Research into AAI in the South African context

AAI is a growing field of interest for researchers in South Africa. A number of the studies discussed in relation to benefits occurred in South Africa, including Odendaal and Meintjies (2003), Sentoo (2003), Rinquist (2005), Le Roux and Kemp (2009), Lubbe and Scholtz (2013), Le Roux, Swarts, and Swart (2014) and Boshoff, Grobler and Nienaber (2015). These studies have made important contributions to the understanding of AAI and have also improved our knowledge of AAI in the South African context. This knowledge is supplemented by further research on the subject of AAI within this country.

Helfer (2006) considered the use of therapeutic horse-riding (THR) for children with disabilities. Through qualitative interviews with the children involved, she found that the riding contributed to confidence, emotional control, social interaction ability and cognitive stimulation. Boyd (2015), who interviewed the parents of children with disabilities who were participating in THR, supported these results. She found that the parents perceived improvements in physical, psychological and social functioning, as well as improving QoL.

Wiedeman (2007) explored the use of THR for adolescents with disabilities and found that the participants experienced the riding as enjoyable and motivating, as well as encouraging increased interaction and improving social skills. De Villiers (2009) also investigated the use of THR but focused on children with foetal alcohol syndrome and found this led to an increased awareness of their surroundings and an improvement in their focus.

Bronkhorst (2006) found that equine-assisted psychotherapy (EAP) can improve aggressive behaviour. A boy displaying abnormal levels of aggression was exposed to four sessions of EAP, during which he learnt to interact appropriately with a horse. She found that after the EAP, the boy was able to interact more assertively and less aggressively with the horse and with other humans. Hurwits (2013) explored the use of EAP for adolescents who had been removed from their families and placed in residential care. She found that participation in EAP led to improvements in physical, psychological and social wellbeing.

Coetzee (2012) considered the use of AAI involving dogs for the purposes of decreasing aggression in a grade R class. Through observation and interviews with the teachers, she found that interacting with a dog at school can help to decrease aggressive behaviours for grade R children. Buckle (2015) also made use of AAI involving dogs, but focused on QoL and depression in elderly people living in a residential home. She did not find a significant difference between the experimental group and the control group in her study.

These studies indicate that AAI is a promising form of intervention for a variety of different populations in this country. The studies are representative of a growing interest in researching the use of AAI within the South African context, but suggest that further research is needed.

2.4 ANIMAL-ASSISTED ACTIVITIES AND AUTISM SPECTRUM DISORDER

2.4.1 Individuals with ASD and animals

There is a widely held belief that children with ASD have an affinity for animals and bond more easily with animals than with humans (O’Haire, 2013b). This unique relationship and its effect on the children with ASD has been the basis of popular fiction books, such as *A Friend like Henry* (Gardner, 2008) and *The Horse Boy* (Isaacson, 2009). This connection is also noted by Temple Grandin, a well-known adult with ASD who used her connection with animals to help her through the social challenges she encountered as an adolescent (O’Haire, 2013b).

Research into the affinity between individuals with ASD and animals suggests that there is some foundation for this idea. Prothman, Ettrich and Prothman (2009) found that, when presented with the choice of interacting with a person, a toy or a dog, the children with ASD showed a preference for the dog. It is important to note that the children not only responded more to interaction attempts by the dog, but also initiated interaction more, a skill that many individuals with ASD find challenging. Martin and Farnum (2002), who found children with ASD were more engaged when interacting with a live dog, noted a similar preference. This was compared to their behaviour when interacting with a ball or a stuffed dog. When the dog was present, the children were less distracted and spoke more, with more speech focused on relevant topics than in the presence of the ball or the toy dog.

Grandgeorge and colleagues (2015) suggest that setting appears to have some impact on how children with ASD react to animals. Although the children in their study were attracted to animals, they were more attracted to a familiar person (their parent) than to animals. The researchers also found that a previous positive experience of pets increased the attraction to animals, while a previous negative experience with pets may lead to apprehension and avoidance on the part of the child (Grandgeorge et al., 2015).

Research also suggests that in addition to merely liking animals, individuals with ASD show a physical response to the presence of animals. According to O’Haire, McKenzie, Beck and Slaughter (2015), the presence of animals can decrease the physiological signs of stress and anxiety experienced by children with ASD in social situations. When assessed

through skin conductance responses, children with ASD showed increased arousal in response to a social context when reading aloud to peers or during free play with peers in the presence of toys, but showed a decreased arousal during free play with peers in the presence of animals. This indicates decreased stress or anxiety when the animal is present, suggesting that the animal may act as a buffer against stress and anxiety for the children with ASD (O’Haire et al., 2015).

Sensory-based thinking has been proposed as a possible reason for the relationship between individuals with ASD and animals (Grandin et al., 2010). Grandin and colleagues (2010) suggest that the relative ease with which individuals with ASD relate to animals might stem from shared thought patterns. Both individuals with ASD and animals are believed to create memories and connections according to sensory information, instead of words (Grandin et al., 2010). This shared thought process might increase the ease with which individuals with ASD relate to animals.

Another reason that individuals with ASD might prefer animals to humans is the lack of social complexity entailed in interactions with animals. Prothman and colleagues (2009) propose that, while interacting with people requires decoding of two forms of communication simultaneously, namely verbal and non-verbal, animals only make use of non-verbal communication. Individuals would therefore find interacting with animals less complicated and therefore preferable.

Parents of children with ASD also see the value of interaction between children with ASD and animals. In a study by Wright and colleagues (2016), parents of children with ASD indicated their positive opinion regarding their child’s interaction with dogs. This was based on their appreciation of the non-judgemental nature of the dog, and the support offered by the dog. Parents in the study also felt that their dog helped to calm their child with ASD, and reduced problem behaviour, in addition to motivating their child to engage in physical activities (Wright et al., 2016).

Although there appears to be evidence that individuals with ASD do have an affinity for animals, it is important to note that not all individuals with ASD will react well to animals (Grandin et al., 2010). Some individuals with ASD may have difficulty with sensory oversensitivity, and therefore the smell of the dog or the sound of the dog’s bark may overwhelm them, leading to an increase in stress and anxiety (Grandin et al., 2010). Some individuals may also have had bad experiences with animals in the past and therefore avoid the animal out of fear (Esposito et al., 2011; Melson & Fine, 2010). It is important to consider these factors when introducing animals into the lives of individuals with ASD.

2.4.2 Benefits AAI for children and adolescents with ASD

The recognition of the enjoyment of the presence of animals by individuals with ASD has contributed to an increased interest in how animals can assist with this disorder (Grandin et al., 2010). Researchers note that the reactions to AAA in this population are individual and therefore vary from person to person (Kršková, Talarovičová, & Olexová, 2010; Stevenson et al., 2015), but there are benefits which were noted in many of the studies (O’Haire, 2013a). It is important to note that not all studies on the use of AAI for ASD had positive results with some finding mixed results and some indicating very few changes (Davis et al., 2015).

2.4.2.1 Benefits related to social interaction

According to a literature review by O’Haire (2013a), many studies involving the use of AAI for children with ASD report finding increased social interaction. This is an important consideration in ASD research as the ability to interact on a social level is one of the core deficits of the disorder (Fakhoury, 2015).

In one of the earliest studies considering the use of AAI for children with ASD, Redefer and Goodman (1989) found that AAT using a dog increased the children’s participation in, and enjoyment of social interaction with a therapist. Stevenson, Jarred, Hinchcliffe and Roberts (2015) further found that the presence of a dog can improve the quality of the social interaction displayed by a child with ASD and his or her teacher. This increase and improvement in social functioning in the presence of a dog is also supported by Martin and Farnum (2002) and Silva, Correia, Lima, Magalhães and De Sousa (2011). AAI involving other animals, such as horses, rabbits and llamas, reveals a comparable beneficial effect on social interaction (Bass, Duchowny, & Llabre, 2009; Sams et al., 2006; Taylor et al., 2009).

In addition to studies indicating increased social interaction in a one-on-one situation, AAI has also been found to improve the social function of ASD children within a classroom. O’Haire, McKenzie, McCune, & Slaughter (2014) noted improved social functioning and decreased withdrawal among children with ASD when guinea pigs were introduced to their classroom. Kršková and colleagues (2010) also found that the presence of a guinea pig in a classroom of nine children with ASD increased both the quality and quantity of social interactions, but that effects on the children were individual, with most, but not all the children showing more social inclinations.

2.4.2.2 Benefits related to language and communication

Another benefit which was noted in the literature review by O’Haire (2013a) is an increase in the children’s use of language during AAI. Difficulties in language and communication form a major part of ASD and contribute greatly to the detrimental effect of the disorder (Fakhoury, 2015). Lack of communication ability has also been linked to increased ASD-related anxiety (Davis et al., 2011).

The presence of an AAT dog has been found to stimulate increased use of verbal language of children with ASD (Fung and Leung, 2014). Fung and Leung (2014) compared the verbal behaviour of children with ASD when interacting with a dog, to their behaviour when interacting with a doll. They noted that the children spoke more while the dog was present and referred more to it directly after the dog left, asking for more information or making comments. Farnum and Martin (2002) also support the finding of increased speech in the presence of a dog.

In addition to the value of dogs in the increase of communication, other animals were also found to be useful in this regard. Sams and colleagues (2015) found that children attending occupational therapy sessions made significantly more frequent use of language in the presence of animals, including llamas, rabbits and dogs, than when there were no animals present. Gabriels and colleagues (2015) and Keino and colleagues (2009) also found communication dramatically improved by AAI involving horses.

2.4.2.3 Benefits related to motivation

Motivation has also been noted as a benefit resulting from the use of AAI for children with ASD (O’Haire, 2013a). A lack of motivation and engagement is one of the challenges involved in educating children with ASD (Koegel et al., 2010). The ability to increase motivation therefore has important application in ASD intervention.

According to Smith and Dale (2016), teachers felt that AAA involving a dog within an ASD classroom encouraged learner engagement and helped the learners to remain relaxed and clam, but focused. The motivational benefits were also noted by Stevenson and colleagues (2015) in their study involving one-on-one interactions with a dog and their teacher. They found that during the interaction, the children displayed increased motivation to engage socially with their teacher. They also determined that the motivation was increased when the child was allowed to guide the session (Stevenson et al., 2015). In addition to this, they found that some, but not all of the effects noted during the interaction did generalise to the classroom after the AAI sessions (Stevenson et al., 2015).

Increased motivation is also indicated by an improvement in mood and energy (O’Haire, 2013a). Silva and colleagues (2011) noted a significant increase in smiles and affectionate behaviour in children with ASD when they were interacting with a therapy dog. This is supported by research by Martin and Farnum (2002), which compared the interactions of children with ASD and therapists when in the presence of a live dog, a stuffed dog and a ball. When the dog was present, the children displayed a more playful mood and were more inclined to be engaged in the activities. In addition to this, a study by O’Haire and colleagues (2014) found that the motivational benefits extended beyond the AAI sessions. When guinea pigs were introduced into the classrooms of children with ASD, one of the results was an increase in the children’s enthusiasm for attending school.

Although many of the studies considered the excitement experienced by the participants to be useful, Rederfer and Goodman (1989) noted that some participants in their study became over excited and had to leave the room. Martin and Farnum (2002) also noted increased flapping during interaction with a dog, which can be an indication of over-excitement.

2.4.2.4 Benefits related to behaviour

A further benefit discussed in the literature review by O’Haire (2013a) is the reduction of problematic behaviour. The problematic behaviours associated with ASD include self-harm and aggression, which make management of the disorder difficult, and interfere with education (Fakhoury, 2015).

Rederfer and Goodman (1989) found that interacting with a dog increased the prosocial behaviour of children with ASD, and decreased the inappropriate behaviours, such as flapping, spinning and jumping. These results are supported by Silva and colleagues (2011), who found that a child with ASD showed fewer episodes of aggressive behaviour when interacting with a dog. This included aggressive behaviour towards the therapist and towards inanimate objects. They also found that the aggressive episodes that did occur were of shorter duration and recovery was quicker when the dog was present (Silva et al., 2011). There is further evidence of decreased problem behaviour in a study by O’Haire and colleagues (2014), which found that ASD children displayed increased social behaviour and fewer problem behaviours when participating in AAA with guinea pigs.

2.4.3 Reasons for limited use of AAI for ASD

One of the deterrents to widespread use of AAI for ASD is a lack of definitive evidence of the intervention's efficacy for this population (Davis et al., 2015). Many of the studies on this subject are restricted by methodological weaknesses (Davis et al., 2015; O'Haire, 2013a). These methodological weaknesses include lack of experimental design, confounding variables, no measure of treatment fidelity and insufficient detail to allow for the replication of the study (Davis et al., 2015). While the current studies provide evidence to suggest that there are benefits to be gained from the use of AAI for ASD, further research is needed to establish AAI as a widely accepted form of intervention for this population (O'Haire, 2013a).

A study by Smith and Dale (2016), which investigated Australian teachers' perceptions of the use of AAA in ASD classrooms, revealed further barriers to the use of AAI within ASD classrooms. The teachers in that study felt that there was a lack of knowledge regarding the use of AAA in ASD classrooms. They also commented on the lack of evidence in support of this intervention (Smith & Dale, 2016). They further cited concerns regarding animal welfare and the children's reactions and the possibility of allergies (Smith & Dale, 2016).

A further consideration in the use of AAI for ASD is that, while many benefits of this form of intervention have been noted, very little information is provided on the generalisation of these benefits to different settings. One of the challenges in interventions for ASD is the generalisation of newly-learned skills and concepts (Bellini et al., 2007; Brown & Bebko, 2010). The studies which did discuss this feature found that some of the changes noted did generalise slightly, but most did not. According to a study by Redefier and Goodman (1989), the beneficial changes noted in children with ASD during AAI gradually degraded once the dog was no longer present. Similarly, Stevenson and colleagues (2015) found that improvements in social behaviour did not readily generalise to the classroom after individual AAA sessions with the teacher.

2.5 THEORETICAL FRAMEWORK

The positive effect that animals have on humans is based on the relationship between humans and animals, often termed the human-animal bond (Fine & Beck, 2010). There is currently no single, widely accepted theory, which can fully explain this bond, although many different theories have been proposed (Kruger & Serpell, 2010). The two theories selected to provide a framework for this research are the biophilia hypothesis and the social

support theory, as the combination of these theories provides the best framework for understanding the phenomenon of classroom-based AAA for adolescents with ASD.

2.5.1 Biophilia Hypothesis

The biophilia hypothesis, first introduced by Wilson in 1984, proposes that humans have an innate affinity for living things, based on our evolutionary dependence on animals and other living organisms (Kruger & Serpell, 2010). In the past, the likelihood of human survival was enhanced by attending to the behaviour of animals as this could provide cues of danger or safety (O’Haire, 2010). Therefore, if animals were calm and peaceful, it was safe for humans to relax. According to the biophilia hypothesis, humans have retained this attraction to the calming effect of animals (O’Haire, 2010).

Research supports the concept that the presence of calm animals decreases stress. Beck and Katcher (1996) found that watching fish swim in an aquarium was an effective means of reducing the anxiety of adults before dental surgery. Similarly, the presence of a friendly dog helped to decrease the behavioural distress displayed by children during a simulated medical examination, as compared to the simulated examination without the presence of the dog (Nagergost et al., 1997).

The ability of animals to decrease stress has also been noted in individuals with ASD. A study by O’Haire and colleagues (2015) found that although children with ASD experienced increased physiological arousal, as measured by higher skin conductance, during social interaction, this arousal was reduced by the presence of a guinea pig during the social interaction. As anxiety is often associated with ASD, and contributes to the challenges associated with ASD (Lai, Lombardo, & Baron-Cohen, 2014), the ability to calm is very important for this population.

The biophilia hypothesis suggests important implications for the use of AAI, particularly for individuals with ASD. If humans are innately attracted to living things, animals will be more attractive as objects of interest and therefore increase the likelihood of engagement (Melson & Fine, 2010). It is therefore possible to predict that the inclusion of an animal in a learning environment will increase the participation of the learners (Melson & Fine, 2010).

A further implication of the biophilia hypothesis is that the presence of a friendly animal can assist in creating a calm and accepting atmosphere (Melson & Fine, 2010). If an individual feels relaxed and accepted, they are more likely to participate and engage (Melson & Fine, 2010). This implication is of particular interest in an educational setting, as a calmer,

more accepting environment will assist the learners to benefit more fully from their education.

It is important to note, however, that the biophilia hypothesis only predicts immediate mood or behaviour changes, while the animal is actually present, and does not predict a generalisation of these changes to other settings, or times, when the dog is no longer there (Melson & Fine, 2010). This hypothesis is therefore limited with regards to its usefulness in understanding any long-term effect of AAA.

It is also necessary to remain cognisant of the effect of personal experiences, as well as culture, on individual response to animals when considering the biophilia hypothesis (Melson & Fine, 2010). Whilst the biophilia hypothesis suggests that all individuals will experience an innate attraction to nature, the expression of this attraction is not consistent due to the life experiences of the individual. In addition to this, the biophilia hypothesis does not limit the attraction to animals, but includes all living things (Melson & Fine, 2010). Some individuals may therefore respond better to plants, than to animals.

2.5.2 Social support theory

Social support refers to a collection of connected positive experiences resulting from social relationships (McNicholas & Collis, 2006). Social support is very important in health and well-being, as evidenced by the studies relating loneliness and lack of social support to both physical and psychological illness (McNicholas & Collis, 2006). While social support was initially the exclusive purview of humans, there is growing appreciation for animals as an important source of social support (McNicholas & Collis, 2006).

This theory suggests that animals are able to provide social support both directly and indirectly (Beck & Katcher, 2003). As animals are seen as non-judgemental and comforting, interacting with them directly is less threatening and therefore not likely to provoke as much anxiety as interacting with people (Wells, 2009). This is particularly relevant for individuals with ASD, for whom social interaction poses a challenge (Constantino & Charman, 2016). Individuals with ASD often avoid social interaction, making any increase in interaction important.

The social support theory further proposes that animals are able to offer indirect social support by encouraging increased quality and quantity in social interaction with other people (O'Haire, 2010). Studies have shown that people are more likely to approach individuals when they are accompanied by a pet (Kruger & Serpell, 2010). Animals are thought to decrease the intensity of social interactions by providing an external focus of attention, as

well as making the other participants in the interaction appear friendlier and more relaxed (Kruger & Serpell, 2010). This has potential beneficial application for individuals with ASD, as decreasing the pressure involved in social interactions can help to encourage increased social interaction (O’Haire, McKenzie, McCune, & Slaughter, 2014).

The social support theory’s relevance for individuals with ASD is enhanced by the concept of sensory-based thinking. According to Grandin and colleagues (2010), both animals and individuals with ASD make use of sensory-based thinking. Connection and communication are easier if both parties’ experiences and memories are based on sensory information, rather than on words (Grandin et al., 2010). Prothman and colleagues (2009) have also suggested that it is easier for individuals with ASD to interact with animals, as animals only make use of non-verbal communication and are therefore less confusing.

2.6 CONCLUSION

A review of the relevant literature reveals that the prevalence of ASD is concerning and there is currently no single intervention that improves all the features of ASD effectively, suggesting that more research is needed on ways to improve ASD features. With regards to AAI, the literature indicates beneficial effects for a variety of different populations. A consideration of research involving the use of AAI for ASD suggests that this may be an area that warrants further investigation.

Despite methodological weaknesses, the existing studies indicate a number of benefits resulting from this form of intervention. Further research is needed, however, to understand how AAI works and who can benefit from AAI, as well as how to enhance these benefits.

CHAPTER 3

METHOD

3.1 INTRODUCTION

An essential element in research is the design of the study, as this will determine the quality of the data and information obtained (Durrheim, 2006). The methods used in a study should be appropriate for the aims of the research, and should provide applicable data to answer the questions posed by the researcher (Durrheim, 2006). In this chapter, the researcher will provide a detailed description of the design, including the participants, the context of the study, the data collection and analysis, as well as a discussion of trustworthiness of the study and the ethical considerations and procedures.

3.2 RESEARCH DESIGN

The style of research deemed most appropriate for this study is qualitative research using a case study approach. Qualitative research aims to understand individuals' experience of their subjective reality (Williamson, 2009). Qualitative research is often used in education, as the design allows the researcher to delve into the realities in schools or classrooms (Ghesquière, Maes, & Vandenberghe, 2004). The need for the research to consider realities and individuals within classrooms and schooling systems is increased when considering the provision for pupils with special needs (Brantlinger, Jiminez, Klingner, Pugach, & Richardson, 2005).

Research into interventions for special needs individuals, particularly those with ASD, necessitates the description of complex, inter-person interactions in the context of institutional and social processes, and this can only be investigated accurately using a qualitative research design (Nastasi & Schensul, 2005). This is particularly pertinent for the current research, as the aim is to explore an intervention through the perceptions of teachers and parents of the individuals involved.

Stern and Chur-Hansen (2013) point out the lack of qualitative studies regarding the experiences of individuals involved in AAI. They suggest that more in-depth information should be obtained in this manner in order to improve our understanding of the mechanism of AAI, indicating the usefulness of this research design in this study.

Merriam (1998) describes a qualitative case study as the investigation of a unit with distinguishable boundaries. Yin (2009) emphasises the understanding of a case study as a process of research by noting that case study design allows the researcher to consider the

context of a phenomenon as they seek to understand that phenomenon. Yin (2009) also recommends that a case study design is useful for consideration of phenomena where the variables are indistinguishable from the context. These features of a case study are useful in education research, particularly special education research, where diverse factors connect in different ways and on different levels to create unique contexts (Ghesquière et al., 2004).

The use of a case study design for this research provides the researcher with the opportunity to reflect on the phenomenon of the use of AAA within an ASD classroom for adolescents within their context by considering the interconnecting factors that influence them. The use of a single class as the focus of study ensures that social interaction, an important element in ASD research that can only be understood within a group, is evident. By obtaining the impressions of both teachers and parents, a broader, deeper understanding of the class is achieved, with the aim of creating a portrayal of their perceptions of the use of classroom-based AAA for adolescents with ASD.

3.3. RESEARCH PARTICIPANTS

3.3.1 Selection of participants

Due to the specific nature of this research, purposive sampling was used. According to Robinson (2014), purposive sampling is the selection of certain subjects due to their possession of certain features or demonstration of certain characteristics.

Although this research focused on adolescents with ASD, the adolescents themselves were not interviewed directly as, due to the lack of communicative ability and the lack of expressed insight central to the presentation of ASD (Constantino & Charman, 2016), they were deemed unlikely to provide sufficient accurate data for an in depth consideration. As the observations of teachers and parents are essential in the diagnosis and continued monitoring of ASD, and are considered a useful and important source of information for many individuals with ASD (Levy et al., 2009), the teachers and parents of the adolescents were selected as the participants. One of the benefits of interviewing both teachers and parents of the adolescents is that it provides an indication of whether any effects of the AAA are generalised to other settings in the adolescents' lives, such as their homes.

The selection of an appropriate class of learners was essential to the research, as, in order to provide useful information, the class must fulfil certain requirements. The class had to be ASD-specific and provide for adolescent learners living with ASD. The adolescents must also have participated in a classroom-based AAA programme. The adolescent class of an independent school in Somerset West, created with the aim of catering for the specialized

needs of children with ASD, was selected as the appropriate class. This class consisted of 5 learners. An independent diagnosis of ASD is necessary for inclusion in the school, and therefore the adolescents in this class fulfil the criteria of an ASD diagnosis. The class had also participated in a classroom-based AAA programme in the second semester of 2015. The teacher and teaching assistant and the parents (both, where possible) of the adolescents in this class were therefore selected as participants in this study.

3.3.2 Participant information

The teacher, the assistant teacher and the parents of the adolescents were contacted via email, in order to invite them to participate and provide information regarding the study (See Appendices A & B), including the information that participation was entirely voluntary. All those approached responded positively. The parents of one adolescent, however, were unable to accommodate an interview and could therefore not participate. They did, however, give permission for information provided by the teachers regarding their child to be used in the research and the adolescent was given the pseudonym Charlotte.

The participants were asked to provide biographical information (See Appendices C & D) in order to provide an enhanced description of the sample. The parents were also asked to provide pseudonyms for their children in order to protect the adolescents' identity.

The teachers who were interviewed have been teaching for ten years or more and have worked specifically with learners with special needs, including ASD, for at least nine years. It is therefore reasonable to assume that they each have the necessary experience to discuss the use of AAA with the adolescents in their class with sufficient knowledge and insight to be valuable. Both teachers have also been involved with the relevant class for at least two years and spend an average of six hours a day in the classroom on weekdays, allowing them enough time to become adequately familiarised with the learners. The teachers will be referred to as T1 and T2 for the purposes of this study.

The parents are all employed full time, but live at home with the learners concerned and are therefore familiar with their personalities and abilities. All of the parents reported that they have pets at home, including at least one dog in each household. According to the parents, three of the adolescents have siblings, but the other is an only child. The parents also indicated that Skimpy, Janey and David are not involved in any other therapy but are currently taking various medications for ASD related symptoms, while Thom is not taking any medication, but does have regular Kinderkinetics sessions for gross motor and sensory

input. See Table 3.1 for a summary of biographical information regarding the parents and adolescents.

