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Video self-modelling as a therapy tool to improve turn-taking skills in children with Autism Spectrum Disorder

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VIDEO SELF MODELLING AS A THERAPY TOOL TO IMPROVE TURN-TAKING SKILLS IN CHILDREN WITH AUTISM SPECTRUM DISORDER

A Research Study Presented to
The Department of Speech Pathology and Audiology
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In complete fulfilment of the requirements
for the degree Master of Arts in Speech Pathology by dissertation
By

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Date of submission: March 2020

DECLARATION

I declare that this dissertation is my own unaided work. It is submitted for the degree of Masters in Speech Pathology by Dissertation at the University of the Witwatersrand, Johannesburg. It has not been submitted before for any other degree or examination in any other university.

Amanda Hanouch
March, 2020



Abstract

Introduction

Video self-modelling (VSM) was developed to allow participants to view themselves in situations where they are performing at a more advanced level than they typically function. VSM has been used as a therapy tool to train positive behaviour and reduce unwanted behaviour. This study aimed to analyse the effects that VSM has on children with Autism Spectrum Disorder (ASD), specifically in terms of an improvement in their turn-taking skills.

Aim

The primary aim of this study was to determine if the VSM technique improved pragmatic difficulties, specifically turn-taking skills in children with ASD.

Method

Five children between the ages of eight and nine years old, with a diagnosis of ASD, were recruited from a government special-needs school in Johannesburg. Each child was filmed in the classroom setting for 60 minutes per session, three times a week, over eight weeks. The project involved four phases, an assessment, therapy, follow-up 1 and follow-up 2 phase. Filming took place over all four phases. During the assessment phase, each child's conversational turn-taking skills were evaluated, Speech-language therapy assessment reports were studied, with permission from parents as well as the speech-language therapist involved and a personalised video was made of each child being successful at conversational turn-taking. This was done using editing software to remove any negative behaviour, or therapist prompts and to add positive reinforcement, such as audio cheering and positive images. The children watched their personalised videos each morning, at school, during the intervention phase, with the researcher. During the follow-up phases, the researcher aimed to determine whether or not any improvement in conversational turn-taking had occurred.

Implications

VSM stands as a promising intervention tool, since software for the home production of video, requiring minimal expertise, has become increasingly accessible with the continuing development of technology. VSM interventions can now be implemented and readily used by teachers, parents or therapists in naturalistic settings, such as the school or home environment. VSM has possible applications across a wide array of behaviours, including the pragmatic skills involved with conversational turn-taking. VSM presents a tool which is appropriate to children with ASD, as it maximises visual strengths, accounts for attention weaknesses and is expected to be a highly motivating, plus an enjoyable activity for these children.

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1. Introduction

Video self-modelling (VSM) is an exciting therapy tool, which may be beneficial for children with Autism Spectrum Disorder (ASD). The efficacy of VSM as a therapy technique to teach the pragmatics skill of turn-taking to children with ASD, or pragmatic communication disorders, was investigated in this study. The purpose was to determine whether or not the observation of oneself on a video recording being successful at a pragmatic behaviour one usually finds difficult (namely turn-taking) was an efficacious teaching tool for improved performance of this skill.

ASD is a neurodevelopmental disorder which affects approximately 60 per 10 000 children worldwide (Fombonne, 2005). Core deficits associated with ASD, include social interaction, language and communication difficulties, which often lead to social isolation and significant everyday challenges for the individual, as well as their family. Many researchers have pursued a wide range of approaches to teaching social skills and positive behaviour to children with ASD; however, intervention methods are often controversial, due to the lack of supporting research evidence. Video modelling (VM) has become popular as a treatment option for children with ASD to develop social initiations and for improving their ability to play appropriately (Litras, Moore & Anderson, 2010). VSM is an effective treatment for treating language disorders (Buggey, 2005). Despite the efficacy of VSM described in the literature, there are few studies which have researched VSM in children with ASD. Within the South African context, very little published research of this nature has been done. Further investigation into the impact of VSM on children with ASD is essential as researchers expand their findings for various behaviours across age ranges and environments. In summary, the VSM therapy tool is hypothesised to be an effective strategy for teaching pragmatic skills (specifically conversational turn-taking) to children with ASD.

This study aimed to investigate whether or not the VSM technique improved pragmatic difficulties, specifically turn-taking skills, in children with ASD.

2. Rationale

Children with ASD and those with pragmatic communication disorders are faced with life-long impairment in daily social communication. Effective therapy, focusing on pragmatics, is essential in improving their relationships with others, specifically concerning communication. In their research, Sansosti and Powell-Smith (2006) concluded that ASD has increased over recent years. Speech-language therapists working with children with ASD need to determine critically which pragmatics therapy tools or approaches will actually improve pragmatic skills. This will affect the ability of the individual with ASD eventually to function effectively in the working world, to be independent and to form and maintain relationships with others. This study explores the efficacy of VSM as a therapy tool to improve pragmatics skills, specifically conversational turn-taking, to obtain data which may be used in therapy to make informed decisions regarding treatment programmes using evidence-based practice. This means investigating the values, interests and needs of clients and integrating this knowledge with clinical expertise and scientific evidence, to offer optimal services (ASHA, 2015). Since evidence-based practice is centred on the individual; the therapist is required to use the most appropriate, recent evidence from research in relation to an individual client to provide the best possible clinical service to that person. Therefore, this study is fundamental in providing evidence that VSM improves turn-taking skills in children with ASD. Once we can prove this, the benefits of VSM as a therapy tool are limitless. Speech-language therapists may use the findings from this study to solve problems creatively and how they can incorporate the use of VSM into many areas of therapy with children with ASD and other language difficulties.

VSM is a relatively new area of research and an area of exploration within the speech-language therapy context. Speech-language therapists have been using VM as a therapy tool since this modality has been proven to be visually appealing to most children and therefore, effective. In terms of VSM as a therapy tool, little research has been done as yet, particularly in the South African context. It would be highly beneficial in the South African context to have access to a therapy tool which is inexpensive, readily available and easy to teach. Technology has developed beyond imagination in recent years and continues to do so; therefore we need to be aware of new technologies which are readily available to assist and enhance our therapy practices. VSM is an exciting new therapy tool which is expected to be extremely effective in a range of children across

multiple therapy domains. It is also a tool which may be accessible and appropriate to children with ASD, who often display visual strengths, and may be suitable for those with limited attention. It is expected to be a highly motivating and enjoyable activity for children with ASD, and it is proposed that they will be motivated to take part and become involved in watching their personalised videos. This study serves to explore a small part of what can be achieved using this VSM tool.

It is important to look at theories underlying research and to investigate recent literature when researching a new topic to gain an understanding of what has already been done. The theoretical framework and literature review underpinning this research project will be discussed below.

3. Theoretical framework and literature review

Two theorists, namely Bandura and Vygotsky (1997), have influenced the underlying framework for this study. One of the theoretical bases for VSM was Bandura's social learning theory (Bandura, 1997). He proposed the ability to learn by seeing a model without experiencing the behaviour first-hand (Bandura, 1997). In terms of Bandura's social learning theory, the 'self-model' has the advantage of allowing clients to see themselves performing successfully, which improves their self-image and belief in themselves and, in turn, improves the skills being learned (Bandura, 1997). Bandura (2001) describes self-efficacy as the belief that one can produce desired results by one's actions. Self-refection is another important concept, which Bandura describes as a metacognitive activity, whereby a person judges and reflects on their own actions, which may result in them changing their thinking or perception and therefore changing their behaviour or actions (Bandura, 2001). VSM involves both self-efficacy and self-reflection. Children watch themselves being successful at a task, self-reflection takes place and, by seeing themselves as successful at something, their self-efficacy and belief in themselves increases. Therefore, VSM incorporates some of the principles of Bandura's social learning theory.

Vygotsky described learning as a process facilitated by a more knowledgeable person (Vygotsky, 1962, as cited in Hitchcock, Dowrick & Prater, 2003). He states that it involves a change that takes place most effectively within the Zone of Proximal Development, which is the level above

which the child can manage independently and the level below their performance when assisted by an adult (Vygotsky, 1962, as cited in Hitchcock et al., 2003). Vygotsky's view is compatible with self-modelling where learning takes place by seeing one's own potential positive, successful behaviour. In VSM, adults do assist or prompt the child, but these are then edited out so that the children appear to be modelling the skill on their own. The key element in video self-modelling is observing a higher level of performance of what can be achieved by editing, to create images of a skill not yet attained, but which is possible (Dowrick, 1999). In Dowrick's concept of feedforward modelling, students learn to see themselves in a future, more capable state and they can then aim to achieve this goal (Dowrick, 1999).

A thorough understanding of the definition of ASD and the symptoms and behaviours associated with ASD will be discussed below.

Autism Spectrum Disorder

ASD is usually diagnosed during early childhood based on symptoms and signs, namely poor ability to communicate and difficulty interacting with others (Gillham, Carter, Volkmar & Sparrow, 2000). The cause of ASD is not known, although there are many theories. ASD varies in degree and is described as a spectrum disorder which exists along a continuum (World Health Organisation, 1993). The Autism Society of America (2013) stresses the importance of early diagnosis and intervention for the best outcomes for the child with ASD. According to the Autism Society of America (2013), some of the behaviours associated with ASD include language delay, poor eye contact, poor topic maintenance, difficulty with higher-order reasoning and planning, narrow and intense interests, limitations regarding motor skills and sensory issues. The child with ASD may display many of these behaviours or just a few and may also present with other behaviours not mentioned above.

The diagnosis of ASD is confirmed by a psychologist, psychiatrist or paediatric neurologist using the DSM-5 and taking into account all behaviours, signs and symptoms and their severity. The DSM-5 classification of ASD specifies criteria when diagnosing children with ASD (see Appendix P). According to the DSM-5, in children with ASD, social communication difficulties are a classic feature of the disorder (American Psychiatric Association, 2013). This study aimed to probe

whether VSM, as an intervention tool, may be effective, specifically in improving social pragmatic language skills in children with ASD – which, according to the DSM-5, is a significant area of difficulty for all children with ASD. This highlights the importance of this study in possibly improving one of the most significant areas of difficulty for all children with ASD.

According to the DSM-5, individuals who have deficits in social communication, but whose symptoms do not otherwise meet the criteria for ASD, should be evaluated for Social (Pragmatic) Communication Disorder (see Appendix Q for the DSM-5 classification of Social Pragmatic Communication Disorder). For this study, children who have a diagnosis of ASD will be recruited as participants.

The diagnosis of ASD has been divided into three levels of severity (American Psychiatric Association, 2013):

Table 1: Severity of the diagnosis of ASD

Level 1 severity	**Level 2 severity**	**Level 3 severity**
Least severe. Children require some support.	Moderately severe. Children require moderate support.	Most severe. Children require substantial support.
Noticeable difficulty with social communication and interaction. May cope fairly well with supports in place.	Marked verbal and non-verbal social communication deficits. Resistant to change.	Severe verbal deficits. Severe non-verbal communication difficulties. Extremely inflexible. Multiple behavioural problems.