Table 3.1

Biographical Information of Parents and Adolescents

Participant Code	Age	Employment Status	Child Pseudonym	Age of ASD Child	Pets at Home	Siblings of ASD Child
F1	55	Full time	Thom	14 years	2 dogs	1 brother
M1	53	Full time				1 sister
F2	53	Full time	Skimpy	16 years	2 dogs	1 brother
M2	51	Full time			1 cat	1 sister
F3	44	Full time	Janey	13 years	2 dogs	1 brother
M3	43	Full time				1 sister
M4	44	Full time	David ¹	11 years	2 dogs	
					1 cat	
			Charlotte ²	13 years	2 dogs	

Note: F=father; M=mother;

¹ David's father was not available for the interview and therefore only information regarding M4 (David's mother) is provided.

² The parents of Charlotte were not interviewed but gave permission for information regarding Charlotte to be used in the research.

3.3.3 Description of the adolescents

Although the adolescents were not the participants in this study, their participation in the classroom-based AAA was fundamental to the research. The heterogeneous nature of ASD creates difficulties when discussing intervention research as the varied presentation has an impact on the experience and effect of an intervention (Mesibov & Shea, 2011). This feature of ASD increases the need for a focus on the individual in ASD intervention research (Mesibov & Shea, 2011). In her review of AAI for ASD, O'Haire (2013) also emphasises the need for a description of the characteristics of those involved in the research.

A rich description of the individuals under consideration in the research is also an important feature in most qualitative research in order to ensure trustworthiness (Shenton,

2004). Therefore a comprehensive description of each adolescent was obtained from the semi-structured interviews with the parents. This provides necessary information for the construction of a deeper understanding of the effects of AAA, and the characteristics of those for whom it is beneficial. As the parents of Charlotte were not interviewed, there is no description provided for her.

3.3.3.1 Thom

Thom's parents (F1 and M2) describe him as *“our special man. So he is a funny guy, he is a bit crazy and he is a bit different”*. He enjoys spending time with his family: *“he loves to be with us. Um, especially when we have our moments together, like the family moments, he loves”* but as he grows up, *“he wants to be a teenager going separate from his parents, do things with (brother) and (sister) and things like that but that's not always possible because they can't always deal”*.

He has limited communication abilities: *“he's not really verbal. He can of course, he can you know, he's verbal, but not in a social way. So that's what we are still waiting for, that he might be able to say “oh mom, look at the tree” or “how beautiful you look today” or whatever. That's not Thom. Thom is only about his own needs”*. When asked if he is able to discuss what he did at school, they replied: *“No, unfortunately not really. So if he comes ... then I will always go to him and ask him about “how was your day, how was school, what did you do?” So he will normally, you know, say always the same routine, literacy, reading, um, breaktime, lunch”* and *“If I ask him “how was school?”, it's always “good, good””*.

When asked about Thom's attitude to school, they responded that *“we never actually see a lot of excitement when it comes to school, but like I said, it's more that he is always ... you know, I think he likes but he, ja, he's not capable of telling us. But you see that he's more happy when he's free”*. Thom has had numerous different forms of intervention and when asked about interventions, his parents replied *“Oh, you can't ... its better to ask which interventions didn't we do. We did everything possible, I think”*. He has received *“speech therapy, physio, occupational therapy ... sacro-cranial ... reading therapy ... massage ... Son-Rise, ABA”* (Applied Behavioural Analysis), among others. The parents felt that very few of these therapies showed a dramatic effect, *“ja, we keep on trying, of course, everything which comes and you read about for something new then we are open for it”*.

3.3.3.2 Skimpy

Skimpy is described by her parents (F2 and M2) as “*high-functioning. She enjoys everything. You never ... it’s very difficult to know what Skimpy really really likes, because, the other thing, she is very ... she likes copying, so ... and planning big, so, it’s ... you can’t tell what Skimpy likes because if she likes something then someone comes and says, um, “no, we like that”, then she goes with that, then she doesn’t like that*”. In terms of social interaction, “*she’s, like I said, high-functioning, funny because she is opposite of the quiet autistic kids. She loves people. She interacts with anyone. She talks non-stop. She drives me nuts. Um, she ... we try to engage her in conversation, but the problem is she wants conversation on her terms ... she lives on her own world, like all autistic kids*”. “*I think the challenge we face, you know, in our interaction with her, is having appropriate conversations ... she repeats the same thing, she can repeat the same thing over and over. So, so we have to spend a lot of time trying to teach her to have an appropriate conversation for the setup or for the occasion*”.

Although Skimpy is quite talkative, she too has communication difficulties: “*What I have noticed is that she doesn’t have the vocabulary or, she doesn’t how to deal with something that she doesn’t like*”. Skimpy enjoys talking to her family, but does not know when to stop: “*and she doesn’t understand what is bothering someone, she doesn’t understand why you don’t want to listen to her, like for example if you say ... if you say you are irritating me, it doesn’t mean anything to her. She has no clue of whatever you are talking about. So to her it’s just a lot of words with no meaning*” and this extends to her interactions with her siblings: “*I think sometimes it becomes tiring, because we find that her sister will answer, answer, and then it gets to a point where you can see she’s getting irritated*”.

Skimpy has attended a number of schools in an attempt to find the right placement for her: “*we took her to another school, which they said it was, um, a remedial kind of special school, but it did not work out. So we took her out ... we have gone up and down with her*”. Her parents also indicate that she has had “*speech therapy, um, occupational therapy and she had remedial teachers also*”.

3.3.3.3. Janey

According to her parents (F3 and M3), Janey is *“a very loving, kind girl, um, with the most beautiful heart. Um, she’s, um, she’s got the most pure heart of any person I’ve ever met, I ... she’s amazing”*, although she *“can get very agitated at times, um, to the extent that you, it’s very difficult to calm her down”*. *“She’s obviously autistic, with all the autistic characteristics”*, but she wants to be part of normal life. She wants to be part of a swim team and netball and ... *ja, she sort of seeks normality”*.

Her ability to interact with her family is reduced as *“she’s got limited reason so it’s very difficult to almost sometimes impossible to reason with her and her brothers and sisters are having great difficulty doing that”* and *“her communication with her brothers and sisters, uh, is definitely a challenge. Um, she’ll, she’s got the ability to stir very quickly and her younger brother’s 7 years old and that’s huge conflict, sometimes from early in the morning. She also has limited communication ability as “it’s difficult for her to convey, uh, she’s got a bit of a speech challenge, uh, and it’s difficult for her to describe the thing, she needs to describe, sort of, the picture around it, uh, um, and, ja, you need a lot of patience to sort of sit and listen and wait till she conveys something”*.

Janey is also unable to discuss what she does at school: *“So I pick her up and say “how was your day?” she’ll say “it was nice” so I’d say “what did you do?” “ummm”, she cannot. So she’s not able to tell “we painted” or “we swam” or you know, I think she might say “we did swimming”, although I know that they didn’t. It’s just to say something”*.

Decisions regarding education for Janey were complicated as *“schooling was, was traumatic”*. *“She went to a lot of schools. We first tried a normal school, mainstream. Um, ja. Since pre-primary, we knew that there was something wrong ... every quarter, we would call, be called in by the teachers to ... to let us know that she’s underperforming, she’s battling. And so, she ... schooling was a challenge. After a while, we got used to it, um, moved her from one school to another”*. With regard to interventions that had been tried for Janey, her parents responded *“plenty”* and *“lots”*.

3.3.3.4 David

David’s mother (M4) calls him a *“loving boy”* but also notes that his *“hormones is kicking in now”*. His social interaction is improving and *“he likes other people and he’s trying to socialise better and more”*. He does have speech, but *“he will talk, but again, also, mostly he will talk about a DVD, and we try and tell him let’s talk about something else ... if*

he wants something, he comes and asks” but “we can’t like talk “how was your day? My day was fine, how was your day?” That doesn’t work”.

She describes his schooling as “a roller coaster. From he was small, I struggled to find a place for him”. She also tried different therapies that were suggested: “do speech therapy, do occupational therapy. It doesn’t work on some children ... it was like wasting money, throwing it in the toilet and I have nothing against speech therapists, but ... I can’t tell you how many doctors, specialists, naturalists, herbalists we went to. But I mean, that’s ... a lot of parents do that”.

3.3.4 Description of the class

In addition to a description about the individual learners, it is also important to understand the dynamics of the class as a whole, in order to provide context for perceptions of the AAA within the classroom. The class chosen for this research consists of one teacher, one assistant teacher and three girls and two boys between the ages of 11 and 17. The teacher and assistant teacher work closely together in order to provide the structure and individualised attention necessary for students with ASD to progress. Due to their ASD and how this affects their academic ability, the learners do not work according to the national curriculum, but are each provided with an individualised educational development plan which guides their level of work.

Although the learners work on the same subject at any given time, the work is adjusted to suit each particular learner’s capabilities. The learners often need substantial assistance to master new concepts and develop new skills, but are all able to sit at a table and do some level of work independently. The average day includes a combination of academic work, role-play, social skills activities and free play, aimed at equipping the students for caring for themselves in their adult life. The students also participate in a number of activities offered by the school, such as drumming, music and gross motor exercises.

3.3.5 Description of AAA programme

The AAA programme was supplied as part of the curriculum of the school. The AAA itself was in no way the responsibility of the researcher, and therefore does not form a direct part of the methodology of this research, but in order to obtain a complete understanding of the phenomenon within its context, a description of the AAA is necessary. As an employee of the school, the researcher was present for all the AAA sessions, allowing for a clearer and more complete description.

AAA was introduced as one of the activities offered by the school from the second semester of 2015. The AAA took the form of weekly visits from a volunteer and her dog (Gemma) for about an hour. The volunteer and the dog were provided by Pets as Therapy (P.A.T). P.A.T is a non-profit organisation that arranges therapeutic visits by volunteers and their dogs to a variety of different associations or establishments (Pets As Therapy, n.d.). In order to be eligible for visits, the volunteers and their dogs must first be assessed in order to guarantee that the dog is healthy and has an appropriate temperament and that the volunteer and the dog as a team are suitable for the institution which they will be visiting (Pets As Therapy, n.d.). This ensures the safety of the dog, as well as the safety of those who will benefit from the visits. The team selected to visit the class in question was made up of a woman and her adult female golden retriever dog, a team who had previously visited other individuals with special needs.

The visits from the dog occurred most Wednesdays between 12:45 and 13:45, except during school holidays, when there were no visits, or when the volunteer was unable to attend. Where possible, missed visits were rescheduled. The initial visit provided the opportunity for the learners to become accustomed to the dog and the volunteer, and ensure that none of them were scared or uncomfortable around the dog. In the subsequent sessions, the learners participated in a number of activities with the dog, including walking the dog, reading to the dog, feeding the dog, giving the dog simple commands, singing to the dog, drawing pictures of the dog, playing board games in the presence of the dog, giving a short oral presentation to the dog, and throwing toys for the dog, among others. The visits occurred either in the classroom or outside, depending on the weather and on the nature of the activity.

3.4 DATA COLLECTION

As the aim of the research was to gain insight into the perceptions of the teachers and parents of the adolescents involved, it was necessary to select a method of data collection that would allow the teachers and parents to express their subjective experiences. An in-depth semi-structured interview format was chosen, as this provides the researcher with the opportunity to delve into the individual, lived experiences of the participant in relation to the research question, while still providing the participant with the opportunity to express him or herself freely (DiCicco-Bloom & Crabtree, 2006). The data collection only took place when the adolescents had been involved in AAA for at least six months to ensure that the data obtained was useful. The interview data was obtained using the following procedures.

On receipt of indication of interest in involvement from potential participants, the researcher then contacted the participants in order to arrange an appropriate place and time for the interviews to occur. In order to minimise the inconvenience to the participants, and increase the richness of data by ensuring their comfort, the time and venue were selected by the participants. Before any data collection occurred, the participants were required to sign a consent form (see Appendices E & F). Their permission for the interviews to be audio recorded was obtained so that interviews could be transcribed verbatim and analysed at a later date.

The participants were offered the option of either English or Afrikaans for the interviews to ensure that they were able to provide rich data, but all expressed their preference for English. The teacher and assistant teacher were interviewed separately. These interviews lasted between 40 and 60 minutes. Where both parents of an adolescent were interviewed, they were interviewed together, providing three interviews with both father and mother and one interview with just the mother of the adolescent. Most interviews lasted between 35 and 60 minutes, but one interview lasted just over 20 minutes, as the parents felt they had shared all the information they could and they needed to leave for another appointment.

The interviews were performed according to interview guides, which were developed through a detailed reading of the current research on the subject. Due to the slightly different nature of their relationship to the research, separate interview guides were developed for teachers (see Appendix G) and parents (see Appendix H). The interviews began with general questions about the adolescents, in order to allow the participants to relax, and the questions gradually became more focused on the AAA.

The open-ended nature of the questions in the interview guide provided the participants with the opportunity to answer in their own words, and therefore invited an increased level of disclosure of their experiences (Turner, 2010). Open-ended questions also provide the opportunity for follow-up questions to probe further or clarify information (Turner, 2010). As the interviews were semi-structured, the interview guides ensured that important, predetermined areas were covered, but the researcher had the freedom to delve deeper into opinions or interests particular to individual participants (DiCicco-Bloom & Crabtree, 2006). When creating the interview guides, the researcher made every attempt to avoid creating leading questions in order to allow the participants to provide their own experiences.

3.5 DATA ANALYSIS

After collection, data must be analysed in order to create a coherent understanding of the information gathered (Turner, 2010). In this study, the data collected through semi-structured interviews was analysed using thematic analysis, which is a method of identifying patterns within the data that describe the phenomenon under investigation (Braun & Clark, 2006). As thematic analysis is not aligned with any particular theory, it provides a flexible tool for analysis, which ensures that the findings from the data are detailed and thorough, but still portray the complexity of the data (Braun & Clark, 2006). The researcher followed the thematic analysis process outlined by Braun and Clark (2006), which consists of six important phases.

The initial phase entailed the familiarization of the researcher with the data (Braun & Clark, 2006). By performing verbatim transcriptions of the interviews and reading and rereading these transcriptions, the researcher was able to become immersed in the data and thereby develop a complete view of the content. Some ideas also began to develop regarding areas of specific interest or importance in the data.

The next phase involved the initial coding (Braun & Clark, 2006). During this phase, the researcher went through the data and labelled or coded any interesting or important items. This was done systematically to ensure that all the data was coded fully, using a highlighter and notes in the margin of the page. Where necessary, more than one code was identified per item.

When the initial coding was complete, codes were organised and arranged into themes, the third phase of analysis (Braun & Clark, 2006). Searching for themes involved considering the similarities and differences between the different codes and using the similarities to combine different codes into themes.

The themes identified were then reviewed and refined (Braun & Clark, 2006). This involved considering each theme in light of the supporting extracts from the data and determining whether these extracts formed a coherent pattern, as well as rereading the data to ensure that all codes relevant to the themes have been included.

The fifth phase involved careful reflection on the themes in order to further refine them, as well as naming and describing them (Braun & Clark, 2006). The individual themes and their supporting extracts were considered with regard to the research question and other themes. The hierarchy of the themes was clarified and sub-themes were identified and a detailed analysis of each theme was created.

The final phase was the reporting of the results of the analysis (Braun & Clark, 2006). The results, in the form of the final, well-defined themes, and their supporting extracts will be described in the next chapter.

3.6 ENSURING TRUSTWORTHINESS IN THE RESEARCH

The usefulness of research depends on the confidence that can be placed in the knowledge produced by that research (Thomas & Magilvy, 2011). Within qualitative research, this is referred to as the trustworthiness of the research (Shenton, 2004). Although there is disagreement about how best to ensure trustworthiness, most qualitative research relies on a number of strategies to both ensure and demonstrate the trustworthiness of the study (Johnson & Waterfield, 2004). Within this research, these strategies will be discussed according to four components that can be considered important in qualitative research, namely credibility, transferability, dependability and confirmability (Thomas & Magilvy, 2011).

3.6.1 Credibility

Credibility refers to the accuracy with which the results of the research represent the experiences or perceptions of the participants (Thomas & Magilvy, 2011). Credibility, therefore, reflects how well the results of the research are able to respond to the questions posed in the research (Shenton, 2004). The strategies used to enhance the credibility of this research include peer debriefing, member checking and triangulation.

One way of ensuring that the research accurately reveals the experiences of participants is to involve the participants themselves through member checking. Member checking refers to asking the participants to confirm that the researcher's interpretation reflects their intended communication (Johnson & Waterfield, 2004). This serves to confirm that the researcher has remained true to the data and interpreted it in a valid manner (Johnson & Waterfield, 2004). This was implemented in this study both during the interviews, by summarising and recapping important points, and during analysis, by providing selected participants with feedback in the form of a written description of the themes and ideas that had emerged from the data. The participants selected for the feedback were the teachers, as they contributed more data, and two of the parents who were available at the time. They were asked to comment on this before the finalisation of the results to ensure that the results accurately reflect their experiences.

Peer debriefing provides another important method for improving credibility. Peer debriefing entails consultation with professional colleagues who have experience either in the field of research, or in the style of research (Nastasi & Schensul, 2005). The discussion of the research and analysis provides alternative perspectives that can help the researcher to define and improve aspects of the research (Shenton, 2004). To this end, the researcher consulted her supervisor regarding the analysis process. The themes that emerged were also discussed with a colleague with more than 10 years of experience working in the field of ASD in order to provide an objective but experienced perspective. In order to maintain confidentiality, no names or identifying features were mentioned during these discussions.

Credibility can be further enhanced by triangulation. Triangulation is the inclusion of data from different perspectives in order to obtain a more complete understanding of the phenomenon (Johnson & Waterfield, 2004). Within this research, triangulation took the form of gaining the different perspectives of the teachers and the parents. This effect was further enriched by interviewing both parents of a child, where possible, as well as both teachers in order to achieve a richer understanding. The triangulation was further augmented by the researcher's presence at all the AAA sessions, as this allowed her a deeper understanding of the participants' perspectives.

3.6.2 Transferability

The extent to which the research and the findings thereof could be extended to a different context is known as the transferability (Thomas & Magilvy, 2011). Due to the many contextual factors that affect qualitative results, it is unlikely that the research can be replicated, but rather the aim is to provide enough descriptive information to allow other researchers to establish the similarity to other contexts (Shenton, 2004).

In this study, transferability is addressed by a comprehensive description of the participants and the context of the study, as well as the methods used for the research and the methods used to ensure trustworthiness.

3.6.3 Dependability

Dependability is concerned with the decisions and choices made throughout the research process (Thomas & Magilvy, 2011). A methodical explanation of the decisions and actions entailed in the research provides transparency and improves the trustworthiness of the research (Johnson & Waterfield, 2004).

The description of the methodology of this study, as provided in Chapter 3, offers a detailed clarification of the decisions made and the procedures followed during the research process.

3.6.4 Confirmability

Confirmability refers to the extent to which the results yielded by the study reflect the experiences and perceptions of the participants, rather than the preferences of the researcher (Shenton, 2004). Some measure of subjectivity is inevitable in research, due to the human nature of the researcher (Johnson & Waterfield, 2004). Rather than ignore this subjectivity, the experiences and beliefs of the researcher can be useful in the research if they are acknowledged and identified (Johnson & Waterfield, 2004). This is done through reflexivity, which requires the researcher to consider her own experiences, preconceptions and agenda throughout the research process (Johnson & Waterfield, 2004).

3.6.4.1 Reflections on the researcher's relationship with participants

In this study, the researcher not only designed the study, but was also the instrument for data collection. Due to this central role in the research, it is important to describe the researcher's relationship with the research focus, as well as with the research participants.

The researcher has worked with individuals with ASD for more than eight years and is therefore conversant with the disorder. Her experiences while working with learners with ASD contributed to her interest in the research topic and also provided the site and opportunity for the research. She is currently employed at the school which the selected class of learners attends, but is the teaching assistant in another class. She therefore has regular contact with the teachers and the class, and is acquainted with the parents involved, but does not ordinarily interact with them.

The researcher was initially concerned that her position as employee at the school attended by the adolescents might affect the freedom with which the parents shared with her, but this was found not to be the case. The parents responded positively and openly and seemed to value the interest in their child.

The researcher's position at the school was also found to be advantageous as she was present for the AAA sessions and could therefore observe and experience the sessions. This improved the researcher's understanding of the AAA and assisted in the interviews and data analysis, as she had a deeper understanding of the events and interactions discussed by the teachers and parents.

Other factors which had the potential to affect the rapport between the researcher and the participants were differences in age, race, culture, gender and education, as these can affect how the participants relate to the interviewer during data collection. As a young, white female in the process of writing a master's thesis, the researcher had initial concerns about her ability to build rapport with participants who differed in age, culture or gender. This, however, did not prove to be a problem during the interviews, as the common interest in the learners and in ASD helped to transcend any barriers created by these differences.

Another consideration with regards to the interaction between the researcher and participants was the possibility of the impact of social desirability on their responses. As the participants were aware of the research and the aims thereof, they may have been more likely to give the answers they felt the researcher wanted. In an effort to counteract this possibility, the researcher reassured the participants throughout the interviews that it was important for the research that a complete view of their perspectives was obtained, rather than just the positive aspects. The researcher also attempted to remain cognisant of the possibility of the effect of social desirability during the analysis of the data.

3.6.4.2 Reflection on feelings and experiences during research process

Due to the researcher's position at the school, her presence in the AAA sessions and her prior acquaintance with the participants, as well as the adolescents, reflection was an important part of the research process. During the sessions the researcher interacted with the adolescents and the dog, but did not interfere with the activities unless the adolescents needed some guidance in appropriate interaction with the dog. In order to separate her own experiences from those of the teachers and parents, the researcher made extensive use of a journal throughout the process.

After the AAA sessions, the researcher used the journal to reflect on her experience of the AAA and how this affected her perception of it. She also considered carefully how she felt each adolescent responded to the AAA dog and noted this in the journal. In this way, she acknowledged her own opinions regarding AAA, which helped her to prevent her opinions affecting the research.

During each interview, the researcher made notes, both to provide her with more complete information regarding the interviews, and to allow her to remain aware of her own opinions about the matters discussed by the participants. She also made use of the journal after each interview in order to document her experiences during the interview and understand how her opinions affected her interactions with the participants.

In addition to the use of notes and a journal, the researcher discussed her experiences with colleagues and other researchers, giving due regard to ethical considerations. This allowed her to gain perspective on her experiences and opinions.

3.7 ETHICAL CONSIDERATIONS AND PROCEDURES

Ethics is an essential element of qualitative research due to the nature of the research as an investigation of people's lived experience (Jelsma & Clow, 2005). Research requires a balance between the researcher's desire to advance the knowledge regarding their subject of interest and the need to protect the rights of the participants involved (Orb, Eisenhauer, & Wynaden, 2001). The inclusion of ethical procedures within research ensures that any possible harm to participants is prevented or reduced (Orb et al., 2001). The ethical procedures implemented in this research will be discussed next.

In order to ensure the ethical procedures that form part of this study were sufficient to protect the participants, ethical clearance was sought and attained from the Health Research Ethics Committee of Stellenbosch University (HREC): Human Research (Humanities) Committee before any contact was made with participants. The ethical clearance number for this study is SU-HSD-001092 (see Appendix I). Permission to approach and interview the teachers and parents and discuss events which occurred at school was obtained from the school (see Appendix J).

Informed consent represents an important method of insuring that participants are able to exercise their autonomy and act according to their own informed decisions (Orb et al., 2001). This refers to the obligation placed on the researcher to inform the participants of their rights with regard to the research, including their right to be informed about the aims and focus of the study, the right to choose whether to participate in the study or not, as well as the right to withdraw from the study at any time without repercussions (Orb et al., 2001). In order to accomplish this, each participant was required to sign a consent form (see Appendices E & F), containing information regarding the study and their right to withdraw, before any data was collected. This form was also explained to the participants in person and they were encouraged to ask for clarification. Their permission for the interviews to be audio recorded was also obtained before the interviews began.

Confidentiality is an essential contributor to ethical conduct, particularly in qualitative research, as the aim is to obtain rich, descriptive data pertaining to participants' lived experiences, and this is likely to contain sensitive information (Jelsma & Clow, 2005). Within this study, participants were assigned a code name for use in interview transcriptions

and analysis, rather than identifying them by name. The parents were also asked to identify a pseudonym for their child, to conceal the names of the adolescents. Any other identifying features were also removed from the transcribed data to ensure that none of the participants are recognisable.

In order to maintain the confidentiality, the digital data was stored in a password-protected folder on the researcher's computer and any hard copies were stored in a locked cabinet. Only the researcher had access to the data before identifying features were removed and only the researcher's supervisor and colleague had access to transcribed data after the removal of identifying features. The data will be stored safely for five years and then destroyed.