(See Appendix R for the DSM-5 severity classification criteria.)

For this study, children with Level 1 and 2 severity of ASD will be recruited, since they will be required to engage in some form of social communication with peers, to observe and record their turn-taking skills during conversation.

How we view ASD today differs significantly from early historical views of autism, when it was first conceptualised. Our current definition and understanding of ASD has been shaped by history

and early classification systems, as well as how we differentiate ASD from other communication disorders which may have similar features. It is therefore helpful to introduce ASD from a historical perspective when it was first conceptualised, to better understand our current view of ASD and to contrast and differentiate ASD from other communication disorders.

History of autism classification

The definition of autism and our understanding of children with autism has changed over time and continues to evolve today. Autism has also become a more widely known and discussed topic in recent years and has received more media coverage recently. We need to look back at history and early theorists to fully understand our current view of autism today and how far we have come in our understanding of it. This is also important to shape our future learning and research.

In the 1960s and 70s, experts described autism as a type of language disorder whereby the abnormal non-verbal behaviours were secondary consequences of poor communication skills (Bishop & Laurence, 2004). The Diagnostic and Statistical Manual (DSM – IV) identified autism as a Pervasive Developmental Disorder (American Psychiatric Association, 2000). This means that the disorder affects several areas of functioning; in autism, there is a triad of impairments in language, social relationships and behavioural and imaginative skills (American Psychiatric Association, 1994). Pervasive Developmental Disorder also means the impairments in these areas are not simply delayed or immature but abnormal for any age. There are qualitative oddities in the use of language that are not normal at any age.

In recent years, greater emphasis has been placed on joint attention, social interaction and social cognition when working with children with autism and pragmatic difficulties, as they are seen as the hallmark of autistic communication, while other language difficulties vary (Frith, 1989). Bishop and Laurence (2004) argue that the profiles shown by children with pragmatic difficulties vary and it would be careless to assume that all of them have a mild form of ASD. Asperger's syndrome (AS) is defined in the DSM-IV as a Pervasive Developmental Disorder where the deficit lies in the social use of language and restricted interests are hallmarks of the syndrome (American Psychiatric Association, 2000). However, no clear boundaries between Asperger's syndrome, Semantic Pragmatic Disorder (SPD), developmental language disorder (DLD) and ASD exist, and

there are children who have difficulty with language structure and pragmatics (Bishop & Laurence, 2004). Pervasive Developmental Disorder not Otherwise Specified (PDDNOS) was a term coined by O'Hare, Quew and Aitken (1998) and introduced in the DSM-IV, to be used as a default diagnosis for a child who fell short of diagnostic criteria for autism, or where there is significant impairment in only one or two of the domains of the autistic triad. Bishop and Laurence (2004) suggest using the term Pragmatic Language Impairment as an intermediate between Autistic Disorder and DLD, rather than belonging with one or the other.

Traditionally, children were classified into two very separate groups depending on their profiles. A diagnosis of Specific Language Impairment was made when children had difficulties with language structure (grammar, vocabulary, syntax and, sometimes, phonology) but were developing normally in other respects. Those with pragmatic difficulties were often given the diagnosis of ASD. Bishop and Laurence (2004) argue that intermediate cases may exist, where a child with language difficulties may have problems with pragmatics as well as with the structure and form of language. Often therapists view the oral difficulties as the primary goal and treat the pragmatic or social impairments as a secondary issue. However, impairments in language do not occur in a vacuum, hence Brinton and Fujiki (1993) state that language impairments will affect social interaction and other aspects of development. Therefore, many children fall between the diagnostic options of Specific Language Impairment or Autism. Gertner, Rice and Hadley (1994) found that children with language difficulties, specifically receptive language difficulties, were less popular with their peers than those with age-appropriate language. The question is one of ‘a chicken before the egg’ nature in that we are unsure whether the child has language problems, which lead to poor peer relations, or whether the underlying basic deficit in social cognition affects language development.

Firth (1999) describes Semantic Pragmatic Language Disorder as a pattern of semantic and pragmatic impairments which change over time. Children with SPD are often late in starting to speak and would then use a great deal of echolalic language, frequently without comprehension. At a later stage, the child would understand more but have difficulties with social interaction; they would often speak inappropriately, repeatedly change the topic and have difficulty maintaining a normal conversation. Older children would have difficulty understanding the rules of social

situations, as well as conversations and, in addition, would interpret language very literally (Firth, 1999).

Wing (1988) described autism as a spectrum of deficits and identified a triad of impairments, difficulty with social recognition, social imagination and understanding and social communication. However, children with milder difficulties did not fully meet the criteria for typical autism; hence different diagnostic terms evolved. Boucher (1998) stated that SPD could not be part of an autistic diagnosis since this would classify SPD as mild autism. Thus the diagnosis would be redundant, as Asperger's syndrome is already the terminology used to describe mild autism.

Boucher (1998) described autism as a continuum of impairment, whereby degrees of impairment exist in a range of developmental areas, and thus, individual profiles could be established. The major common impairment of those with ASDs is difficulty processing sensory input, where what they see, hear, touch, smell and taste is perceived in an unusual way (Boucher, 1998). The child on the autistic spectrum has a central processing disorder; he tends to develop first words which relate to his interests and personal needs and he will remember words without having a true understanding of their meaning. These children may develop large vocabularies using their often-excellent memory, however, when words are acquired by rote, rather than by a developing understanding of the world around him, the meaning and understanding of the word, in varied contexts, will not be fully comprehended (Firth, 1999). Children with SPD and those with Asperger's syndrome both have an underlying cognitive disorder, but we need to identify the specific individual profile of each child's difficulties and strengths to facilitate the correct support systems and learning opportunities for the child and family (Firth, 1999).

For this study it is important to understand the history of autism classification since some children at the Government Special Needs school (which is the subject of this study), may have been diagnosed differently five to six years ago, but who may today be classified as having ASD. This will affect how we interpret the results.

Language development in the child with ASD

Language develops naturally for most children by listening to their caregivers speaking and

interacting with them. The child first has a growing understanding of the spoken word before even uttering their first word. This is called receptive language development. Later on, expressive language develops when the child begins to speak and use his or her own words to make themselves understood. Lack of language and delay in language development can be extremely frustrating for both the child and parents concerned.

Language development differs in the child with ASD when compared to a normally developing child. For children with ASD, communication development does not follow a predictable pattern and first words and language development are often delayed (Sussman, 2011). These children may not meet their developmental milestones at the expected age and parents may notice that they are delayed in some, or many, of their milestones when comparing them to other children of a similar age.

According to Sussman (2011), children with mild autism or social communication difficulties are unable to predict the thoughts and feelings of others. They may have difficulty empathising and seeing another person's point of view. Social situations are often extremely difficult, resulting in these children finding it difficult to make friends and play with their peers. Speech-language therapists refer to these social communication difficulties in children with high-functioning autism, as pragmatic difficulties or difficulties in the social use of language. These social communication difficulties may be extremely difficult for families to understand and manage. Many family members are affected by the child with ASD and their impairments affect the entire family.

How family members are affected by the child with ASD and their impairments

All families are different and deal with crises differently; however, having a child with autism most certainly affects all members of the family. The way in which the family reacts to their situation will differ and will determine how they all function and manage their situation. The resources available to the family will also determine the outcomes. Despite differences between families, ASD affects all family members closely associated with the child. Families of children with ASD experience more stress, anxiety and depression than families of children with other disorders (Dumas, Wolf, Fisman & Culligan, 1991).

Social support systems often deteriorate as families with ASD children may lose friends who find it difficult to maintain the relationship when the child with ASD is problematic, especially when other children are involved (Altiere & Von Kluge, 2009). There may be a conflict between children which may be blamed solely on the child with ASD and parents of both children may find this behaviour difficult to cope with. Parents, particularly fathers of children with ASD, may withdraw and isolate themselves from social events. At the same time, mothers often report seeking social support groups as a means of meeting other mothers in a similar situation (Altiere & Von Kluge, 2009). A change in the social network may be inevitable and may add to family stress and difficulty in accepting their child and their situation. The financial burden of having a child with ASD is extremely stressful since the cost of treatment and schooling for children with ASD is so high (Altiere & Von Kluge, 2009). Therefore, while differences certainly exist between different families, all families of children with ASD will experience some level of stress as a result of trying to understand their child.

Pragmatics

Pragmatic skills are essential in day-to-day socialising and interaction with others. They are essential in the workplace, in the home, at school when interacting with colleagues, one's boss, teacher, principal, peers, siblings, parents and other family members. Without appropriate pragmatic skills, we would not be able to interact in a meaningful way with the people we meet daily. Verbal pragmatics is the understanding and use of language for social, communicative purposes, and it includes the rules of how to say what to whom, when, and in what context (Bardovi-Harlig, 2018). Pragmatics skills from a language domain include eye-contact, conversational turn-taking, topic introduction, topic maintenance, body language, smiling and facial expressions, initiating eye contact, responding to questions, and giving and recognising compliments (Gallagher, 1991).

Austin (1962), Bates (1976) and Searle (1969) have had a major impact on the early study of language pragmatics, an area of language research which has grown exponentially in recent years (Gallagher, 1991). In the early 1960s, language was classified into semantics and syntax, but this did not always explain the difficulty therapists had with their clients during therapy. This narrow classification of language also failed to facilitate the generalisation of skills to situations outside

the therapy room (Gallagher, 1991). By focusing on Language Pragmatics, clinicians were able to view language as it is used for communicative and social purposes. The social role of language necessitates the assessment and therapy of language-disordered individuals, within social contexts, where peers play a primary role in accomplishing assessment and intervention goals (Gallagher, 1991).

According to Barringer, Pohlman and Robinson (2010), pragmatics can be divided into verbal and non-verbal pragmatics and verbal/non-verbal integration. Verbal pragmatics includes communication and interpretation of feelings, humour regulation, reciprocal and effective communication skills, code-switching for a particular audience and context, topic selection and maintenance. Non-verbal pragmatics involves the actions and patterns of behaviour that foster positive relationships and overall social status (Barringer et al., 2010). These include interpreting facial expressions and gestures, using body language and the appropriate pacing of friendship and acquaintance development. Verbal/non-verbal integration is social actions and communications that combine understanding and use of language with behaviour (Barringer et al., 2010).

This research focused on the pragmatic area of turn-taking from both a verbal and non-verbal perspective. The social skills involved in taking turns can be very difficult for children with ASD. This has to do with the theory of mind deficits. Baron-Cohen (1995) used the term ‘mind blind’ to describe the theory of mind deficits that children with ASD experience (Baron-Cohen as cited in Twatchman-Cullen, 2000). They have difficulty reading mental states, thoughts, feelings and beliefs of others (Twatchman-Cullen, 2000). Since children with ASD lack theory of mind, they cannot take in the perspectives of others and have difficulty understanding other people’s attitudes or beliefs. This has implications for social interaction as they do not read between the lines and tend to remain egocentric.

Theory of mind

Difficulties with theory of mind have been associated with ASD. Brewer, Young and Barnett (2017) described theory of mind as the ability to interpret the beliefs, intentions and emotions of others. Baron-Cohen (2000) states that theory of mind means being able to infer the full range of mental states that cause action. The full range of mental states includes beliefs, desires, intentions,

imagination and emotions (Baron-Cohen, 2000). A lack of theory of mind is, therefore, the inability to interpret another person's beliefs, intentions and emotions. A lack of theory of mind was first hypothesised as the main behavioural difficulty for children with autism by Baron-Cohen and colleagues in 1995. This was the first time that cognitive functioning was linked to behaviours associated with autism (Tager-Flusberg, 2007).

Theory of mind as the major underlying cognitive difficulty for children with autism has been questioned by recent research such as that of Tager-Flusberg (2007). Restricted or repetitive behaviour is a feature of autism which is not explained by theory of mind (Tager-Flusberg, 2001). Superior visual processing skills in many children with autism are also not explained by the theory of mind hypotheses (Tager-Flusberg, 2001). Recent autism research has acknowledged the different neurocognitive system that children with autism use; however, theory of mind does not account for all the social and communication difficulties with which children with autism present. Tager-Flusberg (2007) looked at whether or not children with autism could develop theory of mind. She found that children with autism can develop some understanding of cognitive states such as emotion and beliefs; however, it is particularly challenging for them. Williams, Waiter, Gilchrist, Perrett, Murray and Whiten (2006) suggested that social communication difficulties such as poor face recognition, poor imitation and lack of empathy may be explained by the mirror-neuron system, rather than theory of mind.

Mirror-neurons are found in the premotor cortex, and they function when a person performs a motor act, and when they observe others perform that same motor act (Cattaneo & Rizzolatti, 2009). The human mirror-neuron system is involved in understanding the actions of others and the intentions leading to those actions and explains how we learn by observation (Cattaneo & Rizzolatti, 2009). In summary, there is no single explanation or hypothesis that can explain all of the symptoms associated with autism. Recent research suggests that neurocognitive mechanisms vary between individuals with autism, which stresses the importance of understanding the complexity and variability of this neurodevelopmental disorder (Tager-Flusberg, 2007).

Conversational turn-taking is a pragmatic skill which is difficult for most children with ASD as they lack theory of mind. VSM is hypothesised to be a positive visual reinforcement tool, which

may help the child with ASD to view themselves being successful at taking turns in conversation which, as a result, improves their general turn-taking skills in everyday conversation outside the therapy room. We need to understand the intricacies of turn-taking in conversation and to understand what violations to turn-taking may take place when conversation breaks down. Turn-taking will be discussed below.

Turn-taking

Turn-taking can be non-verbal, such as during toddler play when learning to share toys or take a turn during a game, but it may also be verbal, such as during conversation. Turn-taking during conversation is an important pragmatic skill which many children with autism need to develop. Turn-taking may be different in different cultures and may also differ across gender. Irrespective of which language we speak, conversational turn-taking universally follows the same rules (Coates, 2004). When taking turns in conversation, we try not to talk at the same time, and we prefer a little silence between conversational turns - minimal gap, minimal overlap (Coates, 2004). Turn-taking involves delegating who is to speak next and when and also includes the need to recognise cues in turn-transition.

Sacks (1974) described a Sequential Production Model of Turn-Taking (Sacks as cited in Brinton & Fujiki, 1993). In this model, there are three basic components, turn-construction, turn-allocation and rules. Turn-construction implies that turns are constructed from single words to several sentences. Once the speaker has initiated a turn, the listener can anticipate what type of turn is being constructed and may anticipate the completion point, or the point at which the listener may initiate a speaking turn (Sacks as cited in Brinton & Fujiki, 1993). Turn-allocation includes procedures in which the current speaker selects the next speaker and procedures in which selection is self-initiated. The rules are that the current speaker selects a person to be the next speaker, however, if no speaker is selected then whoever speaks first takes the next turn or the current speaker may continue talking (Sacks as cited in Brinton & Fujiki, 1993).

Sacks (1974) did not explain how speakers can anticipate transition-relevant places; therefore Duncan and Fiske (1985) developed the Signalling Model of Turn Taking (Duncan & Fiske as cited in Brinton & Fujiki, 1993). This model consists of the Speaking-turn unit and the Within-

turn unit. During the Speaking-turn unit, the speaker uses rising or falling intonation, prolongation of certain syllables, stereotyped phrases such as ‘you know’ or completion of a sentence to signal the end of a turn (Duncan & Fiske as cited in Brinton & Fujiki, 1993).

The original speaker then stops speaking and allows the listener to begin speaking. Speakers also produce within-turn units whereby the speaker creates a point where the listener may (but is not obliged to) request clarification, for example, ‘huh?’ or complete a sentence or expression, for example, ‘yeah’, ‘I see’, a head nod or even a smile. The listener may interject here to agree or disagree with the speaker or to show that the message is being understood (Brinton & Fujiki, 1993).

Social turn-taking games include imitative actions (each partner repeats the same act), complementary actions (each partner engages in an action to complete a cycle), and reciprocal actions (partners reverse complementary roles within a cycle) (Eckerman & Didow as cited in Brinton & Fujiki, 1993). Actions can also serve as 'turn-alternation signals' whereby one partner indicates to the other to take a turn (Ross & Kay as cited in Brinton & Fujiki, 1993).

Turn-taking defined and turn-taking violations

The definition of a conversational turn for this study was based on the ‘no gap, no overlap model’ (Coates, 2004). This model means that, in an ideal situation, there are no gaps or overlaps during conversation. If turn-taking is not effective, then turn-taking violations are taking place.

The following constitute violations to conversation turn-taking (Coates, 2004):

- Interruptions: when one interrupts the speaker and they cannot finish their turn,
- Overlaps: when one overlaps the first speaker’s turn before the speaker is finished,
- Grabbing the floor: when a listener interrupts and takes over the conversation,
- Hogging the floor: when a speaker takes a long time talking and ignores others attempting to speak,
- Silence: nobody speaks.

This definition of turn-taking and turn-taking violations was used in creating the turn-taking tallying record sheet and the turn-taking assessment profile (see Appendices). These definitions of

what constitutes a conversational turn as well as the definitions of turn-taking violations were constantly referred to so that tallying of spontaneous turn-taking or violations of turn-taking was done correctly.

Development of turn-taking

The development of turn-taking begins very early in life and is natural and spontaneous for most typically-developing infants. When infants are very young, carers strive to interact with them and consider almost any infant action to be a response. Caregivers often treat infant burps, coughs and sneezes as if they were attempts at conversation. Later, the caregiver becomes more demanding in the type of response that counts as a turn (Brinton & Fujiki, 1993). From very early on, parents are modelling turn-taking skills and encouraging their babies to take a turn in conversation without even realising that they are doing so.

Between the ages of 6 to 12 months, an infant's progress from a passive role during social games to taking an active role and the continuation of the game is contingent on the infant's participation (MacDonald, 1993). The infant may initially take a turn, using gestural responses and then later combine gestures and vocalisations, until finally vocalisations may be produced without gestural support. This is the start of conversational turn-taking.

Between 8 to 12 months of age, infants initiate discrete actions which indicate their knowledge of game structure. By 12 months, infants assume an active role in parent-infant games 93% of the time and, at this age; they initiate parent-infant social games 50% of the time (MacDonald, 1993). Therefore, from eight months, old babies are beginning to use turn-taking skills at a basic level.

Turn-alternation signals with adult partners (such as vocalising while looking at their partner, repeating their own turn, enacting adults' roles and alternating gaze between the adults' face and toy) increases between the age of 9 and 12 months and continues to increase until 18 months of age (MacDonald). As the child grows, their ability to take turns increases in sophistication.

Babies as young as eight months old are already highly efficient at basic turn-taking skills and, by two years of age, few instances of simultaneous speaking occur (Brinton & Fujiki, 1993).

However, this turn-taking skill of the two-year-old is rudimentary and only used in certain situations, for example, to reply to greetings, yes/no questions and offers, amongst others. A two-year-old still allows long pauses in conversation and has difficulty entering a conversation, since they cannot yet initiate an utterance on topic. Children under four years of age have more difficulty managing turns in three-party than they do in two-party interactions (Brinton & Fujiki, 1993). Parents usually control the interaction by introducing the topic and then using back channel utterances to maintain the interaction.

Children learn to use gaze, proximity and body posture to gain attention and they may also use words, volume increases or pitch variation to indicate that the utterance was directed to their conversational partner (Brinton & Fujiki, 1993). Gallagher (1991) found that children between the ages of two and four were able to differentiate between neutral verbal responses and pauses longer than one second. They would be more likely to abandon a request when it was met with a neutral response than when it was met with a pause (Gallagher, 1991). Young children are most definitely aware of pause patterns and silences in conversation. Silence is the most important turn initiation cue for children aged one to two years (Gallagher, 1991). Garvey and Berninger (as cited in Brinton & Fujiki, 1993) discovered that children use terminal intonation patterns and some intervals of silence following speech from a partner to determine turn boundaries rather than projecting ahead to a transition-relevance place. Therefore, turn-taking in conversation is unknowingly taught by parents and caregivers from the very beginning. For most children, this becomes a natural skill which they pick up with ease. However, for many children with ASD, this is a skill which needs to be taught explicitly.

The developmental milestones related to turn-taking will be taken into consideration, when assessing the pragmatic skills of children with ASD. They will be used to guide the assessment and intervention process.

Turn-taking in children with ASD

Turn-taking is not always easily developed for children with ASD, and they need to be taught how to take turns during a game, or when playing with objects and with peers before conversational turn-taking can be mastered. Turn-taking needs to be made explicit for the child with autism, and

they will need multiple opportunities to practice turn-taking in a safe, non-threatening environment, such as a group therapy context which may be mediated. These newly-found skills will then need to be generalised to situations outside the therapy room, such as the classroom and playground. VSM is one method of teaching turn-taking skills by watching oneself being successful at taking turns. VSM is expected to encourage increased turn-taking behaviour during real-life interaction.