Non-maleficence is a guiding principle for qualitative researchers, as the benefits of the research must be balanced with the risk of harm to the participants (Houghton, Casey, Shaw, & Murphy, 2010). One of the risks inherent in the use of qualitative interviews for research is the possibility that participants may become distressed through recounting emotional experiences (Houghton et al., 2010). The possibility of distress to participants due to the emotional nature of the content was considered in this study, but as the adolescents have all had their diagnoses for more than five years and the parents receive continuing support from the school, the risk was considered minimal. In the event that one of the participants did become distressed in the process of an interview, they would have been referred to a registered counsellor, with the researcher carrying the cost of the initial debriefing session. This proved unnecessary, however, as none of the participants showed any distress during the interviews.

3.8 CONCLUSION

This chapter provides a detailed description of the data collection and analysis methods used in this research, as well as the procedures employed to ensure that the research is trustworthy and ethical. The utilization of these methods provided the results, which will be described in the next chapter.

CHAPTER 4

RESULTS

4.1 INTRODUCTION

This study sought to investigate the use of classroom-based AAA for adolescents with ASD by investigating the perceptions of the teachers and parents. The insights of the participants were explored using semi-structured interviews and these interviews were then transcribed to transform them into a more accessible form of data. A thematic analysis of these transcriptions provided the results, which will be reported in this chapter.

4.2 THEMES AND SUB-THEMES

The thematic analysis of the transcribed interviews revealed that within the data, certain perceptions were common among the participants and these form the three main themes and their sub-themes. These are displayed in Table 4.1. These themes and sub-themes will be outlined below and quotations from the interviews will be provided to allow the participants to provide substantiation for these themes in their own words. Italics will be used for quotations to ensure clarity.

Table 4.1

Themes and Sub-themes Identified

Theme	Sub-theme
Perceived benefits of AAA	Communication benefits
	Engagement and motivation benefits
	Social interaction benefits
	Emotional benefits
	Behavioural benefits
Opinions regarding the implementation of AAA	Teachers' recollection of activities
	Assumptions regarding the role of the AAA dog
	Impact of scheduling and preparation
Teachers' and parents' evaluation of AAA	Prior knowledge about AAA
	Factors which influenced the learners' experience of AAA
	Impression and future use

4.2.1 Perceived benefits of AAA

The main theme which arose from the analysis was the perception of benefits, both while the AAA dog was present and generalised benefits which were perceived at school or at home when the AAA dog was not present, but during the time of the implementation of the AAA.

Many of the benefits were noted as immediate reactions to the AAA dog and were therefore discussed predominantly by the teachers, who were present for the AAA sessions. Some benefits, however, were perceived when the learners were at home and therefore discussed by the parents. The parents were also able to provide some necessary context for the benefits when discussing their child's abilities and challenges.

4.2.1.1 Communication benefits

The teachers found the AAA dog very useful in that it was able to stimulate communication. This was partly because the AAA dog provided a topic of conversation that captivated the learners' interest and made the conversation more practical for them due to the

presence of the AAA dog. The dog also provided the opportunity to initiate discussion about the learners' own self care in comparison to that of the AAA dog.

They would come up with conversation or they say something and then we'll support them to talk about whatever they wanted to ... to say with regards to Gemma (T1).

We could focus also a lot on animal ... on pet discussion ... taking care, but we could also bring it into ... into how the kids take care of themselves and how they need to eat and how animals eat ... or how we should ... you know, all those things, we could bring into ... into the conversations (T1).

The AAA dog was also able to stimulate conversation by providing someone for the learners to talk to. The teachers felt that the learners believed that the AAA dog was communicating with them on a verbal level and continued the interaction on this level. Individual learners were also described as talking more than usual when conversing with the AAA dog, with David's interaction with the AAA dog being characterised as "he talked to her quite a lot" (T2).

The volunteer was saying "what does Gemma think?" but they really seemed to, um ... respond to that and actually believe that the volunteer was communicating with Gemma. She would say "oh look, there's whatever ... and the children would engage on that topic and talk to Gemma, talk to Gemma about it (T2).

The AAA dog also provided the opportunity for the teachers to work on the communication skills of the learners, in a more direct manner by instructing them as they communicated with the AAA dog and allowing the AAA dog to provide feedback in her response or lack thereof. One of the teachers felt that there was a definite improvement in the learners' communication skills, including speaking and listening, particularly when interacting with each other.

That was actually working a lot on how to communicate, you know, loudly, expressively and, um, ja, to see if Gemma interacts (T1).

That's something that I've noticed, that they actually listen to each other and respond better to each other (T1).

The communication regarding the AAA dog was not limited to the AAA sessions, but occurred throughout the school day, in the form of requests for information about when the AAA dog would be coming back, as well as comments about the AAA dog.

They'll ask ... uh ... mainly Skimpy and Janey will ask, uh, is Gemma coming this week? Or is Gemma coming today? Or is Gemma coming later? (T2)

Skimpy mentions her all the time ... and the other children do talk about her. Thom will occasionally randomly just say "Gemma" and you never really know what he's trying to ask or say. Um, David will talk about ... uh, he'll sort of tell a little story ... that's how David tends to communicate ... Skimpy asks quite frequently about Gemma and about the volunteer. And then Janey asks about her as well. And the kids talk to each other about the dog. (T2).

The parents further reported that there was some communication regarding the AAA dog after school hours at home. Skimpy, who is more verbally able, talked to her parents about the AAA dog "all the time" (M2), while Janey "once said something" (M3) and David once mentioned "Gemma" (M4). The limited nature of the some of the learners' communication regarding the AAA dog should be understood within the context of the general communication abilities of that learner, as the parents indicate these learners are usually unable to communicate anything regarding their experiences at school.

She really finds it difficult to describe any activities afterwards. It's, it's 1, I think she can't remember it, she honestly can't remember it and 2, she doesn't have the vocab or the ability to describe it (M3).

His father asks "what did you do at school today?" and he never stops and I asked him don't ever stop asking him because you don't get a answer. And he gets frustrated and I get frustrated, but just keep on asking (M4).

4.2.1.2 Engagement and motivation benefits

Another perceived benefit of interacting with the AAA dog was the increase in motivation and engagement, which the teachers noticed in the learners during and after the AAA sessions. The teachers remarked on an increased engagement with the tasks required of them while the AAA dog was present, saying “*They were engaged in what was happening and they were all eager to take part*” (T2). The teachers also noted a clear enthusiasm for engagement directly with the AAA dog, as exemplified by the comment “*They really tried to engage with Gemma*” (T1).

In addition to the discussion of general engagement, social engagement was specified as an area of interest. One of the teachers remarked on the learners’ enjoyment of the AAA dog and their social engagement, as well as a general increase in the learners’ engagement with their peers during the implementation of the AAA sessions.

The children really enjoyed the, um, animals and I know they, they, they engage socially more and we, we actually have seen it (T1).

Enjoyment and excitement, important components in engagement, were also noted. The teachers found that the learners enjoyed the visits from the AAA dog, and displayed excitement each time she arrived. The pleasure and amusement associated with the AAA dog made the learners more accessible for the teachers, encouraging increased interaction.

The children loved it. Um, they were always excited to see her (T2).

They were very receptive. They were ... they enjoyed it ... they liked it ... they were open and they were actually more relaxed and not so anxious ... They have a big laugh ... they enjoy it (T1).

Although the excitement was generally considered advantageous for the learners, one of the teachers indicated concern that the excitement might lead to overstimulation, which affected the group’s participation.

It was such an exciting thing for Janey, and she was so stimulated that she kind of lost a bit, lost control of her ... how to say it ... she was very excited so she was kind of dominating the ... um ... the sessions (T2).

The improvement in engagement is closely related to the motivation which stimulates the learners to participate in activities. This was particularly evident in the increased motivation for physical activity which was referred to by the teachers. The inclusion of the AAA dog in physical activities such as walking, which is not a preferred activity for some learners, made the activity more enjoyable and therefore lessened resistance.

Especially with walking with the lead, that helped a lot. Also encouraging them to be more active. So with that was very good for some children that needed that ... um, movement motivation to do something. You know, go for a walk with the doggie, with Gemma (T1).

Although the learners showed a definite improvement in engagement during the AAA sessions, it is important to note that this effect was still tempered by the symptoms associated with ASD, such as inattention. One of the learners who experiences difficulty with focussing for extended periods of time was similarly challenged when interacting with the AAA dog and this affected her engagement with the AAA dog, despite her enjoyment of the AAA sessions.

She (Skimpy) enjoys the interaction. She does sometimes just lose, um, focus quickly, but that is a problem across the board of her, um, profile. So, she'd engage and then she might be, um, distanced and then she might not feed, or not read properly. That whole engagement part, but she does enjoy animals, and um, but she loses interest very quickly, whether it's focus or just because she's thinking of something else (T1).

The motivational benefits associated with the AAA dog extend beyond immediate motivation to participate in activities due to the enjoyment experienced. The AAA sessions also improved motivation for attending school, as expressed by the more verbal learner, who was very upset about missing out on an AAA session due to having to leave school before the session began.

The only thing I know that she looked forward to Gemma coming to school, she ... I think she missed it once and she was not happy. And then she told me Gemma, oh, she

is coming next week or whatever, but that day, she was, when I picked her up, she was not happy because she had missed Gemma (M2).

In addition to the motivational benefits expressed about the whole group, the teachers were also interested in the motivation and engagement shown by one particular learner. When discussing Thom's general behaviour, before the AAA programme was introduced, Thom was described as "easily bored" (T2) as "it's very difficult to stimulate Thom because really all he cares about is going home" (T2). This affected the whole learning environment as "his behaviours and noise can be very disruptive" (T2). "Thom just wants to get through the day" (T1) so "it's difficult to interest him in other things" (T2). Thom's engagement with the AAA dog was therefore considered significant.

I thought that Thom would ... would not engage at all and he ended up engaging (T2).

I mean, I wouldn't say Thom, there were major interactions, but um, the fact that Thom interacted with the dog at all was surprising to me to be honest. Um, he even one day spontaneously went up to her and said hello and patted her on the head, which was very surprising (T2).

His parents, who described Thom as "only about his own needs" (M1), also commented this learner's lack of motivation on. This was exemplified by his father who commented "he will set up the table because he wants to have dinner ... he loves to eat" (F1). It was therefore remarkable that there was a noticeable difference in the learner's enthusiasm for taking the family dog for walks. While they did express some equivocation as to whether his enjoyment was related to interacting with the dog directly or if he was motivated by the sense of accomplishment that he gained from holding the dog's lead, the learner did appear to be more motivated to engage in the activity.

It's just the last few months that we really could see a difference in Thom being outside, walking, but it is more that he, he likes to go outside. It's not about, you know, being with the dog for walks, it's just that we gave him now the role that he needs to have (pet dog's name) on the leash and that he can do his thing, and then he's proud of doing, you know, his own tasks (M1).

4.2.1.3 Social interaction benefits

Social interaction represents an important learning area, as this is an area in which the learners face great challenges. The implications of benefits relating to social interaction can only be understood when appreciated in conjunction with the challenges faced by the learners. According to the teachers, the challenges observed during the school day range from a lack of desire to interact, to trouble remembering social norms such as turn-taking.

If he (Thom) wants something, he will ask ... but other than that, his spontaneous interaction with people is very limited. Skimpy forgets boundaries a lot of the time. Janey has trouble remembering things like taking turns and not interrupting ... she forgets some social rules sometimes. Charlotte follows instructions and she is ... polite, but, um ... she also ... I don't think that it's because she has internalised the rules of social interaction (T2).

These challenges regarding social skills were expounded upon by the parents who discussed their children's social interaction at home and how this affected their lives and those of their family members. The lack of social skills portrayed by the learners prevented normal social interaction between the learners and their parents, as well as between learners and their siblings and also impacted on the learners interaction with the general public due to their lack of awareness of social norms.

We try to engage her (Skimpy) in conversation, but the problem is she wants conversation on her terms. She will ask you something. If ... you don't answer her the way she thinks that's what she wants, then ... she loses interest. When she asks you a question, she will never wait for the answer. Then you wonder why she asked the question (M2).

Her (Janey) communication with her brothers and sisters, uh, is definitely a challenge. Um, she'll, she's got the ability to stir very quickly and her younger brother's 7 years old and that's huge conflict, sometimes from early in the morning till late (F3).

These challenges in social interaction provide the participants' own context for the benefits observed by the teachers. Teachers indicated an increase in social engagement during

the interaction with the AAA dog, as well an improvement in general social interaction in the classroom, which the teachers felt was as a possible result of the AAA sessions.

They engage socially more and we, we actually have seen it. Um ... it is ... it is really a nice tool to implement in class (T1).

There is definitely a development, whether it's the impact of Gemma visiting or just them growing through the year, that they're more engaged with each other (T1).

The teachers were of the opinion that the AAA sessions helped the learners to work together more closely. One teacher suggested that the sessions provided an important bonding experience as it allowed the learners to gain new perspective when relating to their peers.

They more closer and talking to each other and working as a group more as a cohesive group (T1).

It's always nice when they have a positive experience together in a group and it's a bonding experience as a ... for the class. And they ... I think they get to see ... uh, like, I think everyone was kind of impressed with Thom, so that's ... they get to see a different side of their own classmates (T2).

An important component of social interaction is the knowledge of social skills. This was felt to be an area that showed improvement during the AAA sessions. The learners interacted more appropriately in terms of social skills, such as taking turns, during activities involving the AAA dog.

Definitely social skills. It helped them with their ... with some of their social skills (T2).

They took turns, so that was another skill that they worked on there, uh, their turn taking, uh, so they each had a turn to, um, to walk Gemma. And they responded well to that. There was no pushing and shoving and fighting and trying to steal each other's turns. They did that very well (T2).

In addition to the observable improvement in the learners' social skills in the presence of the AAA dog, the AAA session also created opportunities for the learners to practice their social skills, with the instruction and support of the teachers.

Don't throw the biscuit up in the air, but try and engage with the eye contact even. Try and get Gemma's attention before you kinda interact with her (T1).

And with that, um, we could give some advice how to change their voice, how to look at Gemma, how to slow down talking. And they really listened to that so they really tried to engage with Gemma (T1).

4.2.1.4 Emotional benefits

The emotional benefits of interacting with the AAA dog were also considered important. It was suggested that even just the physical contact and proximity when sitting with the AAA dog could provide emotional support for the learners.

It's something that really can be helpful. Even if it's just emotionally. If they just want to go and hug Gemma and just sit with her. You know, might not have to do anything (T1).

One of the emotional benefits discussed by the participants was relaxation. The teachers experienced the AAA sessions as having a calming effect on the learners and observed a reduction in anxiety. One of the teachers described the AAA dog as “*a calming influence*” (T2), while the other teacher felt that the learners “*were open and ... actually more relaxed and not so anxious*” (T1).

The calming effect of the AAA dog was most evident when an activity from an AAA session was compared with the same activity that occurred without the presence of the AAA dog at another time. When walking out with the learners, holding the lead and interacting with the AAA dog helped the learners to remain calm and maintain an appropriate pace.

I think they were just a lot more relaxed because Gemma was there. So, we have been on walks before, obviously, with the kids, but it's usually a little bit rushed and maybe a bit stressful (T2).

But this was very, this was, I found this to be relaxed. Even Thom held the leash. He held it really well and he walked ... he walked at a nice calm, normal pace (T2).

As individual learners in the class face different challenges, it is important to note the individual impact of the relaxation inspired by the AAA dog. The anxiety of one of the learners was considered to be “*problematic for school*” (T2) because “*once he gets in to this sort of anxiety spiral ... uh ... everything falls by the wayside ... he loses a lot of his cognitive abilities*” (T2). It was therefore important to the teachers that “*He (David) seemed less nervous. I think she (Gemma) was ... soothing for him*” (T2). This suggests that AAA might be useful for ASD individuals who suffer from anxiety.

In addition to helping the learners to relax, participants also suggested that the AAA sessions helped to build the learners’ confidence, particularly in their academics. This was attributed to the lack of pressure when performing for the AAA dog instead of for people.

So we used Gemma to help them build their confidence in academic area, um, without them having that “what am I doing, I’m talking to people” bit, now they’re actually talking to a friend (T1).

This was felt to be of particular importance for one of the learners who is “*not so confident*” (T1) as she “*still needs confidence in herself*” (T1). Her confident behaviour during the AAA sessions was remarked on, as she showed improvement in her social confidence by leading the other learners, as well as indicating improved academic confidence by speaking more fluently in what is actually her second language.

She (Janey) really just really enjoyed taking the lead with Gemma and teaching her new, wanting to teach her new tricks and new things. Um, and she also wanted to show off a little bit, so confidence came in there (T1).

Um, Janey’s Afrikaans, she’s actually speaking to her (Gemma) in English, reading in English, so that was brilliant to see (T1).

It was interesting to note that the emotional benefits resulting from the AAA sessions were not restricted to the learners. One of the teachers described her own unexpected reaction to the AAA dog, as she discovered that, instead of feeling pressured to use the time more

constructively, she actually felt more relaxed and found herself enjoying the interaction with the AAA dog.

It was actually me, in myself, it actually um ... I was like “oh, I got so much work! I got so much work now. I can’t sit around doggie now”. But you know what? It also actually also had a nice calming effect and a “rustigheid” (restfulness) so it was actually quite nice to, um, to interact and just to go for a walk and just to be around Gemma, so ja. It was nice (T1).

4.2.1.5 Behavioural benefits

Behavioural changes were also considered a noteworthy benefit of the AAA sessions. Behavioural difficulties form part of ASD and when behavioural issues occur at school, the learners must be removed from the classroom, affecting their education.

We ask the children to leave the classroom, if it really gets out of hand, let them calm down in the various area that they possibly need for themselves and then we’ll sort the situation out afterwards when everything’s calmed down (T1).

The behavioural challenges experienced at school also affect the learners and their families in their home lives, as the learners with ASD can be disruptive and can make family outings more fraught, particularly for siblings.

It’s difficult for me still when we go out and other people don’t understand. When we go out as well, he’ll jump, you know he’s got this jumping and people look funny at you. I don’t care any more. I used to think oh just calm down, but now I just switch off (M4).

He wants to be a teenager going separate from his parents, do things with (brother) and (sister) and things like that but that’s not always possible because they can’t always deal (with him) (M1).

It is within this context that the teachers viewed the learners’ behaviour during the AAA sessions. Previous experience of the learners caused one of the teachers to expect rough

and overexcited behaviour from the learners when interacting with the AAA dog, but the presence of the AAA dog improved their behaviour.

I thought they might be a little rough with the dog but they weren't, they were very gentle and sweet. And I thought it would be perhaps a little too stimulating for them but in the end, it calmed them down (T2).

The learners' behaviour towards the AAA dog also changed in the course of the implementation of the AAA. Those who had been nervous and withdrawn initially were more willing to participate in later sessions. One learner who was initially rough and aggressive with the AAA dog became much gentler as she interacted more with the AAA dog.

They uncertain, you know, they're a little bit afraid, but I think, I believe, near the end of the sessions, they're more comfortable, of ... of Gemma because she's now more your friend. Um, so ja. You, you'll see that some children are a little bit scared and they would go to the back, but it still has an impact on them eventually and they, they soften up (T1).

Her (Charlotte) movements were very rigid and very loud and very hard. In the beginning it was "be careful, be careful" and near the end, she softened. Um, I noticed that she softened up (T1).

The teachers and parents felt that the presence of the AAA dog helped to remind the learners to modulate their behaviour appropriately, as the inappropriate behaviour on the part of the learners would have an adverse effect on the AAA dog.

The dog, you have to stay calm around the dog, you can't be loud and, you know, boisterous (T2).

Because there's something else, something different there, they are, they will kind of ... ja, change their behaviour, be aware of their behaviour because the dog is ... and kind of adjust it (M2).

In addition to reminding the learners to modulate their behaviour, the AAA dog also provided a model of good behaviour for the learners. The teachers were able to instruct the learners on their behaviour and the AAA dog provided a practical example.

We also actually had a good discussion with regards to “look at how Gemma listens and responds and we need to listen and respond (T1).

Although most of the reaction to the AAA was observed at school while the AAA dog was present, there were some behaviour changes discussed by the parents. The parents of the two boys indicated an increased interest in the outdoors, including playing with mud and sand. Although the parents did not relate these changes directly to the AAA, it is important to note that the changes occurred within the same time frame as the implementation of the AAA.

But like I said, it’s just the last few months that we really could see a difference in Thom being outside, walking, but it is more that he, he likes to go outside. You know, it’s funny that we actually didn’t thought about the dog and the therapy and the way that it was set up in class. We, you know, it, it’s more that we, that we also started to introduce (pet dog’s name) more, you know (M1).

He (David) loves playing in the mud these days. He never used to want to get his hands dirty or anything, and now he goes in and we’ve dug him a hole so he takes the water and he’s playing in the mud for hours. I’ve tried in the past and he just never wanted to even go outside. Swimming yes, then he’ll stay in the pool forever, but things like that. So this is to me now, sort of, the last month or two that he’s doing that (M4).

4.2.2 Opinions regarding the implementation of AAA

Another theme which arose during the analysis of the data involved the teachers’ and parents’ opinions of the implementation of the AAA. As the parents were not present for the AAA sessions, the teachers provided much of the information regarding the implementation, but the parents did contribute to the assumptions about the role of the AAA dog and the reflections on AAA and the possibility of continued use.

4.2.2.1 Teachers' recollection of activities

During the interviews, the teachers discussed their recollections of the activities which took place. Although this does not provide a complete overview of all the activities which took place, it does provide insight into the most memorable activities. According to the teachers, although there was a basic plan for each session, the actual content would be decided by the learners and their inclinations.

I wouldn't say it was adult-led a lot, um, we would start with a plan, like reading, but out of it, it would be, um, child-led, it would be initiated, they would come up with conversation or they say something and then we'll support them to talk about whatever they wanted to ... to say with regards to Gemma (T1).

The teachers described walking outside with the learners and the AAA dog as an enjoyable activity which helped to calm the learners and provided a pleasant change from the stress of the classroom. The highlight for the learners was when the AAA dog went swimming during one of the walks.

When we went on our walk, everyone was just so calm, and it was just so nice. It was a nice break from the ... you know ... hectic, uh, pace of the classroom. Uh, ja, I think that for me, was, ja, what stood out. We went for a walk and she swam (T2).

The swimming, when Gemma went swimming, they loved it. They enjoyed the swimming when Gemma was wet. They really liked that (T1).

Reading to the AAA dog was also considered a useful activity. This provided the teachers with an opportunity to instruct the learners in their reading style and encourage them to pay more attention to what they were reading, without increasing their anxiety about the work.

They'll be in a group but each one will have their turn to read a book to Gemma and they would interact with Gemma that way. And with that, um, we could give some how to change their voice, how to look at Gemma, how to slow down talking. We also looked into reading books about different animals, we could go that route (T1).

We did some reading, so we would ... uh ... the children would all read a book to Gemma while Gemma listened. Um, and they ... we would ask them questions and they would answer. (T2).

Another activity, which, in the teacher's opinion, provided the opportunity for the learners to practice their communication skills, was the show and tell activity. The learners each had a turn to describe their favourite toy to the AAA dog and the rest of the class.

We did a show and tell, their favourite item, their favourite toy, and they really enjoyed that too. Um, that was actually working a lot on how to communicate, you know, loudly, expressively (T1).

The teachers' description of activities which encouraged communication also included discussions based on the AAA dog and how to care for the AAA dog. The presence of the AAA dog and the dog's behaviour encouraged the learners to remain engaged in the discussion. The teacher also felt that the AAA dog's ability to perform tricks increased the learners' enjoyment of the interaction.

We could focus also a lot on animal ... on pet discussion ... taking care, but we could also bring it into ... into how the kids take care of themselves and how they need to eat and how animals eat ... or how we should ... you know, all those things, we could bring into ... into the conversations (T1).

Especially if she catches ... like she does tricks ... ooo, they are very excited if she catches the biscuits or sits when they tell her to sit. So that, um, they enjoyed that (T1).

The recollection of activities also included the learners playing with each other and the AAA dog. This was noted as an important way to work on the learners' social interaction skills, in an enjoyable manner.

We played, one time I remember we played ball a bit. We played a bit of ball outside, um, to try and get them playing in a group and interacting appropriately when the ball goes ... throwing and catching. So that also went well (T1).

The teachers also briefly referred to other activities that took place. These, however, were merely mentioned and not discussed in detail as the other activities were, and were therefore understood as having made less of an impact on the teachers.

You could have vocational skills – how to ... once again, groom pets, clean pets, look after pets (T1).

Um, they did... they did a bit of art and colouring in. And we were, um, singing Christmas songs to Gemma, that was a fun one (T2).

In addition to the description of the various activities included in the AAA sessions, the teachers also provided insight into the individual preferences of the learners. Most of the learners showed definite partiality for a particular activity, although one learner was felt to enjoy all activities involving the AAA dog, as “*he (David) just is a little happy ball and excited when Gemma comes*” (T1).