Assessment of pragmatics

Assessing pragmatic skills can be difficult since the social use of language in conversation is difficult to assess using standardised or norm-referenced tests. Real-life conversation needs to be observed, and data collected in a naturalistic interaction (Hadley & Schuele, 1998). Spontaneous language samples are effective in achieving the naturalistic interaction, but this method of assessment may be difficult to measure or rate, and it may be difficult to obtain a representative and realistic sample of behaviour (Hadley & Schuele, 1998). Information collected by observation, interview and checklists is often more accurate, realistic and meaningful, particularly when gathered from more than one source and across several contexts (Hadley & Schuele, 1998). It is essential to observe interaction with different conversational partners, such as therapists, teachers, parents and peers, to obtain a holistic view of social communication (Hadley & Schuele, 1998). Within the school context, therapists and teachers may obtain a more realistic assessment of pragmatics since they can observe the child interacting with others daily and may be able to observe where and when conversational breakdown typically takes place. For this study, it was most beneficial to use the child's current speech-language therapist's most recent assessment of the child and therapy progress reports to gain greater insight into the individual strengths and weaknesses, especially related to areas of pragmatics, and receptive and expressive language for each particular child. A case history examination also provided further insight from the parent's perspective of their child, following which the child was observed in the classroom setting over time.

When assessing pragmatics, the speech-language therapist should focus on certain criteria as described by the American Speech and Hearing Association (2015). The therapist needs to assess whether or not the child can initiate spontaneous communication and take turns in conversation

(ASHA, 2015). The assessment also includes evaluation of the child's willingness to maintain a conversation, their ability to manipulate conversational topics and repair communication breakdowns (ASHA, 2015). Communication for a range of social functions needs to be assessed, and the speech-language therapist needs to investigate the child's ability to differentiate their own feelings from the feelings of others, Theory of Mind (ASHA, 2015).

A comprehensive assessment of the child is necessary to establish goals and priorities for intervention. Therefore, receptive and expressive language, as well as speech and articulation and even auditory processing assessment for the older child, will also guide the understanding of the child and their strengths and weaknesses.

Facilitating turns and topics - intervention ideas

Many therapists have discovered creative ways of facilitating turn-taking in the therapy context. The environment may be structured to focus on turn-taking in a small group. 'My turn', 'your turn' may be a good verbal cue to encourage turn-taking. Visual cues may be useful to encourage turn-taking, such as a child handing something to another child to signal their turn. Some teachers used a wooden spoon which is held when you are speaking and given to the next child when it is their turn to speak.

Various intervention programmes have been developed for improving social interaction, including turn-taking, in children with ASD. Some of these include Responsive Educational and Prelinguistic Milieu Training (RPMT) whereby the child is taught an object exchange as a means of turn-taking behaviour (Yoder & Stone, 2006). Another approach which is used to develop turn-taking skills is the Picture Exchange Communication System (Yoder & Stone, 2006). Social stories were developed by Carol Gray to help children with ASD to navigate different social roles and social situations through stories or scenarios (Sansoti & Powell-Smith, 2006). Social, or group, therapy with peers provides opportunities to practice social-pragmatic skills, in a low-stress yet naturalistic environment with the speech-language therapist intervening when necessary (Hadley & Schuele, 1998). Interactive games with familiar game routines are useful in therapy to encourage turn-taking behaviour (Brinton & Fujiki, 1993).

Turn initiation should be encouraged in therapy by remembering to allow the child enough time to respond; silence is a valuable tool in therapy sessions. Non-verbal cues such as gestures, eye gaze or a questioning expression, may be used to let the child know that a speaking turn has become available (Brinton & Fujiki, 1993). The therapist may need to cue the child to stop talking with a gesture of finger on the lips, for example, or using a walkie-talkie intercom system or pretend telephone to encourage turn-taking (Brinton & Fujiki, 1993). Turns in games may need to be directly allocated by the therapist before the child learns to take turns spontaneously and the therapist may need to encourage an interest in what others are contributing to the conversation (Brinton & Fujiki, 1993). The therapist also needs to handle interruptions, by discussing why they are disruptive, by helping the child to identify interruptions and by discouraging interruptions when they occur (Brinton & Fujiki, 1993).

The turn-taking activities mentioned above may be too abstract for the child with ASD since they involve metalinguistic skills, which may be difficult for the child with ASD to grasp. These activities also require a fairly competent understanding of language and some children with ASD have difficulty with receptive language. Therefore, the benefit of using VSM as a visual tool, which is appealing and more concrete, is an exciting new prospect when focusing on pragmatic skills in children with ASD. They don't need well-developed language or good metacognitive skills to watch their video and model similar behaviour.

General programmes may not be suitable for all children with ASD since each child presents with a different profile of strengths and areas requiring support; therefore personalised treatment programmes are important to focus on the specific areas of difficulty with which each child presents. A personalised video will target the specific skills that a particular child requires.

Brinton, Robinson and Fujiki (2004) described an individualised social language treatment programme for an adolescent male with impaired language comprehension and expressive skills. The therapist used video clips from familiar movies to help the adolescent analyse and comment on the nature of the conversational exchange, the therapist drew the adolescent's attention to the perspectives of the individual characters, in terms of what they were thinking and feeling. The therapist looked at what information was available from the spoken language and what was

available from non-verbal cues (facial expression and gestures, amongst others). They then viewed videotapes of clinic personnel role-playing common events and interactions, the adolescent had experienced at school and analysed these role-plays in a similar way (Brinton et al., 2004). A conversation game was then played in therapy sessions, whereby the reciprocal exchanging of turns back and forth, in a balanced way, during conversation was compared to a game of tennis. The initial scripted exchanges were highly structured and basic and gradually increased in complexity (Brinton et al., 2004). Once the adolescent had mastered these types of turn-exchanges on set topics, the therapist then encouraged the adolescent to initiate topics spontaneously. Results indicated that the adolescent could use concrete strategies learnt by the structure and feedback provided in the conversation game, to assist him during peer conversations and thereby enhance his social aptitude (Brinton et al., 2004). This individualised treatment programme proved to be highly effective. The advantage of VSM is that it is a highly individualised method of teaching new skills, which the child is on the verge of mastering. It incorporates essential psychological components, which include self-belief and self-confidence, into the therapy approach, to affect the child's behaviour positively and improve conversational skills. This therapy tool is real to the child, in terms of being meaningful and personal.

Video modelling (VM)

Video technology seems suited to children generally but specifically those on the autism spectrum since they often have strengths in visual processing (Sturmey, 2003). Television can be a non-threatening teaching tool as an alternative to direct human interaction. VM involves a child watching a specifically made video of peers or adults engaging in a behaviour being taught (Litras et al., 2010). Charlop and Milstein (1989) found that VM was effective in teaching conversational speech to children with autism. Nikopoulos and Keenan (2004) investigated the effectiveness of VM on social initiations by children with ASDs and results indicated that VM improved social initiations and play behaviours in this group. VM has been studied widely and found to be effective, specifically in improving behaviours of children with autism. Bandura, as early as 1997, found that the most effective models are often those who have similar characteristics to ourselves (Bandura, 1997). VM now allows observers to act as their own models (Buggey, 2005). This may be used for a variety of aims across many disciplines.

Video self modelling (VSM)

VSM involves observing oneself performing at a slightly advanced level, using an editing technique called video feed-forward (Litras et al., 2010). This is achieved by showing only positive performances of a targeted behaviour. This is an effective tool to encourage positive behaviour and discourage unwanted behaviour. Bandura's theory (1969) around social learning is closely linked to video self-modelling. This social-cognitive model emphasised awareness and observable actions or consequences on learning new skills (Hitchcock et al., 2003). VSM allows individuals to see themselves and how they could be, which results in improved self-efficacy.

The usefulness of VSM has been researched in the fields of professional sports and sports psychology for improving performance. Petro, Ehmann, Bardos and Szabo (2018) interviewed 20 top elite athletes from four different sports teams, including water-polo, basketball, soccer and handball. The majority of these top athletes displayed a positive attitude towards the use of VSM to improve performance and for new skill acquisition, such as increasing bilateral skills. Other recent research has investigated VSM as a performance-enhancing technique for competitive sports performances such as diving (Martini, Rymal & Ste-Marie, 2010) and gymnastics (Martini, Rymal, Ste-Marie & Vertes, 2011). The studies involving gymnasts, in particular, indicated that competitive beam scores improved significantly when the gymnasts used VSM at competitions (Martini, Rymal, Ste-Marie & Vertes, 2011).

VSM has been investigated more recently in the fields of psychology and education. Lee, Lo and Lo (2017) conducted a pilot study to investigate the effectiveness of VSM as an intervention tool to teach an Asian-American five-year-old child functional play using three scenes and corresponding toys, a farm, doctors rooms and rescue helicopter with bridge scene. An improvement in functional play was noted over time, which supports the evidence of VSM as a successful therapy tool when teaching a child with ASD a new skill. VSM has also been reported to have a beneficial effect on positive social interactions in the preschool years (Lemmon & Green, 2015).

Barnett, Donovan, Kalra, McCoy and Morrison (2017) investigated the use of an iPad for VSM and for displaying activity photos in a preschool setting when trying to improve listening behaviour. Both VSM and activity photo exposure resulted in increased engagement and a reduction in off-task behaviours (Barnett et al., 2017). Both children and teachers displayed a preference for VSM rather than looking at activity photos when addressing problematic behaviours (Barnett et al., 2017).

When working with school-aged children, VSM was researched in terms of reading comprehension and fluency outcomes for first-grade children with reading difficulties (Dowrick, Hitchcock & Prater, 2004). This study proved that VSM accelerated reading fluency skills and consolidated reading comprehension skills, specifically when accompanied by direct tutoring (Dowrick, Hitchcock & Prater, 2004). This suggests a positive therapeutic intervention using VSM for the school-aged population.

VSM has been investigated recently when working with children with ASD. VSM has been effective in teaching motor imitation skills involved in playing active video games to children with ASD (Kurnaz & Yanardag, 2018). Active video games (as opposed to non-active ones) have been proven to increase physical activity and provide appropriate leisure skills to children with ASD (Dattillo & Garcia-Villamisar, 2010). VSM has been used successfully to improve language and communication skills, in behaviour modification and in improving social skills in individuals with ASD (Anderson, Buggey, Gelbar & McCarthy, 2012).

Buggey (2005) realised that there was a substantial body of evidence, across a range of ages and behaviours, to prove the efficacy of VSM, however, few studies had focused on students with ASDs. In 2005, Buggey, therefore, investigated and proved that VSM improved behaviours such as language and social initiations in children on the autism spectrum. Buggey, Toombs, Gardener and Cervetti (1999) used VSM to train responding behaviours in students with ASD, in terms of appropriate verbal responses to questions. Students were filmed over two weeks within their home environment and were asked questions by the researchers. These videos were edited into VSM video clips. Students watched themselves responding rapidly and often to the questions asked. The

results indicated that responding to questions improved dramatically after the VSM videos had been viewed.

In 2003, Wert and Neisworth found that VSM improved spontaneous requesting in four preschool children with autism. Results for all four participants showed significant gains in spontaneous requesting and carry-over was noted (Wert & Neisworth, 2003). These research findings hold promise for the use of VSM for children with ASD in the South African context to improve the pragmatic skills of turn-taking.

Some of the studies mentioned above explicitly used live reinforcement such as rewards, printed 'well done, great job, excellent' motivators, audio cheering and positive images of the participant within the video. This live reinforcement significantly improved the results obtained in a short time (Litras et al., 2010). In some of the studies mentioned above, rules emphasising the target behaviour were stated, both in written form and voice-over, which improved performance for participants. Multiple examples were also effective in improving target behaviours. In many of the studies on the effects of VSM in teaching social skills to children with ASD, successful generalisation across settings was noted after a two-week period during which the videos were no longer being watched. It will be valuable to observe the children in this study after two weeks with no VM, as well as three months post-video exposure, to determine whether long-term (far) transfer of the new skills will be retained, rather than merely looking at short-term (near) transfer.

Buggey (2005) describes two major methods for getting children to perform desired behaviours for videotaping. The first, which is less time consuming, involves getting the children to imitate the target behaviour (Buggey, 2005). Children can often imitate correct responses to social situations before they can use these appropriate responses spontaneously in their everyday communication (Buggey, 2005). The second method involves filming a person's behaviour over time and then editing the film so that only examples of the positive behaviour are included. This second method is effective for children who may not readily imitate (such as those with autism); however, it is time-consuming (Buggey, 2005). The second observation-based method was used for this study.

Accessible and easy-to-use software for home video production is now available, which means that VSM intervention is now easy to implement and can be used by teachers, parents or therapists at home, in the therapy room and even in the mainstream classroom. This makes VSM an exciting new therapy tool to be used by the many people involved in the lives of children with ASD.

The benefit of all those involved with the child being able to use video as an intervention tool is that family members, teachers and therapists can all share in the teaching, and this collaborative approach is certain to improve the quality of intervention and carry-over of skills. This study aimed to prove the efficacy of using video self-modelling as a therapy tool with children with ASD, to have research-based evidence that this therapy technique is an effective method of improving pragmatic skills, such as turn-taking. The outcome of this study will significantly affect the use of VSM within the therapy context. The use of VSM for home programmes and to promote generalisation and carryover of new skills to contexts outside the therapy room, such as the classroom and home, is also an exciting prospect.

4. Methodology

Primary aim

To determine if the VSM technique improves pragmatic difficulties, specifically turn-taking skills, in children with ASD.

Sub-aims

1. To establish the frequency of conversational turn-taking and turn-taking violations in a small group of children with ASD.
2. To describe the nature of conversational turn-taking and turn-taking violations in a small group of children with ASD.
3. To relate the profile of each child to the nature and frequency of their conversational turn-taking.
4. To determine whether the VSM approach is applicable in the South African context.

Research design

A qualitative, multiple subjects, multiple baseline research design was implemented to assess the effectiveness of the intervention. Naturalistic observations were included in the study. Large group studies may not always be valid when clinicians attempt to apply data to specific clients. In addition, it is not always possible to construct large homogeneous groups of participants with similar difficulties. Multiple subjects, multiple baseline research design involves the investigation of a small group of participants in which intervention and dependent variables are controlled (Zhan & Ottenbacher, 2001). This data is often easily translated into clinically significant findings by systematic recording and analysis of outcomes (Zhan & Ottenbacher, 2001) and was thus used for this study. The advantages of this design are that it allows the researcher to measure several targets simultaneously in several participants in various settings, thereby increasing external validity (Horner et al., 2005). Multiple subject research methods also allow the researcher to focus on individuals in a heterogeneous population, for which parametric analysis would not be possible (Richards, Taylor, Ronald, Ramasamy & Richards, 1999). This design was, therefore, particularly appropriate for this study, where the five participants each presented with unique and different communication profiles of strengths and weaknesses. Inconsistency of findings may be a factor due to the subjective nature of the analysis (Zhan & Ottenbacher, 2001).

A qualitative research paradigm was used as this assumes that reality is defined by the interaction of the researcher with the phenomenon under study (Harrell, Lee & Mark, 1996). The researcher used a qualitative paradigm as naturalistic interaction with the subjects, by observation and immersion in the classroom, was essential for gaining insight into the nature of conversational turn-taking skills of children with ASD in their most natural, everyday settings.

Experimental research was used for this study. A pilot study on one participant was conducted, prior to the main study, to fine-tune intervention and coding procedures.

Sampling strategy

Non-probability, purposive sampling was used as all children were recruited from a single special-needs school (Schiavetti & Metz, 2002). No randomisation in selecting subjects was used. Subjects who were able to provide useful information for the study were chosen. The disadvantage is that

the characteristics of each of the subjects of the sample may not approximate the characteristics of the total population and that purposive sampling may be biased (Welman & Kruger, 1999). However, children with ASD who are suitable candidates for video self-modelling are difficult to define, locate and recruit. Purposive sampling was, therefore, necessary to ensure that participants were appropriate for the study (Mark, 1996). Caution must be exercised in generalising from the data collected in the study and research should aim to gain insight into the trends of possible conversational turn-taking violations and the efficacy of VSM in other children with ASD.

Inclusionary and exclusionary criteria

- Age - The ages of the participants ranged from six to nine years old by which time the diagnosis of ASD has generally been made. In the period between three and five years of age, developing children typically begin to take turns in conversation to maintain the topic of conversation (Gosse & Gotzke, 2007). Conversational turn-taking is not a skill that develops naturally for many children with ASD who need it to be taught. Between the ages of five and nine years, some children with ASD may have the prerequisite skills for VSM training, namely the ability to model or imitate the correct behaviour.

- Diagnosis - A diagnosis of ASD from a neurodevelopmental paediatrician or child psychologist, based on the DSM V criteria as previously outlined, was an essential criterion. The participants all had pragmatic difficulties, specifically conversation turn-taking, but were able to model or imitate turn-taking behaviour.

- Participants did not present with any organic abnormalities such as hearing loss or seizures, which could have affected the child's ability to respond to the intervention consistently.

Due to the heterogeneity of children with ASD, there are other variables which could not be controlled, but which will be considered when interpreting results. These include:

- Previous speech-language therapy the children have received.

- Medication taken; this may imply poor health of the child or it may have affected the level of focus or willingness to take part in conversation.

- Educational history; children who were exposed to a good quality educational system to suit their needs from an early age may have been more engaging and able to communicate, than those who had less opportunity to learn.

Table 2: Research instruments

Name of instrument	Explanation	Appendix
Codes and definitions for turn-taking violations (adapted from Coates, 2004).	Used to define turn-taking violations to tally and record correctly.	Appendix K.
Frequency of turn-taking tallying record sheet.	Used to record the number of times spontaneous turn-taking, as well as turn-taking violations, were noted for each child for each session.	Appendix L.
Turn-taking assessment profile.	The tallying record sheet was used to plot the turn-taking assessment profile for each child.	Appendix M.
Procedural checklist for video presentations.	Used to ensure treatment fidelity by recording any interruptions, distractions or the presence of others during the viewing session.	Appendix N.
Teacher satisfaction questionnaire.	Used to determine social validity on completion of the study.	Appendix O.

Pilot Study

Aim of the pilot study

A pilot study was carried out before the main study to fine-tune the treatment protocol and coding procedures. The pilot study aimed to determine whether the proposed video self-modelling intervention was feasible to implement and whether the intervention led to observable increases in the participant's ability to take turns in conversation.

Description of the participant

The pilot study was administered to one child with ASD at a private remedial school in Johannesburg. The pilot participant was an eight year old white male diagnosed with ASD with no

co-occurring diagnosis, such as hearing loss or epilepsy. He was diagnosed with ASD by a neurodevelopmental paediatrician. The pilot participant was receiving two speech-language therapy sessions per week at school from the school speech-language therapist, as well as a social skills group at school with the school educational psychologist. He was on no medication at the time of intervention. He was in Grade 2 in a small class with approximately 13 pupils.

Recent speech assessment and progress reports were studied with permission from the parents, school and speech-language therapist, to obtain information about his speech and language profile.

The pilot participant presented with some articulation errors, namely ‘f’ for ‘th’ substitution in all word positions such as funder for thunder, birfday for birthday and teef for teeth. He also used ‘d’ for ‘th’ voiced in initial and medial word positions such as dat for that and feada for feather. In terms of auditory processing, the pilot participant had good rhyming skills but had some difficulty with auditory discrimination, phonological segmentation, phonological blending and auditory closure. His auditory memory for digits, forward and reversed, and words was within the average range; however he had difficulty with sentence memory and story memory tasks. In terms of language, the pilot participant presented with good receptive and expressive vocabulary, good sentence comprehension, well-developed listening comprehension and strong word association skills as well as a strong ability to formulate sentences orally, with good expressive grammar. He had difficulty with the understanding of linguistic concepts and following directions. In terms of pragmatics, the pilot participant frequently said ‘I'm sorry’ inappropriately and had difficulty with topic initiation and maintenance. He was reportedly responding well to speech-language therapy and improvement had been noted in many language areas; however he required further development in answering ‘wh’ questions (for example ‘who?’, ‘where?’, ‘why?’), storytelling skills, abstract inference tasks and problem-solving skills.

Research procedure - pilot study

Pilot studies are valuable as they allow preliminary testing of a hypothesis to refine the methodology for the main study. They often provide the researcher with ideas and reduce the potential problems that may not have been thought of before conducting the pilot study as there is an opportunity to restructure parts of the study to overcome difficulties revealed by the pilot study

(Meriwether, 2001).

The pilot study took place at a private special needs primary school in Johannesburg. The pilot study involved video recording one child (who met the criteria mentioned above) in the classroom setting for 30 minutes three times a week for three weeks. All video recordings were done at school. The pilot participant was filmed during interactive moments when class discussion was encouraged, namely during Rave-O® reading group sessions with his class teacher and during language stimulation sessions with the class, led by his speech-language therapist. He was, therefore, familiar with the environment and with his teacher and speech-language therapist.

The project involved three phases, assessment, therapy and follow-up. In the assessment phase, the child's speech-language therapy assessment reports and background case history were studied with permission from the parents, school and speech-language therapist.

Assessment phase:

The child was filmed in the classroom setting, three times a week, for one week during the assessment phase. Frequency of turn-taking behaviour (including turns offered spontaneously and turns taken when directly asked), as well as turn-taking violations, were tallied and scored on the frequency of turn-taking tallying record sheet for each session filmed (see Appendix L). During the assessment phase, a video was made of the child being successful at conversational turn-taking. The video clip was made using video scenes of the classroom observation from the assessment filming phase, including three different examples of the child engaging in appropriate turn-taking behaviour. This video was made using editing software to remove any negative behaviour or therapist prompts and including positive reinforcement, such as audio cheering and visual rewards. The final product was given to the parents. During the intervention phase, the child watched his personalised video at home every evening for one week. The child also watched his video on the iPad at school each morning with the researcher.