I think to him (Thom), basically the walks he enjoyed. As I mentioned also, he walked far and he liked that ... She (Janey) really enjoyed feeding her (AAA dog), walking with her, playing with her, talking to her ... I think Skimpy actually loved the show and tell. Telling about things. Skimpy is interested in things in the world. She would really enjoy telling Gemma all about the world and things that she knows. She will go in long conversations into that (T1).

4.2.2.2 Assumptions regarding the role of the AAA dog

The interviews also provided insight into how the teachers and parents felt the AAA dog contributed to the perceived benefits from the AAA sessions. The non-judgemental nature of the AAA dog was considered to be very important in the learners’ reactions as the dog could not criticise them and this encouraged them to participate more fully.

A way of them having something to talk to, which is a dog, so it can’t answer, so they say whatever they want (M2).

As when we teach, it's not ... you know ... an animal, or Gemma is less socially intense. It's less like "gasp, what do they expect of me" you know? People are afraid of people. The dog won't say now something nasty about them, I guess (T1).

This was felt to be particularly important for one learner who enjoys social interaction but finds appropriate interaction a challenge. According to the teachers, she is often met with discouraging feedback, as her interactions are inclined to be inappropriate. Her interactions with the AAA dog provided her the opportunity to interact without fear of undesirable consequences.

You know what was good for Skimpy, is that usually when Skimpy talks a lot, um, or talks to people, it quickly becomes quite tedious and there's then a negative feedback for Skimpy. Um, but then of course with Gemma, Gemma's not going to say "stop talking, Skimpy" so Skimpy can talk to her and say whatever she wants and there's no judgement and there's no negative feedback there (T2).

In addition to the non-judgemental nature of the AAA dog, both teachers and parents also remarked on the influence of the support and comfort which the AAA dog was able to provide. The dog's support was understood to be distinct from the support offered by the people in the learners' lives, and therefore beneficial for the learners' and their educational needs.

If they just want to go and hug Gemma and just sit with her. You know, might not have to do anything. Ja, we ... depends what they need (T1).

That a dog, uh, brings more confidence with the child with autism, for instance, because it's not the teacher, it's not the other children. He (the child with ASD) knows that the dog, the dog can't talk as well, so maybe he feels more comfortable with a dog than with human beings (F1).

I think they (dogs) can sense, um, things that we can't, especially on this level, where we battle to interact, they just, they just there (M3).

Although the participants appreciated the beneficial characteristics of the AAA dog, there was also interest expressed as to whether the influence of the AAA dog was the only factor in the learners' reactions or whether the volunteer who accompanied the AAA dog might also play a role.

But they are still not sure if it's the therapist (volunteer) or the animal, huh? That's always the discussion, I think, with pets and the therapist (volunteer) on the side. Is it the therapist (volunteer) that brings in the interaction? (M1).

The volunteer sort of facilitated it and ... they ... she would ... she would say "oh look, there's whatever ... and the children would engage on that topic and talk to Gemma, talk to Gemma about it (T2).

The novelty of having the AAA dog visit the class was also felt to add to the excitement and enjoyment displayed by the learners. This might, therefore be considered to be a contributing factor in the usefulness of AAA. It is, however, important to note, that the eagerness was not evident only during the initial visits from the AAA dog, but continued throughout the six months of intervention.

I think it was helpful in that it was a new experience for them and that's always helpful for autistic children, especially our children who lead quite a sheltered life, to sort of have a bit of a mix up in their schedule and something new and something different (T2).

Because there's something else, something different there, they are, they will kind of ... ja, change their behaviour, be aware of their behaviour because the dog is ... and kind of adjust it (M2).

4.2.2.3 Impact of scheduling and preparation

The discussion of the implementation also revealed which factors the teachers felt had an impact on the implementation of the AAA. The first of these was the importance of preparation. The teachers' description of their preparation for the first session of AAA indicated the learners' excitement at the prospect of the AAA dog visiting but also referenced the need to explain the AAA to the learners in order to ensure they were aware of what would

happen. This was important as the excitement and chaos produced by the idea of the AAA dog was lessened by preparation and structure.

Before Gemma came the first time, of course we had a conversation with them about it, explained to them. Um, they were all very excited (T2).

From the first time, as I mentioned, it was a big excitement and a bit chaotic. Um, it was just “doggie, doggie!” but then it was more structured near to the end (T1).

In addition to preparation before the first session, the teachers emphasised the need for preparation before the AAA dog arrived each week. This should be understood in the context of the general need for preparation associated with ASD, as the preparation forms part of the morning discussion, during which the learners are prepared for all the events of the day.

We have a visual time table for every day which changes on ... everyday and then they follow that time table so in the morning when we're at circle time we'll tell them it's, what's the day today? Ok, it's Wednesday, Gemma's coming to visit. And so they do know and they all look forward to it. They are aware, uh, that it's scheduled and that she's coming and they know when (T2).

They would know early in the morning when Gemma would come because we do schedule and what the day is ahead, so they already excited that morning and they know exactly when Gemma would be here so then they ready and they're all excited (T1).

The teachers felt the preparation was necessary to create a calm atmosphere in which to interact with the AAA dog to encourage the learners to concentrate on the activity. This was seen as particularly necessary for one of the learners who relies heavily on his visual schedule, and unexpected changes in his schedule lead to episodes of difficult behaviour, such as tantrums.

We would all wait for Gemma, we all sit down on the carpet. We'll have a calm space for Gemma. The children must be calm before Gemma arrives, otherwise there's too

much excitement and then we can't get them focused on what we actually want to try and achieve on that particular session (T1).

He (Thom) needs a structured routine. He needs to exactly know visually what comes next. Um, and if it varies a bit, he is totally out of ... he can, he can be upset or have a melt down or anything like that (T1).

The teachers had differing opinions on the effect of the time of day on the AAA sessions. One of the teachers felt that because the AAA sessions took place after lunch, at the end of the academic day, the learners were tired and therefore not as responsive. She described the learners as *“a little bit more tireder”* (T1) and she attributed this to the scheduling of the session as *“at that time of the day ... everyone's a bit tired”* (T1).

The other teacher, however, perceived the time slot as advantageous for the learners. She described her experience of that time of day when the AAA dog did not visit as *“the biggest lull in the day ... when people start complaining that they're tired ... or you don't have their full attention”* (T2). She felt that the presence of the AAA dog improved this time as *“it gave the children a bit of a boost”* (T2). In addition to this, she suggested that had the sessions *“been earlier on in the day, the children would have been a bit too intense”* (T2) and therefore *“it was good that it was a bit later when they were ... not so hyper”* (T2).

The aspect of the scheduling of the sessions was also raised with regard to the value of spontaneous teaching. As the presence of the AAA dog was limited to an hour a week, this precluded the possibility of utilising activities with the AAA dog to help the learners at other times, such as when a learner showed indications of overstimulation, which leads to problem behaviour. The AAA dog visited the school for an hour each week but this was not felt to be enough and was described as *“rarely”*, with an expressed desire for more interaction with the AAA dog.

It's so difficult because with autism, it's also in the moment, so maybe you need the dog today when somebody's having a melt down to go sit in the sensory room or just go in yourself, so it's hard to actually put it also in a structured set time. It would be nice if each school has their own pet (T1).

I think it would be good if she could come a lot more often actually. I think that that's the only thing that hasn't been great is that it's just so rarely. Cause the children all love her and they respond well to her (T2).

4.2.3 Teachers' and parents' evaluation of AAA

The analysis of the interviews also provided insight into the participants' evaluation of AAA. This included a discussion of their knowledge of AAA before the AAA sessions began, consideration of the possible impact of previous exposure to animals, as well as the participants' experience of AAA and suggestions for future use.

4.2.3.1 Prior knowledge of AAA

The participants' experience of AAA was partly affected by their knowledge of AAA before the implementation of the AAA sessions. The levels of knowledge differed among the participants, but many of them admitted to knowing very little about it initially. Most of the participants knew about the use of guide dogs for the visually impaired. There was also awareness of the use of horses for therapeutic uses.

The, the one I'm aware of is where ... like for the blind people, you got dogs that are trained to guide them and do that. And I also believe there is some there is some therapeutic involvement with horse riding for certain conditions or children or stuff like that. That's the little I know about animal-assisted activities (F2).

Now dogs, dogs, for me, was more with blind people, you know. Everybody knows that especially that type of dog are very good in helping blind people. The ... the dolphins is also something I think which is broad... well known. Also, uh, but I hadn't heard ... and horses. The horse whisperer ... (F1).

In addition to the knowledge about the use of dogs and horses, one parent discussed the use of dolphins in therapy, indicating that they had in fact considered participating in this with their child. This suggests an enthusiasm for the use of AAA on the part of the participant.

Dolphins, for instance, you hear a lot of stories of, great stories about dolphins, huh? In Florida, there are a lot of therapies also with dolphins. So there must be an effect

from animals, anyway, on, on children, and you know, we also said maybe we must do that one. I don't know what's so special about the dolphin in that way, but I read about it (F1).

Another parent was more aware of the use of animals for ASD. She had been informed about the use of service dogs for individuals with ASD and therefore had a more informed opinion about AAA.

You know, also a friend of mine, they had a, well, has an autistic child, spoke to me about ... there was programme, ah, it's currently running where they actually train guide dogs for autistic people, so I was aware of that as well. I think that's brilliant (M3).

One of the teachers also discussed her lack of awareness of the practicalities involved in AAA. She indicated her surprise at the differences between her expectations of what would occur and what she experienced. She felt that she lacked knowledge about AAA before the AAA sessions began.

I didn't have much of an idea. Um, I thought that ... I thought it might be more sort of ... um ... separate from the class. I thought you ... that you might go somewhere else and do it and perhaps it would be one-on-one. So I was surprised that it was ... they stayed in their class, the dog came to them and we all ... we all did it as a group. So that surprised me about it. Um, I haven't really had much experience at all with it (T2).

4.2.3.2 Factors which influenced the learners' experience of AAA

The analysis of the interviews indicated certain factors which the teachers and parents felt might be relevant in how the learners experienced the AAA sessions. These included the learners' previous exposure to animals, the setting of the AAA sessions, the learners' ages and the impact of the symptoms associated with ASD.

The teachers alluded to the learners' previous experience, with one teacher noting that “a lot of them are already used to interact with animals” (T2), and the other teacher specifying that “they all have dogs” (T1). The teacher further described her impression of the learners' previous interaction with their pets as “they all actually walk their animals, feed

their animals, take care of their animals” (T1). It was felt that “they know that this is a dog ... and they interacted with her that way” (T1).

The impact of the learners’ previous exposure to animals was also noted by the parents, some of whom expressed uncertainty about how their children might react to the AAA dog. This was based on how their children had reacted to certain dogs in the past. One parent noted that her daughter was not comfortable around unfamiliar dogs, particularly large dogs. Another participant had been apprehensive before the AAA sessions began as her child did not enjoy dogs with long hair.

If she’s not familiar with the animal, she’s very scared. So, ja, if we get her any place and there’s dogs and she’s not familiar with them, she will be freaked out until she gets to know them. Um, if it’s a big dog, she won’t necessarily bond with it (M3).

I thought David’s not going to like this, because when I heard bout the dog and what type of dog and I know (pet dog’s name) is an Anatolian and she’s also big and hairy and he doesn’t want ... so I didn’t expect much and I didn’t think he would like it (M4).

Another factor that was suggested as possibly influential in the learners’ experience of the AAA was the setting in which the AAA was implemented. Although the learners had interacted with dogs at home, one parent noted that *“this is a different environment. I wonder how she is going to react with the dog at school” (M2)*. Another parent suggested that this might be related to the structure of the classroom due to the *“kind of ruling” (F1)* which was felt to be *“a different thing, than private” (F1)* as in *“private life, he is free” (F1)*.

A further factor discussed during the interviews was the age of the learners. As the learners had already reached their teenage years, they were entering or already experiencing puberty and *“hormones is kicking in now” (M4)*. It was suggested that this might distract the learners from the AAA as *“it’s very difficult because it’s puberty with everything and everything becomes more haywire” (M2)*.

In addition to the factors relating to previous experience, setting and age, the interviews revealed that the parents felt that there was also the possibility of symptoms specific to ASD that would affect how the learners experienced AAA. This was felt to be a particular challenge for one of the learners as *“she (Skimpy) sometimes just lose, um, focus quickly, but that is a problem across the board of her, um, profile” (T1)*. This affected her

interaction with the AAA dog as “*she’d engage and then she might be, um, distanced and then she might not feed, or not read properly*” (T1). This was further described by her father who noted “*I think the challenge is that, when you have such activities, or animal-assisted activities, is to get her to apply her mind and concentrate and focus*” (F2).

4.2.3.3 Impression and future use

During the interviews, the teachers expressed their favourable opinions of AAA. They felt that AAA enabled them to interact with and instruct the learners more effectively, particularly when working with the social and emotional aspects of learning. It was also suggested that beyond the ASD-specific usage, learners with other disorders or learners without disorders might also benefit from AAA. The importance of AAA was emphasised by one of the teachers, who felt that the value of AAA outweighed the effect of time limitations for other activities.

It will be beneficial, both socially and emotionally for all children. Um, and a nice teaching tool to ... to reach children on a different level. Um, of course autism is very specific. You use it in a different way but it is a nice therapy to use for all children. Um, ja. In their all round of their development (T1).

I can’t think of any negatives. Oh, I mean ... the only thing that I can think of would be a problem would be if it’s taking time out of their schedule that, where they’re doing other things but in this case I don’t think that’s at all relevant, to be honest (T2).

The favourable opinion of AAA was shared by the parents, who were enthusiastic about their children’s participation in the programme, in spite of not expecting dramatic improvements to results from the AAA. One parent even characterised the interaction with animals as a necessity, indicating the importance she placed on the AAA.

I think it’s always good to try everything possible so I think if ... and I find it really wonderful that it was happening in our school. So it’s nice to, to, be part of that. And that Thom was able to be part of this whole exciting thing (M1).

I think it's just good for them. I think that interaction and that ability to be able to care for someone or something, that's something that's good. So, it's not that we sat back and thought "oh, we want this to happen", I just think it's worth it for them. I think it's a necessity, more than a nice-to-have (M3).

One of the parents also indicated a desire to introduce more animals into her son's life. She expressed her hopes of getting a puppy which would belong to him and help him to learn responsibility, as well as a desire to involve him in horse riding. She felt that both of these would be beneficial for her son.

We want to get him a puppy because the one is now 15 years old, the border collie, and she's getting blind and deaf and so she'll soon ... pass. So then we want to get him a little puppy, but then make him understand that he would be responsible. I think it will be good for him. I really want to do that. It will be good for him to have sort of a ... something that he likes (M4).

It can only be good. I mean, it's nothing bad. Um, I'd like him to do horse, maybe horse riding again. He used to do it and he liked it. Um, ja, cause I heard a lot of good things about horses and children and therapy (M4).

Due to their favourable impression of AAA, the teachers felt that the use of AAA should be extended to learners of other ages, particularly younger children. It was suggested that they might benefit from the AAA in a different way due to their lack of life experience, and general knowledge.

I think that, um, something, something as positive as this, uh, could be very helpful for the younger kids, especially if you're doing an early intervention. I think that would be really good. I think that they will really enjoy that (T2).

Just quickly thinking of other children I work on, that are younger. You know, they sometimes don't even know dog eats food, they actually feed dogs with grass. If I say younger age and they don't know about animals, do we want to teach them taking care of living things, then round that, you use that (T1).

Another way in which the teachers suggested AAA could be extended was the possibility of including more individually oriented AAA in the program, in addition to the group work. While the teachers recognised the importance of interacting as a group, the possibility of the inclusion of more one-on-one attention was raised in response to the individual nature of the learners as it was felt that they could benefit further if they were allowed to participate more in their preferred activity.

I think if you have enough time, I think it would ... it's worthwhile doing both approaches (individually and as a group). I think they both have their place. I think with the limited time, this was definitely the way to go (T2).

Maybe more individually focused and not rather in a group, but maybe could be group, then go individually. Um, I'm not quite sure there, cause everyone, because they're such on different levels, um, they could benefit in different ways with the animal therapy (T1).

4.3 CONCLUSION

The exploration of teachers' and parents' perceptions of classroom-based AAA provided information which was organised into three main themes. The first theme encompassed the benefits perceived in connection with AAA. These included communication benefits, engagement and motivation benefits, social interaction benefits, emotional benefits and behavioural benefits.

The second theme provided insight into the teachers' and parents' opinions regarding the implementation of the AAA, including the teachers' recollections of the activities involving the AAA dog, what role the AAA dog performed in the sessions and the contemplation of the impact of scheduling and preparation with regard to the AAA.

The final theme was concerned with the teachers' and parents' evaluation of the AAA, including their prior knowledge of AAA, the factors which they felt might have influenced how this particular group of learners experienced AAA, and their impressions of classroom-based AAA and the possibilities of continued and extended use of AAA.

In the following chapter, these results will be discussed in relation to existing literature.

CHAPTER 5

DISCUSSION

5.1 INTRODUCTION

This chapter provides an interpretation of the perceptions of the teachers and parents with regard to classroom-based AAA. The chapter will begin with a brief summary of important elements of the study, including the aim and purpose of the research, the theoretical framework and the methods used. This will be followed by a discussion of the results presented in Chapter 4, with reference to existing literature and the chosen theoretical framework, in order to understand the participants' perceptions within the context of prevailing knowledge on the subject. The chapter will be completed with a reflection on the limitations of the study and recommendations for future research, followed by concluding remarks.

5.2 SUMMARY OF STUDY

A consideration of the current literature regarding ASD provided insight into the effect and prevalence of the disorder, and the need for more effective interventions. To this end, research pertaining to the use of AAI was explored, with particular focus on the use of AAI for individuals with ASD. This revealed promising benefits of AAI for individuals with ASD but also exposed the need for further research on this topic, particularly with regards to understanding how AAI affects different populations and the use of AAI in South Africa.

This study aimed to further our understanding regarding the use of AAI for individuals with ASD. This was done by exploring the perceptions of the teachers and parents of adolescents who had participated in classroom-based AAA.

A complete understanding of the perceptions of the participants requires the guidance of existing theories to provide a framework for the interpretation of the results in combination with existing literature. The theories selected for this research are the Biophilia theory and the theory of social support.

The method chosen to explore the teachers' and parents' perceptions was a qualitative enquiry using a case study approach. The participants were interviewed using a semi-structured interview guide, and the interviews were audio-recorded and transcribed verbatim. These transcriptions created from the interviews were then analysed using thematic analysis. This analysis provided the results which were presented in Chapter 4 and will be discussed in this chapter.

5.3 DISCUSSION AND INTERPRETATION OF RESULTS

The purpose of this study was to investigate the use of AAA for adolescents with ASD by exploring the perceptions of the teachers and parents. The teachers and parents were able to provide insight into the benefits they observed, describe and assess the implementation of the AAA, and indicate their sentiments about the use of AAA for the adolescents. These themes will be discussed and interpreted in conjunction with existing literature and the theoretical framework.

5.3.1 Perceived benefits of AAA

The results of this study indicated that the main theme of the interviews related to the benefits perceived by the participants. The majority of these benefits were noted by the teachers in the presence of the dog, and were therefore an immediate effect of interacting with the AAA dog, although a few benefits were noted at school before or after the dog visited or at home. This suggests that most of the effects of the AAA dog are dependent on the presence of the dog and do not necessarily generalise to other settings.

This supports findings by Redefer and Goodman (1989) that children with ASD showed improvement while the dog was present, but this improvement gradually degraded when the dog was no longer present. In addition, Stevenson and colleagues (2015) found that some learners showed improvement in a number of areas during an interaction with the teacher and therapy dog, but only some of these improved skills were generalised upon returning to the classroom. This is also in line with research on other social skills interventions for children with ASD (Bellini et al., 2007). In a meta-analysis of school-based social skills interventions for children with ASD, Bellini and colleagues (2007) noted that most of the interventions resulted in poor generalised effects.

This is further supported by the biophilia hypothesis. According to Melson and Fine (2010), the biophilia hypothesis does not predict any generalisation of the effects of interacting with animals, but focuses on the immediate reaction to the presence of the animal. The benefits associated with AAI are therefore likely, for the most part, to be limited to the immediate interaction with the animal, as occurred in this study.

Another important feature of the benefits perceived by the teachers was the individual nature of the reactions of the learners. This may also have been related to the different developmental levels of the learners as, at times, their developmental abilities determined how they were able to interact with the dog. Certain benefits were more evident for some

learners than for others, suggesting that individuals may benefit from AAI in different ways. This may affect how the AAI is implemented.

The individual nature of the benefits found in this study support previous research. In a study considering the effect of the presence of a guinea pig on the social interaction of children with ASD (Kršková et al., 2010), each child with ASD reacted differently. Some showed only a slight increase in social approaches, while others showed a much larger increase (Kršková et al., 2010). A further difference in their reactions was that some showed increased verbal interaction with the guinea pig, while others preferred stroking and touching the guinea pig (Kršková et al., 2010). Stevenson and colleagues (2015) also noted the individual impact of the interaction with animals. One of the children in their study showed minimal improvement in motivation, while the others showed a much bigger improvement (Stevenson et al., 2015).

The biophilia hypothesis recognises the importance of cultural and environmental elements in shaping individual responses to animals (Melson & Fine, 2010). Although the hypothesis proposes an innate attraction to living organisms, including animals, this attraction is shaped by lived experience of individuals, and therefore individuals will react according to their abilities and personalities.

The perceived benefits discussed by teachers and parents in this study included communication benefits, engagement and motivation benefits, social interaction benefits, emotional benefits and behavioural benefits. According to reviews of studies involving the use of AAI for children with ASD, these benefits correspond with previous research on the subject (Berry et al, 2013; O’Haire, 2013a).

5.3.1.1 Communication benefits

The communication benefits discussed by the teachers and parents in this study related partly to the ability of the AAA dog to increase the communicational desire of the learners. The dog stimulated and maintained conversation, as the physical presence of the dog helped to prevent the learners from getting distracted, and redirected the learners’ attention to the topic of conversation. The AAA dog also provided a conversational partner and the learners were perceived as talking more to the dog than they would to human partners.

These benefits are similar to those described by Martin and Farnum (2002) who found that children with ASD initiated more conversation with the dog, and with the therapist who accompanied the dog, as compared with their interaction with a therapist and ball or a therapist and stuffed dog. Similarly, Sams and colleagues (2006) found that children with

ASD used significantly more language when an animal was present, than when there was no animal present.

The increase in communication prompted by the AAA dog was felt to continue to some extent outside the confines of the AAA sessions, both at school and at home. The learners would ask for information regarding the dog's visits or merely mention the dog in some way. When understood in the context of the communication challenges experienced by the learners, this was seen as an important function of the interaction with the AAA dog. This suggests that the enjoyment experienced during the AAA sessions may help the learners with ASD to overcome communication challenges, in order to accomplish their goal of gaining or sharing information.

This supports research by Fung and Leung (2014), which found that children with ASD displayed more communication regarding interaction with a therapy dog post treatment, than they did for toys. The communication included discussion of wanting to see the dog again, and relating memories of interacting with the dog.

The social support theory suggests that due to the non-judgemental nature of the dog, the learner is less intimidated, and therefore more likely to communicate directly with the dog (Wells, 2009). According to the social support theory, the dog is also able to offer indirect support, by decreasing the intensity of the social interaction involved and providing an external focus for the communication, as well as making the other participants in the conversation appear friendlier (Kruger & Serpell, 2010). This theory is enhanced by the suggestion that individuals with ASD may find it easier to interact with animals, due to shared sensory-based thinking, as well as the non-verbal nature of the communication by the animals.

5.3.1.2 Engagement and motivation benefits

In addition to communication benefits, benefits relating to engagement and motivation were noted by the teachers. According to Steinbrenner and Watson (2015), learners with ASD show limited engagement within the classroom, and this influences how much they benefit from education. This is, therefore, an important consideration in this study.

The teachers found that, when interacting with the AAA dog, the learners were more engaged with the lesson content, the dog, and their peers. The AAA dog attracted and maintained the learners' attention, and encouraged their full participation in the activities. This suggests that interaction with the dog is rewarding for the learners, and therefore the activities with the dog form an intrinsic reward, by creating enjoyment from the task itself.

Increased engagement was also noted as a benefit of classroom-based AAA for learners with ASD in a study by Smith and Dale (2016). The teachers in their study felt that interaction with animals encouraged engagement with activities, and with the teacher and their peers. Stevenson and colleagues (2015) also reported increased engagement on the part of children with ASD when interacting with a dog, as the dog encouraged more meaningful interaction, both with the dog itself, and with other people.

While the teachers felt that the excitement and enjoyment evinced by the learners when interacting with the dog generally enhanced their engagement, the participants did note the possibility of overexcitement resulting from the interaction. Although this was controlled with relative ease by the teachers, it is a factor that should be considered when discussing AAI for individuals with ASD.