Intervention phase:

During the intervention phase, the child continued to be filmed in the classroom three times a week for one week so that the frequency of turn-taking tallying record sheet could be completed for each session.

Follow-up phase:

During the follow-up phase, the researcher wished to determine whether or not any improvement in conversational turn-taking had occurred. Once again, the child was filmed in the classroom three times a week for one week to complete the frequency of turn-taking tallying record sheet. A parent satisfaction questionnaire was sent out on completion of the study (see Appendix O).

During the pilot study, the parents were involved in the intervention phase, since they showed the child his personalised video at home and they were also involved in completing a parent satisfaction questionnaire at the end of the follow-up phase. However, parent bias and encouragement may have been a variable that interfered with results, since parents may have commented or encouraged their child to display more turn-taking behaviour, which would then affect the validity of the research results. For the main study, therefore, the parents were not involved in the intervention phase, and only the researcher showed the participants their personalised videos at school so as not to interfere with the treatment phase. The parents were not given a parent satisfaction questionnaire to complete, but the teacher was given a teacher satisfaction questionnaire as she was present as an observer during the data collection process in the classroom.

Results of the Pilot Study

The results of the pilot study indicated an improvement in turns taken spontaneously and less silence when a turn was expected of the child after video-self modelling was implemented. Results of the pilot study are presented in Figures 1 and 2P below.

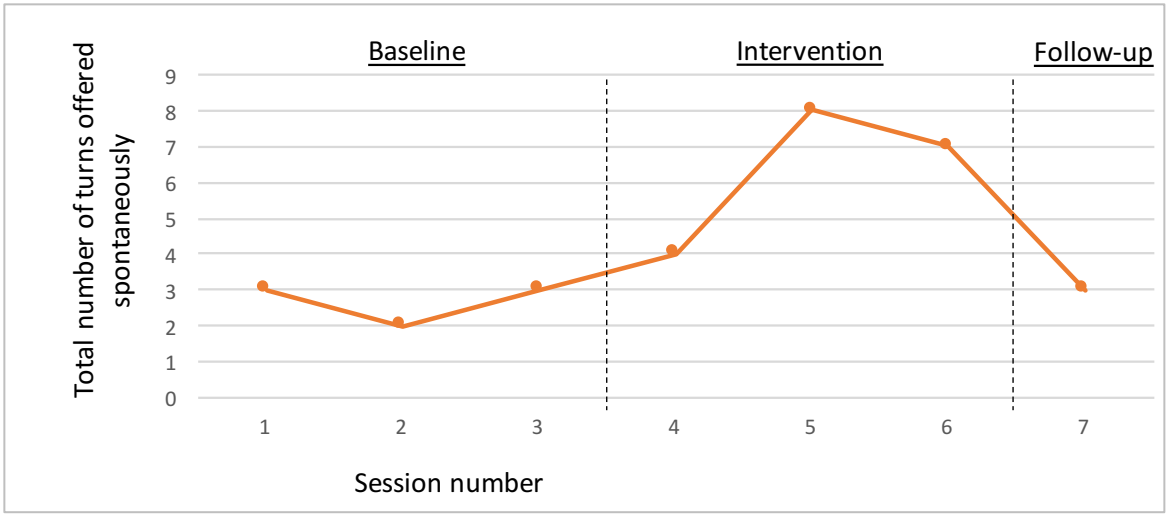


Figure 1P: Turns offered spontaneously

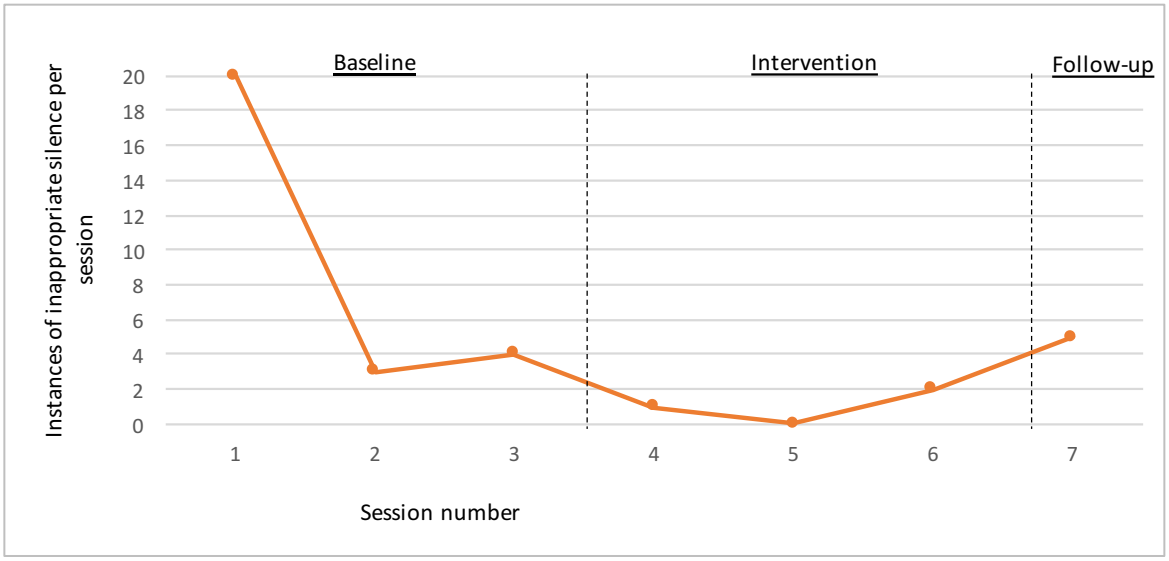


Figure 2P: Violations – silence

The results will be presented in the three phases – baseline, intervention and follow-up.

During the baseline phase, the pilot participant's scores were fairly low but were constant and similar for turns offered spontaneously over three consecutive sessions. The only turn-taking violation that was noted was silence. The pilot participant demonstrated many instances of silence during the first session and then considerably fewer in the second and third sessions. He seemed to realise that he was expected to take a turn more often as a result of the filming and possibly

during the discussion when his consent to participate in the study was obtained and, therefore, an improvement in his turn-taking, as opposed to silence, was already seen in the second and third sessions of the baseline phase.

Once the intervention phase was implemented, the pilot participant presented with improved scores for turns offered spontaneously over three consecutive sessions with a marked improvement in sessions five and six. During the intervention phase, once again, the only turn-taking violation that was noted was silence. The pilot participant demonstrated very few instances of silence during the intervention phase so improvement was noted in terms of taking a turn when asked or cued to do so, which contrasts with more instances of silence during the baseline phase. During the intervention phase, the pilot participant's class teacher stated that she had noticed that generally he was putting up his hand more during class and was more willing to take a turn in the classroom than before the study was implemented. The positive feedback also suggested that, from the subjective view of the class teacher, the video self-modelling intervention improved his turn-taking skills.

One follow-up session was filmed after the intervention had ended and, during this session, the pilot participant presented with a lower score than expected for turns taken spontaneously. This may indicate that carry-over, or transfer of new skills after the intervention was not optimal. However, it may also indicate that the intervention period was not long enough to focus significantly on the target skill and, therefore, during the main study, the intervention phase was extended to daily over two weeks. The follow-up phase, being only one session, also proved to be less than optimal, since the pilot participant may have had a day that was not typical for him and the follow-up phase was, therefore, extended to two weeks during the main study. In addition, a second follow-up phase was implemented after a two month interval, to determine the long-term carry over of skills acquired during the main study. During the follow-up session, once again, the only turn-taking violation that was noted was silence. The pilot participant demonstrated more instances of silence than was expected during this session. This was less than optimal in terms of carryover since the instances of silence increased when compared to the intervention phase. This once again necessitated a longer intervention and follow-up phase and a second follow-up phase after two months during the main study.

The percentage of turns taken appropriately, when asked directly, was calculated by dividing the number of turns taken when asked directly by this same number, plus the inappropriate silence (the total number of opportunities for turn-taking). During the baseline phase, the pilot participant was able to take turns appropriately 41% of the time in the first session, 73% in the second and 56% in the final one. During the intervention phase, these scores increased dramatically with the pilot participant able to take turns appropriately 94% of the time in the first session, 100% in the second and 82% in the last session. During the follow-up phase the score decreased notably, with the pilot participant only able to take turns appropriately 58% of the time, which once again necessitated longer intervention and follow up phases for the main study.

Figure 3P displays the percentage of turns taken appropriately, when asked directly, during the baseline, intervention and follow up phases. Marked improvement in appropriate turn-taking skills can be visualised on the graph during the intervention phase.

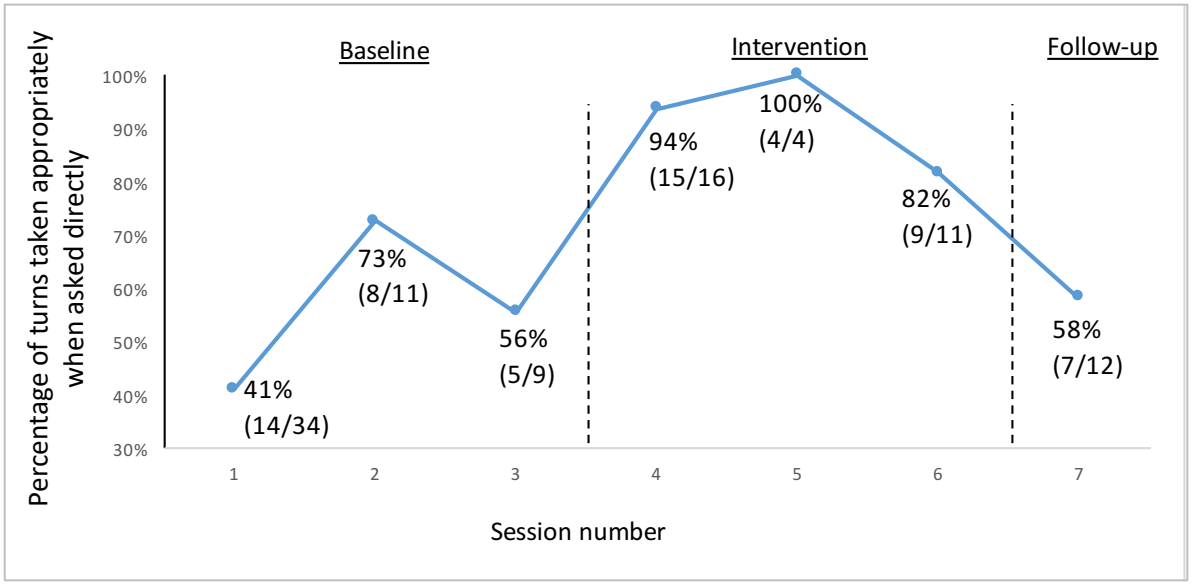


Figure 3P: Percentage of turns taken appropriately when asked directly

Challenges

Careful observation of the baseline and intervention sessions revealed that the pilot participant was already improving as early as the second session in the number of silences being recorded; this was still in the baseline phase. To control for extraneous variables, the assent form taken from the