The possibility of overstimulation is also mentioned in other studies on the subject. Martin and Farnum (2002) found that children with ASD showed increased flapping behaviour in the presence of a dog, indicating high levels of excitement. Redeker and Goodman (1989) also indicate that some of the learners in their study became overexcited when interacting with the animals.

In addition to motivating the learners to engage, the AAA dog was thought to provide more generalised motivation in the form of motivating the learners to attend school. This supports existing research. O'Haire and colleagues (2014) found that there was an increase in interest in attending school among children with ASD for the duration of an AAA programme. This was also found to be true of learners in a mainstream classroom, who displayed a more positive attitude towards school and other learners when there was a dog present in their classroom (Beetz, 2013).

The innate attraction to living things proposed by the biophilia hypothesis suggests that the presence of an animal will increase motivation and engagement (Melson & Fine, 2010). The learners are therefore more likely to participate fully in activities that involve the animal, due to their attraction to that animal.

5.3.1.3 Social interaction benefits

The benefits from the AAA in this study were also thought to include social interaction benefits. The teachers noticed increased social engagement between the peers, and increased cohesion within the group. Interestingly, one of the teachers attributed the improvement in group dynamics to the shared positive experience of the AAA sessions, and the opportunity this presented for the learners to gain a new perspective of each other. This

suggests that the group cohesion in the class might be partly based on mutual respect among the peers, which is increased by positive experiences.

The social interaction benefits are also in line with current literature. Kršková and colleagues (2010) noted that the presence of guinea pigs increased the frequency and quality of social interactions between ASD peers. Stevenson and colleagues (2015) found that the presence of a dog improved the social interaction between a child with ASD and a teacher. In addition to this, studies by Kotrschal and Ortbauer (2003) and Hergovich and colleagues (2002) found that the presence of animals can generate cohesion between learners in a mainstream classroom. The findings of this study suggest there is a similar impact on class cohesion in an ASD specific classroom as in a mainstream classroom.

The teachers also indicated that social skills, a necessary component of social interaction, were impacted by the AAA. The learners displayed improved social skills when participating in activities with the dog and the interaction with the dog also provided an opportunity for the teachers to instruct the learners in social skills. The dog therefore creates a situation where the learners are able to practice and improve their social skills in a natural setting, without feeling pressure to perform. Redefer and Goodman (1989) also referred to the value of the interaction with the dog as an opportunity to instruct children with ASD in order to improve their social skills.

The aptitude of animals to increase and improve social abilities is an important feature of the social support theory (Kruger & Serpell, 2010). In this study, the dog appeared to help the learners overcome the challenges involved in social interaction by providing an external focus. This prevented the learners from focusing on themselves or the other people involved in the interaction, thereby lessening the intensity of the interaction and increasing the enjoyment.

5.3.1.4 Emotional benefits

Further benefits indicated in this study were emotional benefits. The learners were perceived as being calmer in the presence of the AAA dog. This effect was seen as particularly evident for one learner for whom anxiety was an impediment to his education. This suggests that AAA might be useful in assisting learners with ASD who also struggle with anxiety, as the presence of the dog might enable them to focus more on learning by decreasing the stress they experience. The calming effect of the dog was also related to a noticeable increase in confidence for the learners.

This supports the opinions of teachers in a study by Smith and Dale (2016), who felt that AAA in classrooms for learners with ASD helped the learners to relax, and thereby improved the possibility of learning and social interaction in the classroom. O’Haire and colleagues (2014) also found that animals help to decrease the stress involved in participation in the classroom, and thereby improve social interaction between peers in the class.

Another finding in this study was that the calming effect of the dog was not limited to the learners. The teachers also experienced the AAA sessions as relaxing in contrast to their expectations of feeling like the time could be better spent on other work. The teachers’ attitude can impact the efficacy of an intervention, as enthusiasm on the part of the teacher can help to encourage the learners to participate in the intervention (Anderson & Olsen, 2006). This supports the discovery of Zents, Fisk and Lauback (2016) that school staff also benefit from the use of animals in schools. This is also in line with research which indicates that calming benefits, such as lowered blood pressure and increased endorphin, can result from interacting with a friendly dog (Marcus, 2013; Odendaal & Meintjies, 2003).

The biophilia hypothesis predicts the calming properties of friendly animals (Melson & Fine, 2010). The calm and friendly nature of the AAA dog in this study created a calm atmosphere for the learners, which encouraged the learners to participate more fully in the AAA.

5.3.1.5 Behavioural benefits

Finally, this study also revealed that behaviour benefits were associated with the classroom-based AAA. Most of the behaviour changes discussed in this study related to how the learners interacted with the AAA dog, becoming more gentle with the dog over time. The teachers also indicated that the learners’ behaviour toward the dog differed from the teachers’ expectations, suggesting that the learners had modulated their behaviour when interacting with the dog.

This supports the existing literature, which found that the behaviour of children with ASD is positively influenced by the presence of animals (Martin & Farnum, 2002; Redeker & Goodman, 1989). The capacity of animals to prompt learners to modulate their behaviour was also found to be true of learners in a mainstream classroom (Kotschral & Ortbauer, 2003). This suggests some similarity between the behavioural benefits noted in ASD learners and mainstream learners.

The main benefits which were noted as generalising from the classroom-based AAA to home were behavioural benefits. These behaviour changes were observed by the parents of

the two boys and related to the boys' enthusiasm for outdoor activities, which increased during the time period of the implementation of the AAA. The parents of the boys did not feel that the AAA was directly responsible for the changes, but did not note any other significant differences in their sons' lives which could account for their behaviour changes. It was interesting to note that the generalised behaviour changes were seen in the boys, rather than the girls, as this corresponds with the gender differences indicated by Kotschral and Ortbauer (2003).

The benefits noted by the participants of this study therefore support existing literature, and are explained by the theoretical framework. Many of the previous studies investigated the use of AAI for younger children with ASD, but this study suggests that adolescents may benefit from AAI in a similar manner.

5.3.2 Opinions regarding the implementation of AAA

The second theme which arose from the interviews involved the opinions of the teachers and parents regarding the implementation of the AAA. Reviews of AAI for ASD emphasise the importance of developing a treatment manual in order to standardise the intervention (Davis et al, 2015; O'Haire, 2013). In order to accomplish this, it is important to establish how the activities were experienced by those involved and what effect various features of implementation had on the experience of those participating.

The teachers' presence in the AAA sessions allowed them to describe and discuss the activities which occurred during the implementation of the AAA programme. Although a basic plan guided each session, they felt that most of the content was led by the learners themselves which encouraged the learners to participate more fully in the activities. This agrees with findings from Stevenson and colleagues (2015), who noted that allowing the child some control in the sessions improved their engagement. Shreibman et al. (2015) also indicate the motivating influence of learner choice in any ASD intervention.

5.3.2.1 Teachers' recollection of activities

The activities recollected by the teachers in this study do not represent all the activities that took place, but rather provide insight into which activities they experienced and remembered as important during the AAA. It was interesting to note that activities most readily discussed by the teachers were activities which had formed a part of the school day before the AAA programme was implemented, but the teachers related how the dog had

improved these activities. This suggests that teachers may have viewed the dog as an adjunct to normal school activities, rather than a separate intervention.

This supports the proposal by Esteves and Stokes (2008) that dogs can be used as assistants in classrooms, as part of the curriculum, to help with learning academic skills such as reading or story writing, and can also participate as a group member in other classroom activities. They suggested that the presence of the dog in the classroom assists with engagement of the learners in the classroom activities.

The teachers also revealed that preferences for activities differed between individual learners. While some learners were more enthusiastic during academic activities, others preferred the physical activities, such as walking the dog. The learners were more engaged during their preferred activity and were therefore more willing to participate. The effect of personal preferences might be an important consideration in implementing AAI, in order that the programme can be planned to provide more for individual engagement.

5.3.2.2 Assumptions regarding the role of the AAA dog

The teachers' and parents' assumptions regarding the role of the dog were also important in the consideration of implementation. An understanding of how the dog is able to help the learners, provides insight into why AAI is useful, and how it might be used more effectively with different populations. The role of the dog in the AAA programme is closely related to the theoretical framework of this study, and will therefore be discussed in terms of the biophilia hypothesis and the social support theory.

The non-judgmental nature of the AAA dog was considered to be a very important factor in the effect on the learners. The teachers and parents felt that the learners were encouraged to participate and interact more because they felt less pressure when interacting with the dog. This lends support to the social support theory which suggests that the non-judgmental nature of interacting with animals can encourage social interaction by making the interaction less intense (Wells, 2009).

This view of the role of a dog for an individual with ASD echoes opinions in a study by Wright and colleagues (2016), in which parents felt that a dog provided their child with a non-judgmental companion. Friesen (2010) also notes the non-judgmental nature of the dog as an important feature of the use of a dog in any classroom. This study therefore adds support to the understanding of the importance of the accepting nature of animals for childhood and adolescent development, particularly for individuals with ASD.

In addition to the non-judgemental nature of the dog, the support of the AAA dog was seen as valuable to the learners. The participants felt that the AAA dog was able to support the learners in a different way to humans, due to an innate connection the learners felt with the dog. This innate connection is consistent with the biophilia hypothesis, which suggests that humans feel more at ease in the presence of a calm, friendly animal (Melson & Fine, 2010). It is possible to assume, therefore, that the calm presence of the dog was experienced as supportive by the learners.

The perceived support offered by the dog is consistent with the parents' view of dogs as a source of support and confidence in the study by Wright and colleagues (2016). In that study, it was felt that dogs offered children with ASD affection and support, and this contributed to the development of the child. Stevenson and colleagues (2015) also noted the importance of the support of the dog in encouraging ASD children to increase social interaction.

While the teachers and parents in this study felt that the dog played an important role in the AAA, they also indicated the possibility of other factors contributing to the impact of the AAA. The factors referred to were the presence and personality of the volunteer, and the novelty of the presence of the dog in the classroom.

These factors have also been discussed and explored in existing literature. O'Haire and colleagues (2013) compared the use of an animal with the use of a toy as part of an intervention for children with ASD, thereby focusing mainly on the effect of the animal, and preventing the influence of the therapist and effect of novelty. They found that the animal significantly affected the children's social behaviour. Prothmann and colleagues (2009) found a similar result when comparing the reaction of children with ASD to dogs with their reaction to a ball and a toy dog. The children were more attracted to the live dog and showed a preference for the dog. These results suggest that the dog is the principle actor in AAA.

5.3.2.3 Impact of scheduling and preparation

In addition to the more theoretical opinions, the teachers in this study also referenced important practical features regarding the implementation of AAA within an ASD classroom. The teachers found preparation to be an important element of the AAA programme. The teachers felt it necessary to prepare the learners before the intervention as a whole started, in addition to the preparation that occurred before each individual session.

This preparation was described as a normal part of each day, but was felt to be very important for the AAA sessions, as a calm environment was needed to obtain maximum

benefit from the AAA. The teachers therefore prepared the learners throughout the day, but also directly before the sessions to create a calm space for the dog to enter. It was felt that this would improve the productivity of the AAA sessions. In spite of the importance of preparation for individuals with ASD, very little information could be found on whether participants in other studies were prepared for the AAI.

The need for preparation for any changes in the schedules of ASD children is reflected in the current literature on ASD. Lytle and Todd (2009) advise that preparation for new activities helps to reduce the stress which many children with ASD experience as a result of deviation from their usual schedule. This is, therefore, an important method for promoting engagement in schooling for children with ASD (Lytle & Todd, 2009).

Another implementation-related matter which was important to the participants was the scheduling of the AAA sessions. In the AAA programme which informed this study, the sessions took place just after lunch, at the end of the academic day. Interestingly, the teachers' opinion of the use of this time differed. One teacher felt that the learners were tired, and therefore less likely to engage. The other felt that the use of this time encouraged the learners to participate, during a time of day that had not previously been useful, as, before the start of the AAA programme, the learners were not motivated or engaged. A discussion of the impact of the time of day on the effect of AAA was not found in the existing literature.

The aspect of scheduling was also raised by the teachers in relation to how often the AAA dog was present in the class. The teachers discussed the importance of teaching life skills and interaction skills in a naturalistic way, as the situation arises. It was felt that the restriction of the AAA dog's presence to only one hour a week limited spontaneous teaching involving the dog, and the teachers expressed a desire for the dog to be present more often. Esteves and Stokes (2008), however, note that, despite the value of the interaction with the dog, the presence of the dog in the class throughout each day might not be beneficial, as this would likely be exhausting for the dog and disruptive for the learners.

A discussion of the implementation of the AAA programme which informed this study suggests preparation and scheduling are important factors, which must be considered when implementing an AAI programme. Preparation and scheduling are elements of treatment fidelity. Their prominence in this study therefore supports the emphasis placed on treatment fidelity in reviews by Davis and colleagues (2015) and O'Haire (2013a). Both of these reviews discuss a lack of description of treatment fidelity as one of the methodological weaknesses found in many studies of AAI for ASD.

5.3.3 Teachers' and parents' evaluation of AAA

Parents, often with advice from teachers, play an important role in the selection, and frequently the implementation of any ASD intervention (Matson & Williams, 2015). It is therefore important to discover their views on an intervention. This will predict whether there is likely to be widespread use of an intervention or not. The teachers and parents in this study revealed what they knew about AAA, what factors they felt might be influential in the use of AAA for this group of learners, and their opinions of the classroom-based AAA programme in which the adolescents had participated.

5.3.3.1 Prior knowledge of AAA

The teachers and parents in this study expressed a lack of knowledge regarding AAA. They revealed that their knowledge of the therapeutic use of animals was confined largely to awareness of the use of guide dogs for the visually impaired and the use of therapeutic horse riding for various disabilities. This supports the findings of Smith and Dale (2016), who noted that Australian teachers indicated that a lack of knowledge and understanding of AAI was considered a major barrier to the use of this form of intervention in a school for children with ASD.

The findings in this study suggest the possibility that the ASD community in South Africa many not be aware of the potential for the use of AAA for individuals with ASD, and the literature indicates this problem is not unique to South Africa. It is reasonable to expect that more people will become aware of this form of intervention as the evidence for it grows.

5.3.3.2 Factors which influenced the learners' experience of AAA

The teachers' and parents' evaluation of AAA was also related to the factors which they felt might have an effect on the experiences of this particular group of learners with ASD. O'Haire (2013a) discusses the importance of developing an understanding of how different individuals benefit from AAI, in order to refine the intervention. It is therefore necessary to consider the teachers' and parents' perspectives on factors which were relevant to particular learners.

The most important factor noted by the teachers and parents in this regard was the effect of the learners' previous exposure to animals. As the learners all lived with pet dogs in their own homes, it was felt that this might decrease the impact of the AAA dog at school. Existing literature is inconclusive on the impact of previous exposure to animals. Grandgeorge and colleagues (2015) found that a previous close relationship with pets made

the children more attracted to the visiting animals. Another study, however, found that pet ownership did not affect the impact of AAA (O’Haire, et al., 2013). These studies therefore suggest that positive experiences with pets at home will not negatively impact the efficacy of AAA.

Although pleasant previous experiences with pets are not considered to affect the outcomes of AAA, Grandgeorge and colleagues (2015) found that prior negative experiences with pets at home caused the children in their study to be more cautious about interacting with the animals introduced in the research. Parents in the present study did note some apprehension about the AAA, based on their children’s previous interaction with animals. The teachers, however, observed no anxious or fearful reactions to the AAA dog in class.

While the teachers and parents felt that the learners’ reaction might be affected by their previous exposure to pets, they did indicate that the effect of the pets at home might be limited by the difference in settings between home and school. It was suggested that the learners might not generalise their experience of dogs at home to their interaction with the dog at school.

The effect of the setting of the interaction with the animal was also noted by Grandgeorge and colleagues (2015), who hypothesised that ASD children’s reaction to animals might be affected by the location of that interaction. It is therefore reasonable to assume that there may have been some difference in reaction to the animal based on the interaction with the AAA dog at school, rather than at home, where their previous interaction with dogs occurred.

Another factor suggested as having an effect on the experience of the learners was the age of the learners. This study focused on adolescents with ASD and it is therefore important to consider whether their age may have had an impact on how much they benefited from the AAA. It was suggested by teachers and parents that the age of the adolescents might have prevented the AAA from being as effective for them as for younger children.

The effect of age on the efficacy of interventions for ASD was discussed by Bellini and colleagues (2007). In a meta-analysis of school-based social skills interventions, it was noted that school-based social skills interventions were more effective for adolescents than for younger children (Bellini et al., 2007). While their finding was not statistically significant, it does indicate the possibility that the age of the adolescents did not have a detrimental effect on their experience of the AAA.

5.3.3.3 *Impression and future use*

Finally, teacher and parents in this study indicated favourable impressions of the AAA programme. The teachers felt that the presence of the AAA dog made the learners more open to interaction and instruction. AAA was seen as more important than other activities that might take priority in the academic day. This supports the existing research by Smith and Dale (2016) which found that teachers in Australian ASD schools had a positive attitude toward AAI in the classroom and would be interested including more AAI in their classrooms.

The parents in this study were similarly enthusiastic about AAA, despite not observing many of the benefits at home. They felt that the AAA at school was beneficial for their children and felt that it should continue. One parent also expressed her desire to include more animals in her child's life at home by getting him a puppy and exploring the possibility of horse riding lessons.

This finding is comparable with the findings of a study by Wright and colleagues (2016) which investigated the perspectives of parents with children with ASD on the ownership of pets. Parents in that study were of the opinion that dogs were important in the development of children with ASD.

In this study, the participants' appreciation for the worth of classroom-based AAA was evident in their desire to extend the use of the AAA. The teachers suggested that younger learners in the school could also benefit from it, possibly in slightly different ways due to their lack of experience. The teachers also suggested the possibility of exploring individual AAA sessions in addition to the group sessions implemented in the classroom.

5.4 LIMITATIONS AND RECOMMENDATIONS

Despite careful planning, this study was subject to certain limitations.

5.4.1 Size and homogeneity of sample

The nature of the sample in this study can be considered a limiting factor. The sample was necessarily small due to the use of teachers and parents of a single class of adolescents with ASD. The sample used was also fairly homogenous in nature as indicated by the biographical details provided by the parents. This may have had a restrictive effect on the richness of the data obtained.

5.4.2 Selective memory

A further limitation relates to the nature of the data. In order to access the perceptions of the participants, it is necessary to interview them and hear their own words. However, people's recollection is not perfect, and people are prone to exaggerate some events and ignore others, due to selective memory. This, however, is unavoidable and is perhaps beneficial for this research, as they are more likely to retain important memories, providing insight into what was most important for them.

5.4.3 Limited intervention time

Another limitation relevant to this research was the duration of the AAA programme upon which the teachers and parents based their perceptions. The interviews took place after only one semester of participation in AAA, and it is possible that perceptions based on a longer duration of programme may have differed to those expressed in this study.

5.4.4 Single volunteer and dog

This study was also limited by the use of a single volunteer and a single dog. As only one AAA team was used, any effect seen from the AAA programme could not necessarily be attributed to AAA itself, as it might be due to interacting with this particular team.

5.5 RECOMMENDATIONS

This study prompted a number of suggestions that should be taken into account for future research.

5.5.1 Multiple volunteer and dog teams

For the AAA programme in this research, only one volunteer and dog team were used. Future research could consider using different volunteers and dogs during the AAA programme, rather than using just one team. This will ensure that the effects of the intervention cannot be attributed to the single team of dog and volunteer, rather than the animal-assisted activities.

5.5.2 Multiple case study method

The present study made use of a small, fairly homogenous sample. A multiple case study method could be used in future research in order to provide richer data, while still allowing for in depth consideration of the experiences of those involved.

5.5.3 Duration of AAA intervention

Future research could allow a longer duration of AAA intervention before data collection commences. This would allow for more time for the intervention to have an effect, as well as providing more time for the participants to form their opinions of AAA.

5.5.4 Exploration of different styles of implementation

Future research might consider comparing the use of individual AAA sessions and group AAA sessions, to investigate differences in implementation and effect. It might also be interesting to consider the effect of more frequent AAA sessions, thereby exploring the effect of scheduling. In addition to this, the use of AAA for different age groups, such as young children or adults, might be explored.

5.6 CONCLUSION

The aim of this study was to explore the perceptions of teachers and parents of adolescents with ASD who were participating in classroom-based AAA. The study was qualitative in nature, allowing participants to express their perceptions freely. The results of this study indicate that the teachers and parents felt that the AAA was beneficial for the adolescents involved.

The teachers involved noted several beneficial reactions in the learners during the AAA sessions, including improvements in communication and social interaction, as well as motivational, behavioural and emotional benefits. While all the learners appeared to benefit from interactions with the AAA dog, the reactions and benefits differed for individual learners, as is expected for ASD. The individual profiles for each learner, in addition to their life experience, affected how they benefited from the AAA.

While some benefits were noted at home by parents, it is evident that most of the beneficial reactions occur in the presence of the dog and are not generalised further to other settings. This was confirmation of what was found in the existing literature and is a challenge

in all ASD interventions. It is encouraging to note that some changes, particularly in behaviour, were observed by parents during the AAA programme.

The teachers and parents also provided important insight into the implementation of AAA, as well as opinions about how AAA might influence the adolescents. This contributes to the knowledge regarding how best to make use of AAA, particularly for individuals with ASD. This is important, as currently there is very little standardisation of implementation and a lack of complete understanding of who can benefit and how they benefit. While the participants did indicate some attributes of the adolescents that might affect their experience of the AAA, they were enthusiastic about the intervention and expressed their desire for it to continue and possibly be extended.

It was noted in this study that there is a lack of awareness of the subject among the participants. It is hoped that this study will contribute to the knowledge of how AAA might help those with ASD, as well as contribute to the general awareness, both of AAA and of ASD.

REFERENCES

- Adams, L., Gouvousis, A., VanLue, M., & Waldron, C. (2004). Social story intervention improving communication skills in a child with an autism spectrum disorder. *Focus on Autism and other Developmental Disabilities, 19*(2), 87–94. doi: 10.1177/10883576040190020301
- Altschiller, D. (2011). *Animal-assisted therapy*. Santa Barbara, CA: Greenwood.
- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders (5th ed)*. Arlington, VA: American Psychiatric Publishing.
- Association for Autism. (2012). *Home*. Retrieved from <http://afa.org.za>.
- Autism Western Cape. (2015). *What is Autism?* Retrieved from <http://www.autismwesterncape.org.za/what-is-autism/>
- Azeem, M. W., Imran, N., & Khawaja, I. S. (2016). Autism spectrum disorder: An update. *Psychiatric Annals, 46*(1), 58–62. doi: 10.3928/00485713-20151202-01
- Baird, G., Cass, H., & Slonims, V. (2003). Diagnosis of autism. *British Medical Journal, 327* (7413), 488–493. Retrieved from <http://www.jstor.org.ez.sun.ac.za/stable/25455385>
- Bakare, M., & Munir, K. (2011). Autism spectrum disorders (ASD) in Africa: A perspective. *African Journal of Psychiatry, 14*(3), 208–210. doi: 10.4314/ajpsy.v14i3.3
- Baribeau, D. A., & Anagnostou, E. (2014). An update on medication management of behavioral disorders in autism. *Current Psychiatry Reports, 16*(3), 1–13. doi: 10.1007/s11920-014-0437-0
- Barker, S. B., & Dawson, K. S. (1998). The effects of animal-assisted therapy on anxiety ratings of hospitalized psychiatric patients. *Psychiatric Services, 49*(6), 797–801. doi: 10.1176/ps.49.6.797
- Barneveld, P. S., Swaab, H., Fagel, S., Van Engeland, H., & De Sonnaville, L. M. J. (2014). Quality of life: A case-controlled long-term follow-up study, comparing young high-functioning adults with autism spectrum disorders with adults with other psychiatric disorders diagnosed in childhood. *Comprehensive Psychiatry, 55*, 302–310. doi: 10.1016/j.comppsy.2013.08.001
- Baron-Cohen, S., Leslie, A. M., & Frith, U. (1985). Does the autistic child have a “theory of mind”? *Cognition, 21*(1), 37–46. doi: 10.1016/0010-0277(85)90022-8

- Bass, M. M., Duchowny, C. A., & Llabre, M. M. (2009). The effect of therapeutic horseback riding on social functioning in children with autism. *Journal of Autism and Developmental Disorders*, *39*(9), 1261–1267. doi: 10.1007/s10803-009-0734-3
- Bauminger, N., Shulman, C., & Agam, G. (2003). Peer interaction and loneliness in high-functioning children with autism. *Journal of Autism and Developmental Disorders*, *33*(5), 489–507. doi: 10.1023/A:1025827427901
- Baun, M., & Johnson, R. (2010). Human-animal interaction and successful aging. In A. H. Fine (Ed.), *Handbook on animal-assisted therapy. Theoretical foundations and guidelines for practice* (3rd ed., pp. 283–299). London, England: Academic Press.
- Beck, A. M., & Katcher, A. H. (1996). *Between pets and people: The importance of animal companionship* (Rev. ed.). West Lafayette, Ind: Purdue University Press.
- Beck, A. M., & Katcher, A. H. (2003). Future directions in human-animal bond research. *American Behavioural Scientist*, *47*(1), 79–93. doi: 10.1177/0002764203255214
- Beetz, A. (2013). Socio-emotional correlates of a schooldog-teacher-team in the classroom. *Frontiers in Psychology*, *4*, 1–7. doi: 10.3389/fpsyg.2013.00886
- Bellini, S., Peters, J. K., Benner, L., & Hopf, A. (2007). A meta-analysis of school-based social skills interventions for children with autism spectrum disorders. *Remedial and Special Education*, *28*(3), 153–162. Retrieved from <http://web.a.ebscohost.com.ez.sun.ac.za/ehost>
- Berget, B., Ekeberg, Ø., Pedersen, I., & Braastad, B. O. (2011). Animal-assisted therapy with farm animals for persons with psychiatric disorders: Effects on anxiety and depression, a randomized controlled trial. *Occupational Therapy in Mental Health*, *27*, 50–64. doi: 10.1080/0164212X.2011.543641
- Berry, A., Borgi, M., Francia, N., Alleva, E., & Cirulli, F. (2013). Use of assistance and therapy dogs for children with autism spectrum disorders: A critical review of the current evidence. *The Journal of Alternative and Complementary Medicine*, *19*(2), 73–80. doi: 10.1089/acm.2011.0835
- Bert, F., Gualano, M. R., Camussi, E., Pieve, G., Voglino, G., & Siliquini, R. (2016). Animal assisted intervention: A systematic review of benefits and risks. *European Journal of Integrative Medicine*, *in press*. doi: 10.1016/j.eujim.2016.05.005

- Bishop, S., & Lord, C. (2010). Autism spectrum disorders diagnosis, prevalence, and services for children and families. *Social Policy Report*, 24(2). Retrieved from <http://eric.ed.gov/?id=ED509747>
- Boshoff, C., Grobler, H., & Nienaber, A. (2015). The evaluation of an equine-assisted therapy programme with a group of boys in a youth care facility. *Journal of Psychology in Africa*, 25(1), 86–90. doi: 10.1080/14330237.2015.1007611
- Bowker, A., D'Angelo, N. M., Hicks, R., & Wells, K. (2011). Treatments for Autism: Parental choices and perceptions of change. *Journal of Autism and Developmental Disorders*, 41, 1373–1382. doi: 10.1007/s10803-010-1164-y
- Boyd, L. (2015). “When he’s up there he’s just happy and content”: Parents’ perceptions of therapeutic horseback riding (Unpublished master’s thesis). Stellenbosch University; South Africa. Retrieved from <http://scholar.sun.ac.za/bitstream/handle/10019.1/96745/>
- Brantlinger, E., Jiminez, R., Klingner, J., Pugach, M., & Richardson, V. (2005). Qualitative studies in special education. *Exceptional Children*, 71, 195–207. doi: 10.1177/001440290507100205
- Braun, C., Stangler, T., Narveson, J., & Pettingell, S. (2009). Animal-assisted therapy as a pain relief intervention for children. *Complementary Therapies in Clinical Practice*, 15(2), 105–109. doi: 10.1016/j.ctcp.2009.02.008
- Braun, V., & Clark, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3, 77–101. doi: 10.1191/1478088706qp063oa
- Brown, S. M., & Bebko, J. M. (2012). Generalization, overselectivity, and discrimination in the autism phenotype: A review. *Research in Autism Spectrum Disorders*, 6, 733–740. doi: 10.1016/j.rasd.2011.10.012
- Buckle, C. J. (2015). *Effects of an animal visitation intervention on the depression, loneliness, and quality of life of older people: A randomised controlled study* (Unpublished master’s thesis). Stellenbosch University; South Africa. Retrieved from <http://scholar.sun.ac.za/bitstream/handle/10019.1/98082>
- Burgon, H. L. (2011). ‘Queen of the world’: Experiences of ‘at-risk’ young people participating in equine-assisted learning/therapy, *Journal of Social Work Practice*, 25(02), 165–183. doi: 10.1080/02650533.2011.561304

- Camargo, S. P. H., Rispoli, M., Ganz, J., Hong, E. R., Davis, H., & Mason, R. (2014). A review of the quality of behaviorally-based intervention research to improve social interaction skills of children with ASD in inclusive settings. *Journal of Autism and Developmental Disorders*, *44*, 2096–2116. doi: 10.1007/s10803-014-2060-7
- Carlson, S., Carter, M., & Stephenson, J. (2015). Decision-making regarding early intervention by parents of children with autism spectrum disorder. *Journal of Developmental and Physical Disabilities*, *27*(3), 285–305. doi: 10.1007/s10882-014-9415-z
- Cauffman, J. S. (2013). Medication use in autism spectrum disorders: What is the evidence? *Formulary*, *48*(5), 161–168. Retrieved from <http://search.proquest.com.ez.sun.ac.za/docview>
- Centres for Disease Control and Prevention. (2014). *Autism spectrum disorders*. Retrieved from <http://www.cdc.gov/ncbddd/autism/data.html>.
- Chamberlain, B., Kasari, C., & Rotheram-Fuller, E. (2007). Involvement or isolation? The social networks of children with autism in regular classrooms. *Journal of Autism and Developmental Disorders*, *37*(2), 230–242. doi: 10.1007/s10803-006-0164-4
- Charman, T., Jones, C. R. G., Pickles, A., Simonoff, E., Baird, G., & Happé, F. (2011). Defining the cognitive phenotype of autism. *Brain Research*, *1380*, 10–21. doi: 10.1016/j.brainres.2010.10.075
- Chevallier, C., Kohls, G., Troiani, V., Brodtkin, E. S., & Schultz, R. T. (2012). The social motivation theory of autism. *Trends in Cognitive Sciences*, *16*(4), 231–239. doi: 10.1016/j.tics.2012.02.007
- Coetzee, J. (2012). *Exploring the influence of pet assisted activities on aggressive behaviour amongst Grade R learners* (Unpublished master's thesis). Stellenbosch University; South Africa. Retrieved from <http://scholar.sun.ac.za/bitstream/handle/10019.1/71715>
- Constantino, J. N., & Charman, T. (2016). Diagnosis of autism spectrum disorder: Reconciling the syndrome, its diverse origins, and variation in expression. *Lancet Neurology*, *15*, 279–291. doi: 10.1016/S1474-4422(15)00151-9
- Cotugno, A. J. (2009). Social competence and social skills training and intervention for children with autism spectrum disorders. *Journal of Autism and Developmental Disorders*, *39*, 1268–1277. doi: 10.1007/s10803-009-0741-4

- Darrou, C., Pry, R., Pernon, E., Michelon, C., Aussilloux, C., & Baghdadli, A. (2010). Outcome of young children with autism: Does the amount of intervention influence developmental trajectories? *Autism, 14*(6), 663–677. doi: 10.1177/1362361310374156
- Davis, T. E., III., Moree, B. N., Dempsey, T., Reuther, E. T., Fodstad, J. C., Hess, J. A., ... & Matson, J. L. (2011). The relationship between autism spectrum disorders and anxiety: The moderating effect of communication. *Research in Autism Spectrum Disorders, 5*(1), 324–329. doi: 10.1016/j.rasd.2010.04.015
- Davis, T. N., Scalzo, R., Butler, E., Stauffer, M., Farah, Y. N., Perez, S., . . . Coviello, L. (2015). Animal assisted interventions for children with autism spectrum disorder: A systematic review. *Education and Training in Autism and Developmental Disabilities, 50*(3), 316–329. Retrieved from Retrieved from <http://ez.sun.ac.za/login?url=http://search.proquest.com/docview/1707836156?accountid=14049>
- Dawson, N. (2013). *An ecological perspective on parents' experiences of having a child with autistic spectrum disorder (ASD) in the South African context* (Unpublished doctoral dissertation). University of Witwatersrand; South Africa. Retrieved from <http://wiredspace.wits.ac.za/handle/10539/12606>
- De Villiers, J. (2007). The interface of language and theory of mind. *Lingua, 117*, 1858–1878. doi:10.1016/j.lingua.2006.11.006
- De Villiers, J. (2009). *Terapeutiese perdry ter bevordering van bewustheid by die kind met fetale alkohol sindroom* [Therapeutic horse riding to promote awareness in the child with Fetal Alcohol Syndrome] (Unpublished master's thesis). University of South Africa; South Africa. Retrieved from <http://uir.unisa.ac.za/bitstream/handle/10500/1889/02dissertation.pdf?sequence=1&isAllowed=y>
- De Vries, M., & Geurts, H. (2015). Influence of autism traits and executive functioning on quality of life in children with an autism spectrum disorder. *Journal of Autism and Developmental Disorders, 45*, 2734–2743. doi: 10.1007/s10803-015-2438-1
- De Vries, P. J. (2016). Thinking globally to meet local needs: Autism spectrum disorders in Africa and other low-resource environments. *Current Opinion in Neurology, 29*(2), 130–136. doi: 10.1097/WCO.0000000000000297

- DiCicco- Bloom, B., & Crabtree, B. F. (2006). The qualitative research interview. *Medical Education*, 40(4), 314–321. doi: 10.1111/j.1365-2929.2006.02418.x
- Durrheim, K. (2006) Research design. In M. T. Terre Blanche, K. Durrheim, & D. Painter (Eds.), *Research in practice: Applied methods for the social sciences* (2nd ed., pp. 33–59). Cape Town; South Africa: University of Cape Town Press.
- Eldar, E., Talmor, R., & Wolf- Zukerman, T. (2010). Successes and difficulties in the individual inclusion of children with Autism Spectrum Disorder (ASD) in the eyes of their coordinators. *International Journal of Inclusive Education*, 14(1), 97–114. doi: 10.1080/13603110802504150
- Elsabbagh, M., Divan, B., Koh, Y., Kim, Y. S., Kauchali, S., Marcin, C., . . . Wang, C. (2012). Global prevalence of autism and other pervasive developmental disorders. *Autism Research*, 5(3), 160–179. doi: 10.1002/aur.239
- Endenburg, N., & Van Lith, H. A. (2011). The influence of animals on the development of children. *The Veterinary Journal*, 190(2), 208–214. doi: 10.1016/j.tvjl.2010.11.020
- Esposito, L., McCune, S., Griffin, J. A., & Maholmes, V. (2011). Directions in human–animal interaction research: Child development, health, and therapeutic interventions. *Child Development Perspectives*, 5(3), 205–211. doi: 10.1111/j.1750-8606.2011.00175.x
- Esteves, S. W., & Stokes, T. (2008). Social effects of a dog's presence on children with disabilities. *Anthrozoös*, 21(1), 5–15. doi: 10.2752/089279308X274029
- Fakhoury, M. (2015). Autistic spectrum disorders: A review of clinical features, theories and diagnosis. *International Journal of Developmental Neuroscience*, 43, 70–77. doi: 10.1016/j.ijdevneu.2015.04.003
- Fiksdal, B. L., Houlihan, D., & Barnes, A. C. (2012). Dolphin-assisted therapy: Claims versus evidence. *Autism Research and Treatment*, 2012(9), 1–7. doi: 10.1155/2012/839792
- Fine, A. H., & Beck, A. (2010). Understanding our kinship with animals: Input for health care professionals interested in the human/animal bond. In A. H. Fine (Ed.), *Handbook on animal-assisted therapy. Theoretical foundations and guidelines for practice* (3rd ed., pp. 3–15). London, England: Academic Press.

- Fombonne, E. (2009). Epidemiology of pervasive developmental disorders. *Pediatric Research*, 65(6), 591–598. doi: 10.1203/PDR.0b013e31819e7203
- Fombonne, E., Quirke, S., & Hagen, A. (2009). Prevalence and interpretation of recent trends in rates of pervasive developmental disorders. *The McGill Journal of Medicine*, 12(2), 73. Retrieved from www.ncbi.nlm.nih.gov/pmc/articles/PMC2997266
- Fredrickson-MacNamara, M., & Butler, K. (2010). Animal selection procedures in animal-assisted interaction programs. In A. H. Fine (Ed.), *Handbook on animal-assisted therapy. Theoretical foundations and guidelines for practice* (3rd ed., pp. 111–134). London, England: Academic Press.
- Friedmann, E., Son, H., & Tsai, A. (2010). The animal/human bond: Health and wellness. In A. H. Fine (Ed.), *Handbook on animal-assisted therapy. Theoretical foundations and guidelines for practice* (3rd ed., pp. 85–107). London, England: Academic Press.
- Friesen, L. (2010). Exploring animal-assisted programs with children in school and therapeutic contexts. *Early Childhood Education Journal*, 37, 261–267. doi: 10.1007/s10643-009-0349-5
- Frith, U., & Happé, F. (1994). Autism: Beyond “theory of mind”. *Cognition*, 50(1–3), 115–132. doi:10.1016/0010-0277(94)90024-8
- Fung, S. C., & Leung, A. S. M. (2014). Pilot study investigating the role of therapy dogs in facilitating social interaction among children with autism. *Journal of Contemporary Psychotherapy*, 44(4), 253–262. doi: 10.1007/s10879-014-9274-z
- Gabriels, R. L., Pan, Z., Dechant, B., Agnew, J. A., Brim, N., & Mesibov, G. (2015). Randomized controlled trial of therapeutic horseback riding in children and adolescents with autism spectrum disorder. *Journal of the American Academy of Child & Adolescent Psychiatry*, 54(7), 541–549. doi: 10.1016/j.jaac.2015.04.007
- Gardner, N. (2008). *A friend like Henry*. Naperville, IL: Sourcebooks, Inc.

- Garland, S. (2013). *An explorative study of the perceptions of social workers who are exposed to work-related, secondary traumatic experiences through their clientele, of the psychosocial support equine-assisted therapy (E.A.T) could provide* (Unpublished master's thesis). University of Cape Town; South Africa. Retrieved from https://open.uct.ac.za/bitstream/handle/11427/3832/thesis_hsf_2013_garland_sarah.pdf?sequence=1
- Geist, T. S. (2011). Conceptual framework for animal assisted therapy. *Child and Adolescent Social Work Journal*, 28(3), 243–256. doi: 10.1007/s10560-011-0231-3
- Ghesquière, P., Maes, B., & Vandenberghe, R. (2004). The usefulness of qualitative case studies in research on special needs education. *International Journal of Disability, Development and Education*, 51, 171–184. doi: 10.1080/10349120410001687382
- Goin-Kochel, R. P., Mackintosh, V. H., & Myers, B. J. (2006). How many doctors does it take to make an autism spectrum diagnosis? *Autism*, 10(5), 439–451. doi: 10.1177/1362361306066601
- Grandgeorge, M., Bourreau, Y., Alavi, Z., Lemonnier, E., Tordjman, S., Deleau, M., & Hausberger, M. (2015). Interest towards human, animal and object in children with autism spectrum disorders: An ethological approach at home. *European Child & Adolescent Psychiatry*, 24(1), 83–93. doi: 10.1007/s00787-014-0528-9
- Grandin, T., Fine, A. H., & Bowers, C. M. (2010). The use of therapy animals with individuals with autism spectrum disorders. In A. H. Fine (Ed.), *Handbook on animal-assisted therapy. Theoretical foundations and guidelines for practice* (3rd ed., pp. 247–264). London, England: Academic Press.
- Green, V. A. (2007). Parental experience with treatments for autism. *Journal of Developmental and Physical Disabilities*, 19, 91–101. doi: 10.1007/s10882-007-9035y
- Guthrie, W., Swineford, L. B., Nottke, C., & Wetherby, A. M. (2013). Early diagnosis of autism spectrum disorder: Stability and change in clinical diagnosis and symptom presentation. *Journal of Child Psychology and Psychiatry*, 54(5), 582–590. doi:10.1111/jcpp.12008

- Harper, C. M., Dong, Y., Thornhill, T. S., Wright, J., Ready, J., Brick, G. W., & Dyer, G. (2015). Can therapy dogs improve pain and satisfaction after total joint arthroplasty? A randomized controlled trial. *Clinical Orthopaedics and Related Research*, 473, 372–379. doi: 10.1007/s11999-014-3931-0
- Hart, L. A. (2010). Positive effects of animals for psychosocially vulnerable people: A turning point for delivery. In A. H. Fine (Ed.), *Handbook on animal-assisted therapy. Theoretical foundations and guidelines for practice* (3rd ed., pp. 59–84). London, England: Academic Press.
- Hartley, S. L., Barker, E. T., Seltzer, M. M., Greenberg, J. S., & Floyd, F. J. (2011). Marital satisfaction and parenting experiences of mothers and fathers of adolescents and adults with autism. *American Journal of Intellectual and Developmental Disabilities*, 116(1), 81–95. doi: 10.1352/1944-7558-116.1.81
- Hartley, S. L., Sikora, D. M., & McCoy, R. (2008). Prevalence and risk factors of maladaptive behaviour in young children with autistic disorder. *Journal of Intellectual Disability Research*, 52(10), 819–829. doi: 10.1111/j.1365-2788.2008.01065.x
- Helfer, A. (2006). *Equine-assisted therapy for primary school children with physical disabilities: A psychosocial view* (Unpublished master's thesis). Stellenbosch University; South Africa. Retrieved from <http://uir.unisa.ac.za/bitstream/handle/10500/1889/02dissertation.pdf?sequence=1&isAllowed=y>
- Hergovich, A., Monshi, B., Semmler, G., & Zieglmayer, V. (2002). The effects of the presence of a dog in the classroom. *Anthrozoös*, 15(1), 37–50. doi: 10.2752/089279302786992775
- Hines, L. M. (2003). Historical perspectives on the human-animal bond. *American Behavioral Scientist*, 47(1), 7–15. doi: 10.1177/0002764203255206
- Houghton, C. E., Casey, D., Shaw, D., & Murphy, K. (2010). Ethical challenges in qualitative research: Examples from practice. *Nurse Researcher*, 18(1), 15–25. doi: 10.7748/nr2010.10.18.1.15.c8044
- Howlin, P. (1997). Prognosis in autism: Do specialist treatments affect long-term outcome? *European Child & Adolescent Psychiatry*, 6(2), 55–72. doi: 10.1007/BF00566668

- Hoy, J. A., Hatton, C., & Hare, D. (2004). Weak central coherence: a cross-domain phenomenon specific to autism?. *Autism, 8*(3), 267–281. doi: 10.1177/1362361304045218
- Humphrey, N., & Lewis, S. (2008). ‘Make me normal’: The views and experiences of pupils on the autistic spectrum in mainstream secondary schools. *Autism, 12*(1), 23–46. doi: 10.1177/1362361307085267
- Hurwitz, J. (2013). *Exploring equine assisted psychotherapy for adolescents in residential care* (Unpublished master’s thesis). Stellenbosch University; South Africa. Retrieved from http://scholar.sun.ac.za/bitstream/handle/10019.1/85745/hurwitz_exploring_2013.pdf?sequence=1
- Ikeda, E., Hinckson, E., & Krägeloh, C. (2014). Assessment of quality of life in children and youth with autism spectrum disorder: A critical review. *Quality of Life Research, 23*, 1069–1085. doi: 10.1007/s11136-013-0591-6
- Isaacson, R. (2009). *The Horse Boy*. New York, NY: Little Brown Company.
- Jelsma, J., & Clow, S. (2005). Ethical issues relating to qualitative research. *South African Journal of Physiotherapy, 61*(1), 3–6. Retrieved from <http://www.sajp.co.za/index.php/sajp>
- Johnson, C. P., Myers, S. M., & The Council on Children With Disabilities. (2007). Identification and evaluation of children with autism spectrum disorders. *American Academy of Pediatrics, 120*, 1183–1215. doi: 10.1542/peds.2007-2361
- Johnson, R., & Waterfield, J. (2004). Making words count: The value of qualitative research. *Physiotherapy Research International, 9*(3), 121–131. doi: 10.1002/pri.312
- Jones, R. S., Zahl, A., & Huws, J. C. (2001). First-hand accounts of emotional experiences in autism: A qualitative analysis. *Disability & Society, 16*(3), 393–401. doi: <http://dx.doi.org/10.1080/09687590120045950>
- Kalkbrenner, A. E., Schmidt, R. J., & Penlesky, A. C. (2014). Environmental chemical exposures and autism spectrum disorders: A review of the epidemiological evidence. *Current Problems in Pediatric and Adolescent Health Care, 44*(10), 277–318. doi: 10.1016/j.cppeds.2014.06.001

- Karst, J. S., & Van Heck, A. V. (2012). Parent and family impact of autism spectrum disorders: A review and proposed model for intervention evaluation. *Clinical Child and Family Psychology Review*, *15*, 247–277. doi: 10.1007/s10567-012-0119-6
- Kasari, C. (2002). Assessing change in early intervention programs for children with autism. *Journal of Autism and Developmental Disorders*, *32*(5), 447–461. doi: 10.1023/A:1020546006971
- Kasari, C., Shire, S., Factor, R., & McCracken, C. (2014). Psychosocial treatments for individuals with autism spectrum disorder across the lifespan: New developments and underlying mechanisms. *Current Psychiatry Reports*, *16*(11), 1–12. doi: 10.1007/s11920-014-0512-6
- Keino, H., Funahashi, A., Keino, H., Miwa, C., Hosokawa, M., Hayashi, Y., & Kawakita, K. (2009). Psycho-educational horseback riding to facilitate communication ability of children with pervasive developmental disorders. *Journal of Equine Science*, *20*(4), 79–88. doi: 10.1294/jes.20.79
- Klintwall, L., Eldevik, S., & Eikeseth, S. (2013). Narrowing the gap: Effects of intervention on developmental trajectories in autism. *Autism*, *19*(1), 53–63. doi: 10.1177/1362361313510067
- Knott, F., Dunlop, A. W., & Mackay, T. (2006). Living with ASD: How do children and their parents assess their difficulties with social interaction and understanding? *Autism*, *10*(6), 609–617. doi: 10.1177/1362361306068510
- Koegel, L. K., Singh, A. K., & Koegel, R. L. (2010). Improving motivation for academics in children with autism. *Journal of Autism and Developmental Disorders*, *40*(9), 1057–1066. doi: 10.1007/s10803-010-0962-6
- Kohls, G., Chevallier, C., Troiani, V., & Schultz, R. T. (2012). Social ‘wanting’ dysfunction in autism: Neurobiological underpinnings and treatment implications. *Journal of Neurodevelopmental Disorders*, *4*(1), 1–20. doi: 10.1186/1866-1955-4-10
- Kotrschal, K., & Ortbauer, B. (2003). Behavioral effects of the presence of a dog in a classroom. *Anthrozoös*, *16*(2), 147–159.
- Kršková, L., Talarovičová, A., & Olexová, L. (2010). Guinea pigs—The “small great” therapist for autistic children, or: Do guinea pigs have positive effects on autistic child social behavior? *Society & Animals*, *18*(2), 139–151. doi: 10.1163/156853010X491999

- Kruger, K. A., & Serpell, J. A. (2010). Animal-assisted interventions in mental health: Definitions and theoretical foundations. In A. H. Fine (Ed.), *Handbook on animal-assisted therapy. Theoretical foundations and guidelines for practice* (3rd ed., pp. 33–48). London, England: Academic Press.
- Lai, M., Lombardo, M. V., & Baron-Cohen, S. (2014). Autism. *Lancet*, *383*, 896–910. doi: 10.1016/S0140-6736(13)61539-1
- Lambert- Lee, K. A., Jones, R., O'Sullivan, J., Hastings, R. P., Douglas- Cobane, E., Thomas, J., . . . Griffith, G. (2015). Translating evidence- based practice into a comprehensive educational model within an autism- specific special school. *British Journal of Special Education*, *42*(1), 69–86. doi: 10.1111/1467-8578.12090
- Landa, R. (2007). Early communication development and intervention for children with autism. *Mental Retardation and Developmental Disabilities Research Reviews*, *13*(1), 16–25. doi: 10.1002/mrdd.20134
- Lasgaard, M., Nielsen, A., Eriksen, M. E., & Goossens, L. (2010). Loneliness and social support in adolescent boys with autism spectrum disorders. *Journal of autism and developmental disorders*, *40*(2), 218–226. doi: 10.1007/s10803-009-0851-z
- Leekam, R. S., Prior, M. R., & Uljarevic, M. (2011). Restrictive and repetitive behaviours in autism spectrum behaviours: A review of research in the last decade. *Psychological Bulletin*, *137*(4), 562–593. doi: 10.1037/a0023341
- Lefebvre, S. L., Golab, G. C., Christensen, E. L., Castrodale, L., Aureden, K., Bialachowski, A., . . . Card, M. L. (2008). Guidelines for animal-assisted interventions in health care facilities. *American Journal of Infection Control*, *36*(2), 78–85. doi: 10.1016/j.ajic.2007.09.005
- Le Roux, M. C., & Kemp, R. (2009). Effect of a companion dog on depression and anxiety levels of elderly residents in a long-term care facility. *Psychogeriatrics*, *9*, 23–26. doi: 10.1111/j.1479-8301.2009.00268.x
- Le Roux, M. C., Swartz, L., & Swart, E. (2014). The effect of an animal-assisted reading program on the reading rate, accuracy and comprehension of grade 3 students: A randomized control study. *Child Youth Care Forum*, *43*, 655–673. doi: 10.1007/s10566-014-9262-1

- Levy, A., & Perry, A. (2011). Outcomes in adolescents and adults with autism: A review of the literature. *Research in Autism Spectrum Disorders*, 5(4), 1271–1282. doi: 10.1016/j.rasd.2011.01.023
- Levy, S. E., Mandell, D. S., & Schultz, R. T. (2009). Autism. *The Lancet*, 374, 1267–1638. doi: 10.1016/S0140-6736(09)61376-3
- Limond, J. A., Bradshaw, J. W., & Cormack, M. K. (1997). Behavior of children with learning disabilities interacting with a therapy dog. *Anthrozoös*, 10(2-3), 84–89. doi: 10.2752/089279397787001139
- Lubbe, C., & Scholtz, S. (2013). The application of animal-assisted therapy in the South African context: A case study. *South African Journal of Psychology*, 43(1), 116–129. doi: 10.1177/0081246312474405
- Ludlow, A., Skelly, C., & Rohleder, P. (2011). Challenges faced by parents of children diagnosed with autism spectrum disorder. *Journal of Health Psychology*, 17(5), 702–711. doi: 10.1177/1359105311422955
- Lytle, R., & Todd, T., (2009). Stress and the student with autism spectrum disorder: Strategies for stress reduction and enhanced learning. *Teaching Exceptional Children*, 41(4), 36–42. Retrieved from <http://search.proquest.com.ez.sun.ac.za>
- Maglione, M. A., Gans, D., Das, L., Timbie, J., & Kasari, C. (2012). Nonmedical interventions for children with ASD: Recommended guidelines and further research needs. *Pediatrics*, 130(Supp 2), S169–S178.
- Malcolm-Smith, S., Hoogenhout, M., Ing, N., Thomas, K. G. F., & De Vries, P. (2013). Autism spectrum disorders – Global challenges and local opportunities. *Journal of Child and Adolescent Mental Health*, 25(1), 1–5. doi: 10.2989/17280583.2013.767804
- Mallon, G. P., Ross, S. B., Klee, S., Ross, L., & Fine, A. (2006). Designing and implementing animal-assisted therapy programs in health and mental health organizations. In A. H. Fine (Ed.), *Handbook on animal-assisted therapy: Theoretical foundations and guidelines for practice* (2nd ed., 149–163). San Diego, CA: Academic Press.