pilot participant needed to be less directive and vaguer in terms of the purpose of the study being discussed with the child. This was adjusted for the main study. After the pilot study had been completed, it was also evident that, by asking the child's parents to watch the personalised video with him at home during the intervention phase, the pilot participant was then open to being exposed to possible additional prompting, subconscious rewards or subtle praise. The main study, therefore, focused only on the directive therapeutic technique of video self-modelling in isolation. The parents were not involved in the therapy stage during the main study, but merely provided with information about the study. They were asked to fill in consent forms if willing to participate and informed that results would be provided after the completion of the study. The pilot participant was filmed during Rave-O® and language stimulation sessions. These two sessions were structured differently, affording different opportunities for turn-taking in each session. The pilot participant is a confident reader, and he was, therefore, more interactive in the Rave-O® reading session and offered more turns spontaneously. In contrast, the language stimulation session was more of a group discussion and he was noted to offer fewer turns spontaneously and needed to be asked questions directly to be pulled into the discussion by the therapist. For consistency of results, the pupils in the main study were filmed at the same time each morning, during morning ring, which followed the same predictable format each time. The morning ring was led by the children, with each child in the class having a turn to be the captain, which resulted in a more naturalistic type of peer-directed conversational turn-taking being recorded.

Conclusion

Although the pilot study intervention overall was felt to be successful, three minor changes to the methodology for the main study would improve the consistency, validity and reliability of results. The assent form taken from the main study participants would be less directive and vaguer in terms of the purpose of the study being discussed with the child, the parents would not be involved during the intervention stage, and the participants in the main study would be filmed at the same time each morning, during morning ring which will follow the same format each time to improve consistency. The time will be extended to four filming sessions per phase, and a second follow-up phase will be included two months post-intervention, to determine long term carryover of skills.

Main Study - Methodology

Description of participants

Five males between six and nine years of age, who were diagnosed with ASD and attended a special needs government school in Johannesburg, were the focus of the study. All five children were in the high-functioning autism class consisting of 11 pupils with a teacher and teacher assistant. The participants all had pragmatic difficulties, specifically conversation turn-taking, but were able to model or imitate turn-taking behaviour. Participants did not present with any organic abnormalities, such as a hearing loss or seizures, which could have affected the child's ability to respond to the intervention consistently. Three of the children were on medication to improve their ability to focus, which was administered at school each morning on arrival and before the start of the school day. None of the participants was receiving private speech-language therapy sessions at the time of the study, but the school speech-language therapist was working with the class teacher to facilitate language stimulation in the classroom environment.

Table 3: Case history for each child:

	Child A	Child B	Child C	Child D	Child E
DOB	13/07/2009	27/03/2009	12/10/2009	19/01/2009	26/07/2008
Medication	Risperdal (0.6 mg mornings).	Risperdal (0.75 mg twice daily).	No	No	Ritalin.
School and diagnosis history	Diagnosed with ASD in 2011. Moderate ASD diagnosis. Special needs school from 2014.	Mainstream for Grades R and 1. Moderate to severe ASD diagnosis. Special needs school from 2016.	Diagnosed with ASD in 2014. Special needs school from 2014.	Diagnosed with ASD in 2011. Moderate ASD diagnosis. Special needs school from 2012.	Diagnosed with ASD in 2013. Mild ASD diagnosis. Special needs school from 2013.
Speech-language therapy	Classroom based	Classroom based	Classroom based	Classroom based	Classroom based
Classroom	High functioning	High functioning	High functioning	High functioning	High functioning
Pragmatic difficulties	Difficulty with turn-taking in conversation. Can imitate turn-taking.	Very little spontaneous turn-taking in conversation. Can imitate turn-taking.	Difficulty with turn-taking in conversation. Can imitate turn-taking.	Very little spontaneous turn-taking in conversation. Can imitate turn-taking.	Very little spontaneous turn-taking in conversation. Starting to imitate turn-taking.
Language skills	Strong expressive language. Difficulty listening and following instructions.	Receptive language far exceeds expressive language.	Strong expressive language. Difficulty listening in class.	Receptive language exceeds expressive language. Internally distracted.	Significant receptive and expressive language difficulties. Internally distracted.
Personality	Confident, keen to learn, tries hard, participates fully.	Quiet, observer, reserved. Seldom speaks out in class. Confidence improving this year.	Energetic, confident, outspoken. Can be bossy, disruptive, controlling. Keen, engaged child. Struggles to control emotions.	Quiet, shy observer, seldom speaks out during class, can be self-conscious. Sensory issues - compensatory behaviours - hands over ears to reduce noise when overwhelmed.	Quiet, shy learner, seldom speaks out during class, often internally distracted. Sensitive child, overstimulated by noise, covers ears or screams when overwhelmed. Enjoys playing alone.

Context of the study

The main study took place at a government special needs school with 270 autistic and visually impaired children ranging from three to 20 years old. The focus is on teaching life skills to function, communicate and interact socially. The classes are small, and the staff includes teachers, remedial teachers, occupational therapists, speech-language therapists and teaching assistants. The

school is the largest school for ASD learners in South Africa and the only government school for ASD learners in Johannesburg.

Baseline, intervention and follow-up sessions, for the main study, took place at the government special needs school. Observation and videotaping took place at the school during the morning ring, in one of the high functioning ASD classrooms. All five participants were in the same class. Morning ring was a particularly useful time to observe since the children themselves led it with the teacher as a facilitator, and there were more realistic opportunities for conversational turn-taking among peers.

Research procedure

The main study followed the same procedure and data collection outlined but took place over eight weeks rather than three. It was noted during the pilot study that the intervention phase was not long enough to promote carry-over, and a longer intervention phase was necessary for the main study. The baseline, intervention and follow-up 1 and 2 phases each took place over two weeks. This additional time allowed the researcher to obtain more data for each phase to improve the validity of the study. The main study also included a second follow-up phase two months after the first follow-up, to determine whether or not carry-over and transfer of skills were observed over time. For the main study, the researcher showed the participants their personalised videos at school so as not to interfere with the treatment phase. The teacher was given a teacher satisfaction questionnaire on completion of the data collection phase since she was present as an observer during the data collection process in the classroom.

Research process

The principal of the school was contacted to request permission to conduct research at the school (see Appendix D and E). Once permission had been granted, the head of the department of speech-language therapy was contacted. She was asked to investigate which of the children on the high functioning end of the autism spectrum at the school had pragmatic difficulties with conversational turn-taking. These children would be appropriate participants for this study. Parent information sheets and consent forms (see Appendix A and B) were distributed to the parents of five children who met the criteria. The VSM procedure was explained, and parents were asked to fill out a

consent form if they were interested in their children participating. All five sets of parents signed the consent forms and gave consent for video-taping (see Appendix C). One parent contacted the researcher telephonically to discuss video material and privacy concerns and then agreed that his child participate.

Most of the pupils had seen various professionals at different stages during their development, and some received speech-language, occupational and play therapy at some stage. The researcher obtained permission from parents, the speech-language therapist and the school principal to access therapy reports and assessment results for each child. The teacher involved was also given an information sheet and consent form to sign since observation and filming would take place in the classroom (see Appendix F and G).

Observation and data collection

The multiple-baseline design consisted of three phases, baseline, intervention and follow-up.

Baseline phase:

During the baseline phase, the children were observed and filmed in the classroom (see Table 4 below). The videos were then edited by the researcher to make a personalised video for each child. Videotaping was done using an iPhone 6S and an iPad to cover different angles and ensure all five children could be seen on video. Video-editing was done using iMovie software for Macintosh.

Video production:

Filming took place at the school during morning ring in the high functioning ASD class. All five children who participated in the study were in the same classroom. Morning ring was a particularly useful time to observe since the children themselves led it and the teacher was a mere facilitator during this time. Each child in the class was given a turn to be the leader of the morning ring for a day. The same routine was re-enacted each morning including a greeting, naming of peers and counting of all the children at school that day, a discussion of the day of the week, date and month of the year, the season and the weather, a counting exercise and vocabulary session related to a theme (for example, transport or animals). Since the children themselves lead the morning ring, there were more realistic opportunities for observation of naturalistic conversational turn-taking, among peers.

A personalised video was made for each child. The title of the film, accompanied by music, was introduced (for example, Johnny is good at taking turns). Each child's video contained three examples of the target positive turn-taking behaviour. At the conclusion of each scene, when the desired behaviour was displayed, the frame would freeze and rewards were introduced including voice-over and text saying ‘well done’ or ‘great job’ and stars and audio cheering as positive reinforcement. The final scene concluded with applause and a celebration or party picture of the children.

Intervention phase:

During the intervention phase, each child viewed their personalised target video on the iPad with the researcher at school (see Table 4 below). The researcher said “It's time to watch your movie” and no other information, prompts or reinforcement was provided. Each child would enter an empty room next door to their classroom, one at a time, to watch their video with the researcher.

Follow-up Phase 1:

During the follow-up phase, the personalised videos were no longer watched. The children continued to be observed and filmed in the classroom (see Table 4 below).

Follow-up Phase 2:

A second follow-up phase took place two months after the initial data collection phases. This second follow-up phase involved the same protocol as the first follow-up phase, but this time the effects of carryover and long-term transfer were taken into account when interpreting results and analysing data.

Table 4: Procedure – 4 phases on a timeline:

Baseline	Intervention	Follow up 1	Follow up 2
45 min to one hour classroom observation and filming five times over two weeks for each child during morning ring.	45 min to 1-hour classroom observation and filming five times over two weeks for each child during morning ring.	45 min to 1-hour classroom observation and filming five times over two weeks for each child during morning ring.	45 min to 1-hour classroom observation and filming five times over two weeks for each child during morning ring.
Personalised videos were made for each child by the researcher.	Each child watched their personalised video once a day (after morning ring at school with the researcher) over two weeks.	Personalised videos no longer watched.	Personalised videos no longer watched.
Turn-taking profiles were tallied and recorded for each child for each session using the Frequency of turn-taking tallying record sheet (Appendix L).	Turn-taking profiles were tallied and recorded for each child for each session using the Frequency of turn-taking tallying record sheet (Appendix L).	Turn-taking profiles were tallied and recorded for each child for each session using the Frequency of turn-taking tallying record sheet (Appendix L).	Turn-taking profiles were tallied and recorded for each child for each session using the Frequency of turn-taking tallying record sheet (Appendix L).
Previous assessments and therapy progress reports studied - individual strengths and weaknesses documented, specifically related to areas of pragmatics, receptive and expressive language. Medication taken and case history was also noted.	Procedural checklist completed every day after watching the video by the researcher (see Appendix N, Procedural Checklist for Video Presentations).		A teacher satisfaction questionnaire was sent out on completion of the study (see Appendix O).
2 weeks	2 weeks	2 weeks	2 weeks (2 months later – November).