- Mandy, W. P. L., & Skuse, D. H. (2008). Research review: What is the association between the social-communication element of autism and repetitive interests, behaviours and activities? *The Journal of Child Psychology and Psychiatry*, *49*(8), 795–808. doi: 10.1111/j.1469-7610.2008.01911.x
- Marcus, D. A. (2013). The science behind animal-assisted therapy. *Current Pain and Headache Reports*, *17*(4), 322. doi: 10.1007/s11916-013-0322-2
- Martin, F., & Farnum, J. (2002). Animal-assisted therapy for children with pervasive developmental disorder. *Western Journal of Nursing Research*, *24*(6), 657–670. doi: 10.1177/019394502236639
- Matelski, L., & Van de Water, J. (2016). Risk factors in autism: Thinking outside the brain. *Journal of Autoimmunity*, *67*, 1–7. doi: 10.1016/j.jaut.2015.11.003
- Matson, J. L., Adams, H. L., Williams, L. W., & Rieske, R. D. (2013). Why are there so many unsubstantiated treatments in autism? *Research in Autism Spectrum Disorder*, *7*, 466–474. doi: 10.1016/j.rasd.2012.11.006
- Matson, J. L., & Wilkens, J. (2007). A critical review of assessment targets and methods for social skills excesses and deficits for children with autism spectrum disorders. *Research in Autism Spectrum Disorder*, *1*, 28–37. doi: 10.1016/j.rasd.2006.07.003
- Matson, J. L., & Williams, L. W. (2015). The curious selection process of treatments for autism spectrum disorders. *Research in Autism Spectrum Disorders*, *9*, 21–25. doi: 10.1016/j.rasd.2014.10.004
- McLeod, B. D., Wood, J. J., & Klebanoff, S. (2015). Advances in evidence-based intervention and assessment practices for youth with an autism spectrum disorder. *Behavior therapy*, *46*(1), 1–6. doi: 10.1016/j.beth.2014.07.004
- McNicholas, J., & Collis, G. M. (2000). Dogs as catalysts for social interactions: Robustness of the effect. *British Journal of Psychology*, *91*, 61–60. Retrieved from https://www.researchgate.net/profile/Glyn_Collis
- McNicholas, J., & Collis, G. M. (2006). Animals as social supports: Insights for understanding animal-assisted therapy. In A. H. Fine (Ed.), *Handbook on animal-assisted therapy: Theoretical foundations and guidelines for practice* (2nd ed., 49–72). San Diego, CA: Academic Press.

- Melson, G. F., & Fine, A. H. (2010). Animals in the lives of children. In A. H. Fine (Ed.), *Handbook on animal-assisted therapy. Theoretical foundations and guidelines for practice* (3rd ed., pp. 223–245). London, England: Academic Press.
- Menna, L. F., Santaniello, A., Gerardi, F., Di Maggio, A., & Milan, G. (2016). Evaluation of the efficacy of animal- assisted therapy based on the reality orientation therapy protocol in Alzheimer's disease patients: A pilot study. *Psychogeriatrics*, *16*(4), 240–246. doi: 10.1111/psyg.12145
- Merriam, S. B. (1998). *Qualitative research and case study applications in education (2nd ed.)*. San Francisco, CA: Jossey-Bass.
- Moretti, F., De Ronchi, D., Bernabei, V., Marchetti, L., Ferrari, B., Forlani, C., . . . Atti, A. R. (2011). Pet therapy in elderly patients with mental illness. *Psychogeriatrics*, *11*(2), 125–129. doi: 10.1111/j.1479-8301.2010.00329.x
- Mossello, E., Ridolfi, A., Mello, A. M., Lorenzini, G., Mugnai, F., Piccini, C., ... & Marchionni, N. (2011). Animal-assisted activity and emotional status of patients with Alzheimer's disease in day care. *International Psychogeriatrics*, *23*(6), 899–905. doi: 10.1017/S1041610211000226
- Myers, B. J., Mackintosh, V. H., & Goin-Kochel, R. P. (2009). “My greatest joy and my greatest heartache”: Parents’ own words on how having a child in the autism spectrum has affected their lives and their families’ lives. *Research in Autism Spectrum Disorder*, *3*, 670–684. doi: 10.1016/j.rasd.2009.01.004
- Nagengast, S. L., Baun, M. M., Megel, M., & Leibowitz, J. M. (1997). The effects of the presence of a companion animal on physiological arousal and behavioral distress in children during a physical examination. *Journal of Pediatric Nursing*, *12*(6), 323–330. doi: 10.1016/S0882-5963(97)80058-9
- Nastasi, B. K., & Schensul, S. L. (2005). Contributions of qualitative research to the validity of intervention research. *Journal of School Psychology*, *43*, 177–195. doi: 10.1016/j.jsp.2005.04.003
- Nathans-Barrel, I., Feldman, P., Berger, B., Modai, I., & Silver, H. (2005). Animal-assisted therapy ameliorates anhedonia in Schizophrenia patients: A controlled pilot study. *Psychotherapy and Psychosomatics*, *74*, 31–35. doi: 10.1159/000082024

- Nimer, J., & Lundahl, B. (2007). Animal-assisted therapy: A meta-analysis. *Anthrozoös*, 20(3), 225–238. doi: 10.2752/089279307X224773
- Nordgren, L., & Engström, G. (2013). Animal-assisted intervention in dementia: Effects on quality of life. *Clinical Nursing Research*, 23(1), 7–19. doi: 10.1177/1054773813492546
- Norwich, B. (2005). Inclusion: Is it a matter of evidence about what works or about values and rights?. *Education 3-13*, 33(1), 51–56. doi: 10.1080/03004270585200091
- Odendaal, J. S. J., & Meintjies, R. A. (2003). Neurophysiological correlates of affiliative behaviour between humans and dogs. *The Veterinary Journal*, 165, 296–301. doi: 10.1016/S1090-0233(02)00237-X
- Odom, S. L., Boyd, B. A., Hall, L. J., & Hume, K. (2010). Evaluation of comprehensive treatment models for individuals with autism spectrum disorders. *Journal for Autism and Developmental Disorders*, 40, 425–436. doi: 10.1007/s10803-009-0825-1
- O’Haire, M. E. (2010). Companion animals and human health: Benefits, challenges, and the road ahead. *Journal of Veterinary Behaviour*, 5, 226–234. doi: 10.1016/j.jveb.2010.02.00
- O’Haire, M. E. (2013a). Animal-assisted intervention for autism spectrum disorder: A systematic literature review. *Journal for Autism and Developmental Disorders*, 43, 1606–1622. doi: 10.1007/s10803-012-1707-5
- O’Haire, M. E. (2013b). Review of current evidence and future directions in animal-assisted intervention for children with autism. *OA Autism*, 1(1), 6–10. Retrieved from <http://www.researchgate.net/publication/258021625>
- O’Haire, M. E., Guérin, N. A., & Kirkham, A. C. (2015). Animal-assisted intervention for trauma: A systematic literature review. *Frontiers in Psychology*, 6, 1121. doi: 10.3389/fpsyg.2015.01121
- O’Haire, M. E., McKenzie, S. J., Beck, A. M., & Slaughter, V. (2013). Social behaviours increase in children with autism in the presence of animals compared to toys. *Plos One* 8(2): e57010. doi: 10.1371/journal.pone.0057010

- O'Haire, M. E., McKenzie, S. J., Beck, A. M., & Slaughter, V. (2015). Animals may act as social buffers: Skin conductance arousal in children with autism spectrum disorder in a social context. *Developmental Psychobiology*, *57*(5), 584–595. doi: 10.1002/dev.21310
- O'Haire, M. E., McKenzie, S. J., McCune, S., & Slaughter, V. (2014). Effects of classroom animal-assisted activities on social functioning in children with autism spectrum disorder. *The Journal of Alternative and Complementary Medicine*, *20*(3), 162–168. doi: 10.1089/acm.2013.0165
- O'Hare, A. (2009). Autism spectrum disorder: Diagnosis and management. *Archives of Disease in Childhood - Education & Practice Edition*, *94*(6), 161–168. doi: 10.1136/adc.2008.150490
- O'Neil, S. (2008). The meaning of autism: Beyond disorder. *Disability & Society*, *23*(7), 787–799. doi: 10.1080/09687590802469289
- Orb, A., Eisenhauer, L., & Wynaden, D. (2001). Ethics in qualitative research. *Journal of Nursing Scholarship*, *33*(1), 93–96. doi: 10.1111/j.1547-5069.2001.00093.x
- Orlandi, M., Trangeled, K., Mambrini, A., Tagliani, M., Ferrarini, A., Zanetti, L., . . . Cantore, M. (2007). Pet therapy effects on oncological day hospital patients undergoing chemotherapy treatment. *Anticancer Research*, *27*(6c), 4301–4303. Retrieved from <http://ar.iiarjournals.org/content/27/6C/4301.full.pdf>
- Pajareya, K., & Nopmaneejumruslers, K. (2011). A pilot randomized controlled trial of DIR/Floortime™ parent training intervention for pre-school children with autistic spectrum disorders. *Autism*, *15*(5), 563–577. doi: 10.1177/1362361310386502
- Paws for People Therapy Dogs. (2014). *Home*. Retrieved from <http://www.pawsforpeople.co.za/index.html>
- Pets As Therapy, (n.d.). *About PAT: An introduction to PAT*. Retrieved from <http://www.pat.org.za/index.php/about-pat/an-introduction-to-pat>.
- Pisula, E. (2007). A comparative study of stress profiles in mothers of children with autism and those of children with Down's syndrome. *Journal of Applied Research in Intellectual Disabilities*, *20*(3), 274–278. doi: 10.1111/j.1468-3148.2006.00342.x

- Prothman, A., Ettrich, C., & Prothman, S. (2009). Preference for, and responsiveness to, people, dogs and objects in children with autism. *Anthrozoös*, 22(2), 161–171. doi: 10.2752/175303709X434185
- Rajendran, G., & Mitchell, P. (2007). Cognitive theories of autism. *Developmental Review*, 27(2), 224–260. doi: 10.1016/j.dr.2007.02.001
- Ravet, J. (2011). Inclusive/exclusive? Contradictory perspectives on autism and inclusion: The case for an integrative position. *International Journal of Inclusive Education*, 15(6), 667–682. doi: 10.1080/13603110903294347
- Redefer, L. A., & Goodman, J. F. (1989). Brief report: Pet-facilitated therapy with autistic children. *Journal of Autism and Developmental Disorders*, 19(3), 461–467. doi: 10.1007/BF02212943
- Reed, P., Osborne, L. A., & Waddington, E. M. (2012). A comparative study of the impact of mainstream and special school placement on the behaviour of children with autism spectrum disorders. *British Educational Research Journal*, 38(5), 749–763. doi: 10.1080/01411926.2011.580048
- Rinquest, E. S. (2005). *Die benutting van diergefasiliteerde speltherapie met die leerder met outisme* [The utilisation of animal-assisted play therapy with the learner with autism] (Unpublished master's thesis). University of South Africa; South Africa. Retrieved from <http://uir.unisa.ac.za/bitstream/handle/10500/2238/dissertation.pdf?sequence=1>
- Robinson, O. C. (2014). Sampling in interview-based qualitative research: A theoretical and practical guide. *Qualitative Research in Psychology*, 11, 25–41. doi: 10.1080/14780887.2013.801543
- Rogers, S. J., & Vismara, L. A. (2008). Evidence-based comprehensive treatments for early autism. *Journal of Clinical Child and Adolescent Psychology*, 37(1), 8–38. doi: 10.1080/15374410701817808
- Saint-Georges, C., Mahdhaoui, A., Chetouani, M., Cassel, R. S., Laznik, M. C., Apicella, F. . . Cohen, D. (2011). Do parents recognize autistic deviant behavior long before diagnosis? Taking into account interaction using computational methods. *PloS One*, 6(7), e22393. doi:10.1371/journal.pone.0022393

- Sams, M. J., Fortney, E. V., & Willenbring, S. (2006). Occupational therapy incorporating animals for children with autism: A pilot investigation. *American Journal of Occupational Therapy*, *60*(3), 268–274. doi: 10.5014/ajot.60.3.268
- Saracino, J., Noseworthy, J., Steiman, M., Reisinger, L., & Fombonne, E. (2010). Diagnostic and assessment issues in autism surveillance and prevalence. *Journal of Developmental and Physical Disability*, *22*, 317–330. doi: 10.1007/s10882-010-92051
- Schreibman, L., Dawson, G., Stahmer, A. C., Landa, R., Rogers, S. J., McGee, G. G., ... & McNERNEY, E. (2015). Naturalistic developmental behavioral interventions: Empirically validated treatments for autism spectrum disorder. *Journal of Autism and Developmental Disorders*, *45*, 2411–2428. doi: 10.1007/s10803-015-2407-8
- Schultz, R. T. (2005). Developmental deficits in social perception in autism: The role of the amygdala and fusiform face area. *International Journal of Developmental Neuroscience*, *23*(2-3), 125–141. doi: 10.1016/j.ijdevneu.2004.12.012
- Sealey, L. A., Hughes, B. W., Sriskanda, A. N., Guest, J. R., Gibson, A. D., Johnson-Williams, L., . . . Bagasra, O. (2016). Environmental factors in the development of autism spectrum disorders. *Environment International*, *88*, 288–298. doi: 10.1016/j.envint.2015.12.021
- Sellers, D. M. (2008). The evaluation of an animal-assisted therapy intervention for elders with dementia in long-term care. *Activities, Adaptation & Aging*, *20*(1), 61–77. doi: 10.1300/J016v30n01_04
- Seltzer, M. M., Shattuck, P., Abbeduto, L., & Greenberg, J. S. (2004). Trajectory of development in adolescents and adults with autism. *Mental Retardation and Developmental Disabilities Research Reviews*, *10*(4), 234–247. doi: 10.1002/mrdd.20038
- Sentoo, G. S. (2003). *The influence of animal-assisted play therapy on the self-esteem of adolescents with special needs* (Unpublished master's thesis). University of Pretoria, South Africa. Retrieved from <http://www.repository.up.ac.za/dspace/bitstream/handle/2263/22901/00dissertation.pdf?sequence=1>
- Serpell, J. A. (2010). Animal-assisted interventions in historical perspective. In A. H. Fine (Ed.), *Handbook on animal-assisted therapy. Theoretical foundations and guidelines for practice* (3rd ed., pp. 17–32). London, England: Academic Press.

- Serpell, J. A., Coppinger, R., Fine, A. H., & Peralta, J. M. (2010). Welfare considerations in therapy and assistance animals. In A. H. Fine (Ed.), *Handbook on animal-assisted therapy. Theoretical foundations and guidelines for practice* (3rd ed., pp. 481–503). London, England: Academic Press.
- Shenton, A. K. (2004). Strategies for ensuring trustworthiness in qualitative research projects. *Education for Information*, 22(2), 63–75.
- Silva, K., Correia, R., Lima, M., Magalhães, A., & De Sousa, L. (2011). Can dogs prime autistic children for therapy? Evidence from a single case study. *The Journal of Alternative and Complementary Medicine*, 17(7), 655–659. doi: 10.1089/acm.2010.0436
- Simpson, R. L., Mundschenk, N. A., & Heflin, L. J. (2011). Issues, policies, and recommendations for improving the education of learners with autism spectrum disorders. *Journal of Disability Policy Studies*, 22(1), 3–17. doi: 10.1177/1044207310394850
- Smile, S., & Anagnostou, E. (2012). New models for considering the role of medication in the treatment and elucidation of the etiology of autism. *Current Psychiatry Reports*, 14(6), 726–731. doi: 10.1007/s11920-012-0326-3
- Smith, B. P., & Dale, A. A. (2016). Integrating animals in the classroom: The attitudes and experiences of Australian school teachers toward animal-assisted interventions for children with autism spectrum disorder. *Pet Behaviour Science*, 1, 13–22. Retrieved from <https://www.uco.es/ucopress/ojs/index.php/pet/article/download/3994/3912>
- Sobo, E. J., Eng, B., & Kassity-Krich, N. (2006). Canine visitation (pet) therapy: Pilot data on decreases in child pain perception. *Journal of Holistic Nursing*, 24(1), 51–57. doi: 10.1177/0898010105280112
- Souter, M. A., & Miller, M. D. (2007). Do animal-assisted activities effectively treat depression? A meta-analysis. *Anthrozoös*, 20(2), 167–180. doi: 10.2752/175303707X207954
- Stasi, M. F., Amati, D., Costa, C., Resta, D., Senepa, G., Scarafioiti, C., . . . Molaschi, M. (2004). Pet-therapy: A trial for institutionalized frail elderly patients. *Archives of Gerontology and Geriatrics*, 38, 407–412. Retrieved from <http://www.sciencedirect.com.ez.sun.ac.za/science/journal/01674943/38/supp/S>

- Steed, H. N., & Smith, B. S. (2003). Animal assisted activities for geriatric patients. *Activities, Adaptation & Aging*, 27(1), 49–61. doi: 10.1300/J016v27n01_04
- Stefanini, M. C., Martino, A., Allori, P., Galeotti, F., & Tani, F. (2015). The use of animal-assisted therapy in adolescents with acute mental disorders: A randomized controlled study. *Complementary Therapies in Clinical Practice*, 21(1), 42–46. doi: 10.1016/j.ctcp.2015.01.001
- Steinbrenner, J. R. D., & Watson, L. R. (2015). Student engagement in the classroom: The impact of classroom, teacher, and student factors. *Journal of Autism and Developmental Disorders*, 45(8), 2392–2410. doi: 10.1007/s10803-015-2406-9
- Stephens, C. E. (2005). Overcoming challenges and identifying a consensus about autism intervention programming. *International Journal of Special Education*, 20(1), 35–49. Retrieved from <http://files.eric.ed.gov/fulltext/EJ846507.pdf>
- Stern, C., & Chur-Hansen, A. (2013). Methodological considerations in designing and evaluating animal-assisted interventions. *Animals*, 3, 127–141. doi: 10.3390/ani3010127
- Stevenson, K., Jarred, S., Hinchcliffe, V., & Roberts, K. (2015). Can a dog be used as a motivator to develop social interaction and engagement with teachers for students with autism? *Support for Learning*, 30(4), 341–363. doi: 10.1111/1467-9604.12105
- Tager-Flusberg, H. (2007). Evaluating the theory-of-mind hypothesis of autism. *Current Directions in Psychological Science*, 16(6), 311–315. doi: 10.1111/j.1467-8721.2007.00527.x
- Taylor, R. R., Kielhofner, G., Smith, C., Butler, S., Cahill, S. M., Ciukaj, M. D., & Gehman, M. (2009). Volitional change in children with autism: A single-case design study of the impact of hippotherapy on motivation. *Occupational Therapy in Mental Health*, 25(2), 192–200. doi: 10.1080/01642120902859287
- Tews, L. (2007). Early intervention for children with autism: Methodologies critique. *Developmental Disabilities Bulletin*, 35(1–2), 148–168. Retrieved from <http://search.proquest.com.ez.sun.ac.za/docview/232463823?OpenUrlRefId=info:xri/sid:wcdiscovery&accountid=14049>

- Thomas, E., & Magilvy, J. K. (2011). Qualitative rigor or research validity in qualitative research. *Journal for Specialists in Pediatric Nursing, 16*, 151–155. doi: 10.1111/j.1744-6155.2011.00283.x
- Thompson, J. A. (2013). *Exploring best practices in animal-assisted therapy with children in the Western Cape* (Unpublished master's thesis). North-West University, South Africa. Retrieved from <http://dspace.nwu.ac.za/handle/10394/9706>
- Touch Our Pets – Therapy Dogs. (n.d.). About. Retrieved from <http://www.therapytopdogs.co.za/index.html>
- Trembath, D., Germano, C., Johanson, G., & Dissanayake, C. (2012). The experience of anxiety in young adults with autism spectrum disorders. *Focus on Autism and Other Developmental Disabilities, 27*(4), 213–224. doi: 10.1177/1088357612454916
- Turner, D. W., III. (2010). Qualitative interview design: A practical guide for novice investigators. *The Qualitative Report, 15*(3), 754–760. Retrieved from <http://go.galegroup.com.ez.sun.ac.za/ps/i.do?id=GALE%7CA231310633&v=2.1&u=27uos&it=r&p=AONE&sw=w&asid=340a5b6802f5a05b889b426cfb1fa945>
- Vitztum, C. (2013). Human–animal interaction: A concept analysis. *International Journal of Nursing Knowledge, 24*(1), 30–36. doi: 10.1111/j.2047-3095.2012.01219.x
- Walsh, F. (2009). Human-animal bonds I: The relational significance of companion animals. *Family Process, 48*(4), 462–480. doi: 10.1111/j.1545-5300.2009.01296.x
- Weideman, S. (2007). *Physically disabled adolescents' experience of therapeutic riding: A phenomenological investigation* (Unpublished master's thesis). North West University, South Africa. Retrieved from <http://dspace.nwu.ac.za/handle/10394/9>
- Wells, D. L. (2009). The effects of animals on human health and well-being. *Journal of Social Issues, 65*(3), 523–543. doi: 10.1111/j.1540-4560.2009.01612.x
- White, S. W., Keonig, K., & Scahill, L. (2007). Social skills development in children with autism spectrum disorders: A review of the intervention research. *Journal of Autism and Developmental Disorders, 37*, 1858–1868. doi: 10.1007/s10803-006-0320-x
- White, S. W., & Roberson-Nay, R. (2009). Anxiety, social deficits, and loneliness in youth with autism spectrum disorders. *Journal of Autism and Developmental Disorders, 39*, 1006–1013. doi: 10.1007/s10803-009-0713-8

- Williams, K., Woolfenden, S., Roberts, J., Rodger, S., Bartak, L., & Prior, M. (2014). Autism in context 1: Classification, counting and causes. *Journal of Paediatrics and Child Health*, 50(5), 335–340. doi:10.1111/jpc.12451
- Williamson, K. M. (2009). Evidence-based practice: Critical appraisal of qualitative evidence. *Journal of the American Psychiatric Nurses Association*, 15(3), 202–207. doi: 10.1177/1078390309338733
- Wolff, S. (2004). The history of autism. *European Child and Adolescent Psychiatry*, 13(4), 201–208. doi: 10.1007/s00787-004-0363-5
- Woodgate, R. L., Ateah, C., & Secco, L. (2008). Living in a world of our own: The experience of parents who have a child with autism. *Qualitative Health Research*, 18(8), 1075–1083. doi: 10.1177/1049732308320112
- Wright, H., Hall, S., Hames, A., Hardiman, J., Burgess, A., Mills, R., & Mills, D. (2016). Effects of pet dogs for children with autism spectrum disorders (ASD) and their families: Expectations versus reality. *Human-Animal Interaction Bulletin*, 4(2), 38–58.
- Yin, R. K. (2009). *Case study research: Design and methods* (4th ed.). Thousand Oaks, CA: Sage Publications
- Zasloff, R. L., & Hart, L. A. (1999). Animals in elementary school education in California. *Journal of Applied Animal Welfare Science*, 2(4), 347–357. doi: 10.1207/s15327604jaws0204_8
- Zents, C. E., Fisk, A. K., & Lauback, C. W. (2016). Paws for intervention: Perceptions about the use of dogs in schools. *Journal of Creativity in Mental Health*, 11, 1–17. doi: 10.1080/15401383.2016.1189371

LIST OF APPENDICES

- A. Information form for teachers
- B. Information form for parents
- C. Biographical questionnaire for teachers
- D. Biographical questionnaire for parents
- E. Informed consent form for teachers
- F. Informed consent form for parents
- G. Semi-structured interview guide for teachers
- H. Semi-structured interview guide for parents
- I. Ethical clearance
- J. Permission letter from school

APPENDIX A INFORMATION FORM FOR TEACHERS

Participant information leaflet



UNIVERSITEIT • STELLENBOSCH • UNIVERSITY
jou kennisvenoot • your knowledge partner

STELLENBOSCH UNIVERSITY

Title of the research project: Animal-Assisted Activities for Adolescents with Autism Spectrum Disorder: Teachers' and Parents' Perceptions.

Reference number: SU-HSD-001092

Principle investigator: Charis Hawkrige

Address: 54 McLeod Street, Somerset West

Contact number: 072 432 4370

You are asked to participate in a research study conducted by Charis Hawkrige, a student in the Psychology Department at Stellenbosch University. This research will contribute toward a master's thesis. You were selected as a possible participant in this study because you teach a class of students with autism spectrum disorder who are currently participating in animal assisted activities at school. You therefore have important insight into the effects of animal-assisted activities on the class.

1. PURPOSE OF THE STUDY

This study was designed to explore the effects of school-based animal-assisted activities on adolescents with autism spectrum disorder from teachers' and parents' perceptions.

2. PROCEDURES

If you volunteer to participate in this study, we would ask you to do the following things:

- You will be asked to participate in one semi-structured interview which should last between 60 and 90 minutes.
- You will also be asked for permission for an audio recording to be made of the interview so that the interview can be transcribed later for analysis.

3. POTENTIAL RISKS AND DISCOMFORTS

There are no anticipated risks involved with participating in this study. As we will be discussing your work, however, the topic is personal, and therefore the questions discussed in the interview may leave you feeling some emotional distress. Should this occur, please feel free to contact Alida Franken (081 762 5757). She is a registered counsellor with experience in supporting the parents of children with autism spectrum disorder. The costs of an initial counselling session will be carried by the research team, should counselling be necessary.

4. POTENTIAL BENEFITS TO SUBJECTS AND/OR TO SOCIETY

This study will not benefit you directly. The research will contribute to our knowledge about autism spectrum disorder in general and particularly the use of therapies for children with autism spectrum disorder.

5. PAYMENT FOR PARTICIPATION

You will not be paid for taking part in this study. This study will, however, not cost you anything and you will be reimbursed for any travelling expenses involved in attending the interview.

6. CONFIDENTIALITY

Any information that is obtained in connection with this study and that can be identified with you will remain confidential, and will be disclosed only with your permission or as required by law. Confidentiality will be maintained by the following means.

- Your will be identified by a pseudonym of your choosing rather than your name.
- Any other identifying features in the data will be removed from the transcribed data.
- The digital data will be stored in a password-protected folder on the researcher's computer.
- Any hard copies will be stored in a locked cabinet.
- Only the researcher will have access to the data before identifying features are removed.
- The data will be stored safely for five years and then destroyed.

7. PARTICIPATION AND WITHDRAWAL

You can choose whether to be in this study or not. If you volunteer to be in this study, you may withdraw at any time without consequences of any kind. You may also refuse to answer any questions you don't want to answer and still remain in the study. The investigator may withdraw you from this research if circumstances arise which warrant doing so.

8. IDENTIFICATION OF INVESTIGATORS

If you have any questions or concerns about the research, please feel free to contact:

Investigator: Charis Hawkrige
Contact number: 0724324370
Address: 54 McLeod Street, Somerset West

Supervisor: Dr. M.C. le Roux
Contact number: 021 808 3444
Address: Psychology Department
Stellenbosch University
Private Bag: X1
Matieland, 7602

9. RIGHTS OF RESEARCH SUBJECTS

You may withdraw your consent at any time and discontinue participation without penalty. You are not waiving any legal claims, rights or remedies because of your participation in this research study. If you have questions regarding your rights as a research subject, contact Ms Maléne Fouché [mfouche@sun.ac.za; 021 808 4622] at the Division for Research Development.

APPENDIX B INFORMATION FORM FOR PARENTS

Participant information leaflet



UNIVERSITEIT • STELLENBOSCH • UNIVERSITY
jou kennisvenoot • your knowledge partner

STELLENBOSCH UNIVERSITY

Title of the research project: Animal-Assisted Activities for Adolescents with Autism Spectrum Disorder: Teachers' and Parents' Perceptions.

Reference number: SU-HSD-001092

Principle investigator: Charis Hawkrigde

Address: 54 McLeod Street, Somerset West

Contact number: 072 432 4370

You are asked to participate in a research study conducted by Charis Hawkrigde, a student in the Psychology Department at Stellenbosch University. This research will contribute toward a master's thesis. You were selected as a possible participant in this study because you parent a child with autism spectrum disorder who is currently participating in animal assisted activities at school. You therefore have important insight into the effects of animal-assisted activities on your child.

1. PURPOSE OF THE STUDY

This study was designed to explore the effects of school-based animal-assisted activities on adolescents with autism spectrum disorder from teachers' and parents' perceptions.

2. PROCEDURES

If you volunteer to participate in this study, we would ask you to do the following things:

- You will be asked to participate in one semi-structured interview which should last between 60 and 90 minutes.
- Before the interview starts, you will be asked to fill out a questionnaire with biographical details about you and your child.
- You will also be asked for permission for an audio recording to be made of the interview so that the interview can be transcribed later for analysis.

3. POTENTIAL RISKS AND DISCOMFORTS

There are no anticipated risks involved with participating in this study. As we will be discussing your child, however, the topic is personal, and therefore the questions discussed in the interview may leave you feeling some emotional distress. Should this occur, please feel free to contact Alida Franken (081 762 5757). She is a registered counsellor with experience in supporting the parents of children with autism spectrum disorder. The costs of an initial counselling session will be carried by the research team, should counselling be necessary.

4. POTENTIAL BENEFITS TO SUBJECTS AND/OR TO SOCIETY

This study will not benefit you directly. The research will contribute to our knowledge about autism spectrum disorder in general and particularly the use of therapies for children with autism spectrum disorder.

5. PAYMENT FOR PARTICIPATION

You will not be paid for taking part in this study. This study will, however, not cost you anything and you will be reimbursed for any travelling expenses involved in attending the interview.

6. CONFIDENTIALITY

Any information that is obtained in connection with this study and that can be identified with you will remain confidential, and will be disclosed only with your permission or as required by law. Confidentiality will be maintained by the following means.

- Your will be identified by a pseudonym of your choosing rather than your name.
- Any other identifying features in the data will be removed from the transcribed data.
- The digital data will be stored in a password-protected folder on the researcher's computer.
- Any hard copies will be stored in a locked cabinet.
- Only the researcher will have access to the data before identifying features are removed.
- The data will be stored safely for five years and then destroyed.

7. PARTICIPATION AND WITHDRAWAL

You can choose whether to be in this study or not. If you volunteer to be in this study, you may withdraw at any time without consequences of any kind. You may also refuse to answer any questions you don't want to answer and still remain in the study. The investigator may withdraw you from this research if circumstances arise which warrant doing so.

8. IDENTIFICATION OF INVESTIGATORS

If you have any questions or concerns about the research, please feel free to contact:

Investigator: Charis Hawkrige
Contact number: 0724324370
Address: 54 McLeod Street, Somerset West

Supervisor: Dr. M.C. le Roux

Contact number: 021 808 3444
Address: Psychology Department
Stellenbosch University
Private Bag: X1
Matieland, 7602

9. RIGHTS OF RESEARCH SUBJECTS

You may withdraw your consent at any time and discontinue participation without penalty. You are not waiving any legal claims, rights or remedies because of your participation in this research study. If you have questions regarding your rights as a research subject, contact Ms Maléne Fouché [mfouche@sun.ac.za; 021 808 4622] at the Division for Research Development.

APPENDIX C
ENGLISH BIOGRAPHICAL QUESTIONNAIRE FOR TEACHERS

Please provide the following biographical information

Age:

Gender: M / F

How many hours do you spend in the classroom with the learners on an average day?

Qualifications:.....
.....
.....
.....

How long have you been teaching?
.....

How long have you been teaching learners with special needs?
.....

How long have you worked with this class?
.....

APPENDIX D
BIOGRAPHICAL QUESTIONNAIRE FOR PARENTS

Please provide the following biographical information

Father

Age:

Occupation: (Full time / part time / unemployed)

Mother

Age:

Occupation: (Full time / part time / unemployed)

Child

Age:

Gender: MALE / FEMALE

Diagnosis:

Age of diagnosis:

Does your child with autism spectrum disorder have siblings: YES / NO

If yes, please specify number and gender of siblings:

.....

Is your child currently taking medication: YES / NO

If yes, please specify current medication:

.....

Is your child currently undergoing any therapy (e.g. speech therapy): YES / NO

If yes, please specify current therapy:

.....

Do you have pets at home: YES / NO

If yes, please specify number and kind of pet:

.....

APPENDIX E INFORMED CONSENT FORM FOR TEACHERS

Participant information leaflet and consent form



UNIVERSITEIT • STELLENBOSCH • UNIVERSITY
jou kennisvenoot • your knowledge partner

STELLENBOSCH UNIVERSITY CONSENT TO PARTICIPATE IN RESEARCH

Title of the research project: Animal-Assisted Activities for Adolescents with Autism Spectrum Disorder: Teachers' and Parents' Perceptions.

Reference number: SU-HSD-001092

Principle investigator: Charis Hawkrige

Address: 54 McLeod Street, Somerset West

Contact number: 072 432 4370

You are asked to participate in a research study conducted by Charis Hawkrige, a student in the Psychology Department at Stellenbosch University. This research will contribute toward a master's thesis. You were selected as a possible participant in this study because you teach a class of students with autism spectrum disorder who are currently participating in animal assisted activities at school. You therefore have important insight into the effects of animal-assisted activities on the class.

1. PURPOSE OF THE STUDY

This study was designed to explore the effects of school-based animal-assisted activities on adolescents with autism spectrum disorder from teachers' and parents' perceptions.

2. PROCEDURES

If you volunteer to participate in this study, we would ask you to do the following things:

- You will be asked to participate in one semi-structured interview which should last between 60 and 90 minutes.
- You will also be asked for permission for an audio recording to be made of the interview so that the interview can be transcribed later for analysis.

3. POTENTIAL RISKS AND DISCOMFORTS

There are no anticipated risks involved with participating in this study. As we will be discussing your work, however, the topic is personal, and therefore the questions discussed in the interview may leave you feeling some emotional distress. Should this occur, please feel free to contact Alida Franken (081 762 5757). She is a registered counsellor with experience in supporting the parents of children with autism spectrum disorder. The costs of an initial counselling session will be carried by the research team, should counselling be necessary.

4. POTENTIAL BENEFITS TO SUBJECTS AND/OR TO SOCIETY

This study will not benefit you directly. The research will contribute to our knowledge about autism spectrum disorder in general and particularly the use of therapies for children with autism spectrum disorder.

5. PAYMENT FOR PARTICIPATION

You will not be paid for taking part in this study. This study will, however, not cost you anything and you will be reimbursed for any travelling expenses involved in attending the interview.

6. CONFIDENTIALITY

Any information that is obtained in connection with this study and that can be identified with you will remain confidential, and will be disclosed only with your permission or as required by law. Confidentiality will be maintained by the following means.

- Your will be identified by a pseudonym of your choosing rather than your name.
- Any other identifying features in the data will be removed from the transcribed data.
- The digital data will be stored in a password-protected folder on the researcher's computer.
- Any hard copies will be stored in a locked cabinet.
- Only the researcher will have access to the data before identifying features are removed.
- The data will be stored safely for five years and then destroyed.

7. PARTICIPATION AND WITHDRAWAL

You can choose whether to be in this study or not. If you volunteer to be in this study, you may withdraw at any time without consequences of any kind. You may also refuse to answer any questions you don't want to answer and still remain in the study. The investigator may withdraw you from this research if circumstances arise which warrant doing so.

8. IDENTIFICATION OF INVESTIGATORS

If you have any questions or concerns about the research, please feel free to contact:

Investigator: Charis Hawkrige
Contact number: 0724324370
Address: 54 McLeod Street, Somerset West

Supervisor: Dr. M.C. le Roux
 Contact number: 021 808 3444
 Address: Psychology Department
 Stellenbosch University
 Private Bag: X1
 Matieland, 7602

9. RIGHTS OF RESEARCH SUBJECTS

You may withdraw your consent at any time and discontinue participation without penalty. You are not waiving any legal claims, rights or remedies because of your participation in this research study. If you have questions regarding your rights as a research subject, contact Ms Maléne Fouché [mfouche@sun.ac.za; 021 808 4622] at the Division for Research Development.

SIGNATURE OF RESEARCH SUBJECT

The information above was described to me by Charis Hawkrige in English and I am in command of this language or it was satisfactorily translated to me. I was given the opportunity to ask questions and these questions were answered to my satisfaction.

I hereby consent voluntarily to participate in this study. I have been given a copy of this form.

Name of Subject/Participant

Signature of Subject/Participant

Date

SIGNATURE OF INVESTIGATOR

I declare that I explained the information given in this document to _____
 [*name of the subject/participant*] and. [*He/she*] was encouraged and given ample time to ask me any questions. This conversation was conducted in English and no translator was used.

Signature of Investigator

Date

APPENDIX F INFORMED CONSENT FORM FOR PARENTS

Participant information leaflet and consent form



UNIVERSITEIT • STELLENBOSCH • UNIVERSITY
jou kennisvenoot • your knowledge partner

STELLENBOSCH UNIVERSITY CONSENT TO PARTICIPATE IN RESEARCH

Title of the research project: Animal-Assisted Activities for Adolescents with Autism Spectrum Disorder: Teachers' and Parents' Perceptions.

Reference number: SU-HSD-001092

Principle investigator: Charis Hawkrigde

Address: 54 McLeod Street, Somerset West

Contact number: 072 432 4370

You are asked to participate in a research study conducted by Charis Hawkrigde, a student in the Psychology Department at Stellenbosch University. This research will contribute toward a master's thesis. You were selected as a possible participant in this study because you parent a child with autism spectrum disorder who is currently participating in animal assisted activities at school. You therefore have important insight into the effects of animal-assisted activities on your child.

1. PURPOSE OF THE STUDY

This study was designed to explore the effects of school-based animal-assisted activities on adolescents with autism spectrum disorder from teachers' and parents' perceptions.

2. PROCEDURES

If you volunteer to participate in this study, we would ask you to do the following things:

- You will be asked to participate in one semi-structured interview which should last between 60 and 90 minutes.
- Before the interview starts, you will be asked to fill out a questionnaire with biographical details about you and your child.
- You will also be asked for permission for an audio recording to be made of the interview so that the interview can be transcribed later for analysis.

3. POTENTIAL RISKS AND DISCOMFORTS

There are no anticipated risks involved with participating in this study. As we will be discussing your child, however, the topic is personal, and therefore the questions discussed in the interview may leave you feeling some emotional distress. Should this occur, please feel free to contact Alida Franken (081 762 5757). She is a registered counsellor with experience in supporting the parents of children with autism spectrum disorder. The costs of an initial counselling session will be carried by the research team, should counselling be necessary.

4. POTENTIAL BENEFITS TO SUBJECTS AND/OR TO SOCIETY

This study will not benefit you directly. The research will contribute to our knowledge about autism spectrum disorder in general and particularly the use of therapies for children with autism spectrum disorder.

5. PAYMENT FOR PARTICIPATION

You will not be paid for taking part in this study. This study will, however, not cost you anything and you will be reimbursed for any travelling expenses involved in attending the interview.

6. CONFIDENTIALITY

Any information that is obtained in connection with this study and that can be identified with you will remain confidential, and will be disclosed only with your permission or as required by law. Confidentiality will be maintained by the following means.

- Your will be identified by a pseudonym of your choosing rather than your name.
- Any other identifying features in the data will be removed from the transcribed data.
- The digital data will be stored in a password-protected folder on the researcher's computer.
- Any hard copies will be stored in a locked cabinet.
- Only the researcher will have access to the data before identifying features are removed.
- The data will be stored safely for five years and then destroyed.

7. PARTICIPATION AND WITHDRAWAL

You can choose whether to be in this study or not. If you volunteer to be in this study, you may withdraw at any time without consequences of any kind. You may also refuse to answer any questions you don't want to answer and still remain in the study. The investigator may withdraw you from this research if circumstances arise which warrant doing so.

8. IDENTIFICATION OF INVESTIGATORS

If you have any questions or concerns about the research, please feel free to contact:

Investigator: Charis Hawkrige
Contact number: 0724324370
Address: 54 McLeod Street, Somerset West

Supervisor: Dr. M.C. le Roux
 Contact number: 021 808 3444
 Address: Psychology Department
 Stellenbosch University
 Private Bag: X1
 Matieland, 7602

9. RIGHTS OF RESEARCH SUBJECTS

You may withdraw your consent at any time and discontinue participation without penalty. You are not waiving any legal claims, rights or remedies because of your participation in this research study. If you have questions regarding your rights as a research subject, contact Ms Maléne Fouché [mfouche@sun.ac.za; 021 808 4622] at the Division for Research Development.

SIGNATURE OF RESEARCH SUBJECT

The information above was described to me by Charis Hawkrige in English and I am in command of this language or it was satisfactorily translated to me. I was given the opportunity to ask questions and these questions were answered to my satisfaction.

I hereby consent voluntarily to participate in this study. I have been given a copy of this form.

Name of Subject/Participant

Signature of Subject/Participant

Date

SIGNATURE OF INVESTIGATOR

I declare that I explained the information given in this document to _____
 [*name of the subject/participant*] and. [*He/she*] was encouraged and given ample time to ask me any questions. This conversation was conducted in English and no translator was used.

Signature of Investigator

Date

APPENDIX G
SEMI-STRUCTURED INTERVIEW GUIDE FOR TEACHERS

Semi-structured interview questions for teachers

1. Please tell me about each of the children in your class
2. Please tell me more about how the children interact as a group
3. You are aware there has been a dog visiting your class as part of an animal-assisted activities programme. What are your thoughts on this?
4. What do you think is meant by animal-assisted activities and what happens in the classroom with the dog?
5. Please tell me about each child's behaviour during the last 6 months.
6. Have the children mentioned the visiting dog or referred to it in any way while the dog was not there? If so, what did they say and in what context was this?
7. What are your thoughts or suggestions or comments on the animal-assisted activities programme that your class has been exposed to?

APPENDIX H

SEMI-STRUCTURED INTERVIEW GUIDE FOR PARENTS

Semi-structured interview questions for parents

1. Please tell me about your child.
2. Please tell me more about his/her interaction with you as his/her parents, his/her siblings and his/her home environment, including any pets.
3. Please tell me about your child's schooling.
4. You are aware there has been a dog visiting your child's class as part of an animal-assisted activities programme. What are your thoughts on this?
5. What do you think is meant by animal-assisted activities and what do you think happens in the classroom with the dog?
6. Please tell me about your child's behaviour and affect during the last 6 months.
7. Has your child mentioned the visiting dog or referred to it in any way? If so, what did they say and in what context was this?
8. What are your thoughts or suggestions or comments on the animal-assisted activities programme that your child has been exposed to?

APPENDIX I ETHICAL CLEARANCE



UNIVERSITEIT • STELLENBOSCH • UNIVERSITY
jou kennisvennoot • your knowledge partner

Approved with Stipulations New Application

10-Nov-2015
Hawkrigde, Charis CJ

Proposal #: SU-HSD-001092

Title: A case study investigation of classroom-based animal-assisted activities for adolescents with autism spectrum disorder: Parents' and teachers' perceptions

Dear Miss Charis Hawkrigde,

Your **New Application** received on **08-Oct-2015**, was reviewed by the Research Ethics Committee: Human Research (Humanities) via Committee Review procedures on **29-Oct-2015**.

Please note the following information about your approved research proposal:

Proposal Approval Period: **29-Oct-2015 -28-Oct-2016**

Present Committee Members:

Lambrechts, Derica D
Van Deventer, Karel KJ
Fouche, Magdalena MG
Hansen, Leonard LD
Nel, Michelle M
De Villiers, Mare MRH
Theron, Carl CC
Beukes, Winston WA
Graham, Clarissa CJ
Lesch, Anthea AM
Toi, Jerall J
Carolissen, Ronelle RL
Nell, Theodore TA
De Klerk, Jeremias JJ
Hall, Susan SLC

The following stipulations are relevant to the approval of your project and must be adhered to:

The researcher may proceed with the envisaged research provided that the following stipulations, relevant to the approval of your project are adhered to or addressed. Some of these stipulations may require your response. Where a response is required, you are encouraged to respond to the REC within six (6) months of the date of this letter.

If a response is required, please respond to the points raised in a separate cover letter titled "Response to REC stipulations" AND if requested, HIGHLIGHT or use the TRACK CHANGES function to indicate corrections / amendments of ATTACHED DOCUMENTATION, to allow rapid scrutiny and appraisal.

1. BIOGRAPHICAL QUESTIONNAIRE [RESPONSE REQUIRED]

The questionnaire collects biographical data from parents. One of the sections that require reconsideration is the information requested from parents regarding their occupation. The researcher should clarify why information about the parents occupation are being collected. Also, the researcher only lists options for a father and mother to add their information. This should be revised to include family structures that accommodates legal guardians, grandparents, etc., i.e. families that may or may not include a father and/or mother.

2. RISK CLASSIFICATION

This is a well-written research proposal. The study is a low risk study and not a medium risk study as suggested by the DESC. The study would have been medium risk if a vulnerable group of children were interviewed but in this study the parents and teachers of autistic

children are being interviewed.

3. INFORMED CONSENT PROCESS AND FORMS

The researcher should consider editing the teachers' consent form so that the font used is the same throughout the form.

Please provide a letter of response to all the points raised IN ADDITION to HIGHLIGHTING or using the TRACK CHANGES function to indicate ALL the corrections/amendments of ALL DOCUMENTS clearly in order to allow rapid scrutiny and appraisal.

Please take note of the general Investigator Responsibilities attached to this letter. You may commence with your research after complying fully with these guidelines.

Please remember to use your **proposal number** (SU-HSD-001092) on any documents or correspondence with the REC concerning your research proposal.

Please note that the REC has the prerogative and authority to ask further questions, seek additional information, require further modifications, or monitor the conduct of your research and the consent process.

Also note that a progress report should be submitted to the Committee before the approval period has expired if a continuation is required. The Committee will then consider the continuation of the project for a further year (if necessary).

This committee abides by the ethical norms and principles for research, established by the Declaration of Helsinki and the Guidelines for Ethical Research: Principles Structures and Processes 2004 (Department of Health). Annually a number of projects may be selected randomly for an external audit.

National Health Research Ethics Committee (NHREC) registration number REC-050411-032.

We wish you the best as you conduct your research.

If you have any questions or need further help, please contact the REC office at 218089183.

Included Documents:

DESC Report - Greeff, Abraham

REC: Humanities New Application

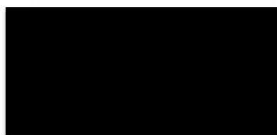
Sincerely,

Clarissa Graham

REC Coordinator

Research Ethics Committee: Human Research (Humanities)

APPENDIX J PERMISSION LETTER FROM SCHOOL



School for Children with Autism
Somerset West

To Whom It May Concern

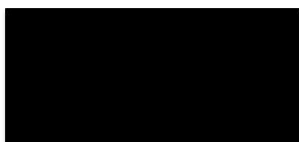
28 August 2015

RE: Proposed research by Charis Hawkridge involving teachers and parents involved with this school.

We hereby give permission for Charis Hawkridge to approach teachers and parents of this school as research participants. We further give permission that she discuss the events that occur within the school with parents and teachers during her interviews.

Her research into the perceptions of teachers and parents of adolescents involved in classroom-based animal-assisted activities is likely to contribute much needed knowledge on the subject of interventions for autism spectrum disorder. We therefore support her in her research and will give all assistance necessary.

Regards,



Programme Director



School for Autism



Somerset West
7130