Data analyses

Data were analysed quantitatively to determine the frequency of spontaneous turn-taking during classroom observation sessions over time. The nature of conversational turn-taking was determined by tallying the number and type of turn-taking violations over time.

The dependent measure was the frequency of the target behaviour (conversational turn-taking). For this study, turn-taking was defined as a spontaneous, appropriate verbal response to a peer or adult's previous statement within a 3-second interval by responding with a related comment (Coates, 2004). This included self-initiated interactions as well as peer or adult-directed turn signals.

Sub-aim 1: Frequency of turn-taking:

The frequency of spontaneous turn-taking for each session was calculated by counting each time the child took a turn spontaneously in conversation, without being directly asked. The definition of a conversational turn was based on the no gap, no overlap model (Coates 2004).

The frequency of spontaneous turn-taking per session for each child was then plotted on graphs over a time period of sessions observed during baseline, intervention, follow-up 1 and 2 for classroom observations.

Sub-aim 2: Nature of conversational turn-taking violations:

A list of codes for the categories of conversational turn-taking violations observed was created based on definitions of turn-taking violations by Coates (2004) (see Appendix K).

The following constituted violations to conversation turn-taking (Coates, 2004):

- Interruptions,
- Overlaps,
- Grabbing the floor,
- Hogging the floor,
- Silence.

The coding was assigned to the observed turn-taking violations during classroom observations throughout the baseline, intervention and follow-up stages of the study. It was then tallied in relevant columns of the turn-taking assessment profile (see Appendix L). This turn-taking assessment profile may prove to be an effective tool to identify and record the frequency and nature of conversational turn-taking.

Data for five children were also analysed qualitatively as a secondary aim to compare the nature and frequency of conversational turn-taking in the classroom context over time (baseline, intervention, and follow up).

Sub-aim 3: Relating the profile of each child to the nature and frequency of turn-taking:

Qualitative analysis was also required to compare the conversation turn-taking violations of each child with their strengths and weaknesses on their language profiles. For example, if a child had particularly narrow interests in one area and was inflexible in thinking or speaking about anything outside of this interest area, he or she may have presented with many instances of hogging the floor (when talking about the interest area) and silence (when talking about anything else). The hypothesis was that the child's conversational turn-taking skills would improve during the intervention and carryover would be noted during the follow-up phase. This would be indicative of the positive effect of VSM on turn-taking skills for the child with ASD.

Qualitative data were analysed using content analysis. Content analysis is a research technique which involves interpreting, finding recurring patterns and coding material to determine trends, patterns and correlations which are valid and can be replicated (Schiavetti & Metz, 2002).

Inter-observer reliability

Measures of inter-observer agreement (IOA) are an important indicator of the degree to which two or more raters agree on a behaviour being coded. Measuring IOA, therefore, helps to protect against observer bias and drift (Reichow, Volkmar & Cicchetti, 2008) and provides a measure of the reliability of the findings. Before the study, the investigator trained a qualified psychology honours graduate on coding the relevant skills. Initial training was done by verbal instruction with the aid of the definitions given in Appendix K and explanation of the turn-taking assessment profile (Appendix L). The researcher and psychology graduate then coded and scored one randomly selected session together, to demonstrate the process and deal with how to code and score when ambiguities or multiple coding options arose. The psychology graduate was not in direct contact with the children since her role was to watch the video recordings and score and code some of the sessions. The researcher coded and scored all baseline, intervention and follow-up sessions. In addition, the psychology graduate observed 10% of the videos (2 out of 20) for two children using randomly selected sessions and independently coded and scored relevant skills to calculate IOA. Total agreement reliability was calculated by dividing the lesser frequency by the larger and multiplying by 100%. Values between 0.6 and 0.75 (60% - 75%) were accepted as good, and values over 0.75 (75%) excellent (Von Eye & Young Mun, 2005).

Interruptions and grabbing the floor were found to be very similar behaviours, and the two were often confused when scoring since the behaviour observed could be coded as either an interruption or an instance of grabbing the floor. The coding of these two violations was found to be subjective, and it was decided, therefore, that the two violations would be better viewed together and a score for interruptions and grabbing the floor was used by adding the two scores together. It was also stressed to the psychology graduate that interruptions were only to be scored when they actually disrupted the class. Flapping of hands, humming quietly or talking to oneself quietly are stereotypical autistic behaviours and were not scored as interruptions.

Table 5: Results of the IOA

Child	Session	IOA - turns offered spontaneously	IOA - turns directly asked	IOA - interruptions and grabbing the floor	IOA – Silence
Child A	Session 1	75% (Good)	89% (Excellent)	85% (Excellent)	67% (Good)
Child A	Session 2	80% (Excellent)	89% (Excellent)	95% (Excellent)	100% (Excellent)
Child C	Session 1	67% (Good)	94% (Excellent)	89% (Excellent)	100% (Excellent)
Child C	Session 2	100% (Excellent)	88% (Good)	96% (Excellent)	100% (Excellent)

The IOA was generally good to excellent for both children across all sessions viewed and scored by the psychology graduate and the researcher.

Treatment fidelity

In intervention research, treatment fidelity is defined as the consistency of an intervention, and it is important to ensure that the research is implemented as planned and that it is delivered in the same way to all participants over time (Smith, Daunic & Taylor, 2007).

Videos, as an intervention tool, provide good treatment fidelity since the treatment is consistent and can be controlled (Horner et al., 2005). Treatment fidelity was also monitored by using a procedural checklist which the researcher filled in each day during the two-week intervention phase (see Appendix N). This procedural checklist included recording any interruptions,

distractions or possibly the presence of others while viewing the video. One checklist was completed for each participant. The video was presented at a similar time each morning, ranging from 8 am to 9:30 am (either before or after the morning ring) to each participant individually. The room next door to the classroom was empty and was, therefore, used to view the videos. Each participant had a turn to watch their personalised video independently on their own with the researcher every day for two weeks, so each participant viewed their personalised video ten times altogether.

Child D was absent for two days and missed viewing the video twice during the intervention phase. Child E was absent once and missed one viewing of the video. No other participants were absent during the intervention phase. The room was unavailable on one of the days, so the videos were viewed in the classroom that day, and this proved to be distracting for all the children. Participant D was particularly self-conscious watching his video in the classroom and covered his eyes while meant to be viewing the video. On another occasion, the room was once again unavailable, but an alternative private room was used on this day to reduce the distraction of the classroom setting.

Social validity

Social validity evaluates whether or not the intervention is relevant (Horner et al., 2005). Social validity was measured using a teacher satisfaction questionnaire on completion of the study (see Appendix O). Teacher observational feedback was also provided verbally, throughout the baseline, intervention and follow-up phases, to demonstrate further evidence of the social validity of the intervention.

Both the teacher and assistant teacher completed the questionnaire, and both reported that they found the VSM programme easy to follow. They both reported that they felt that watching the video was helpful for the children taking part and that the children enjoyed watching the videos. Both reported that they felt that the children's turn-taking skills improved after watching the video. The teacher commented that she believed that eye-contact, listening, imitation and speech were also improved after watching the video. The assistant teacher commented that he believed that following instructions, listening and speech also improved after watching the video. The teacher suggested that perhaps showing all participants each other's videos may boost their confidence more instead of focusing on each video separately.

Ethics

Permission for this study was granted by the University of the Witwatersrand's Human Research Ethics Committee (non-medical), Clearance Certificate Number H16/06/14 (see Appendix S). In making this application, the following ethical principles were considered:

Access/participant recruitment:

To avoid any conflicts of interest, no participants were recruited from the researcher's private practice. In addition, all participants continued receiving the same therapy intervention with their current speech-language therapists and other therapists during the study period. When potential recruitment sites were approached, the researcher was not given any family contact details until families had indicated their interest. Families were contacted by their child's school. They provided written consent before they were contacted by the researcher (see Appendices A – E for parent information sheet, principal information sheet, consent forms and permission to film the children).

Information:

Families of all potential participants were provided with a participant information sheet that described the nature of the project and the intervention, assurance of confidentiality, the right to withdraw at any time with no negative consequences and the need for video recording. It was also discussed in the information sheet that video recordings would be kept in a locked cupboard at the university for five years after the study. The information sheet stated that the intervention techniques were experimental, and success was not guaranteed. The potential participant's families were reassured that their children would continue to receive their regular therapy and that the intervention would be in addition to that (see Appendix A).

Confidentiality:

All data captured was labelled only with a key and the participants' identifying information was kept separate throughout the intervention. Participants were referred to by number in the coding and writing up of the research report. No names were used at any time.

Contact with significant others:

The child's caregivers were provided with written feedback of their child's progress at the end of the intervention. With the caregiver's permission, the child's school and private speech-language therapist were also provided with written feedback regarding the child's progress. This allowed the parents, therapist and teachers to reinforce the target behaviour at home and school. It may also encourage therapists and teachers to use VSM themselves in the classroom and during speech-language therapy sessions to focus on other skills if it was found to be an effective tool.

The children were given a simple explanation of the study and were required to colour a Yes block to indicate if they would like to be part of the study or a No block to indicate that they would not like to be part of the study. In this way, the children could provide assent before the research process began (see Appendix J).

The school principal was also given an information sheet (See Appendix D and E) and was required to sign a consent form to indicate that permission had been obtained from the school before the research process commenced.

Risks to participants:

No foreseeable risks to the participants were anticipated as a review of VSM studies, using similar techniques, revealed no negative effects on participants (Hwang & Hughes, 2000).

5. Results

The results section is presented in line with the aims of this study, primarily to determine if the VSM technique improved pragmatic difficulties, specifically turn-taking skills in children with ASD. The frequency of conversational turn-taking and turn-taking violations for each child is discussed, and the nature of conversational turn-taking and turn-taking violations is related to the profile of each child. A discussion on whether the VSM approach is applicable in the South African context follows.

Description of sample

Five male children who were diagnosed with ASD and who attended a special needs government school in Johannesburg were the focus of this study. Three of the children were taking medication to manage their attention. All children were between six and nine years old. All of the children were in the same high-functioning autism classroom with the same teacher. Classroom-based speech-language therapy was being received by all the children before the study and continued throughout the study. Difficulty with turn-taking in conversation was a challenge for all children, yet they could all imitate turn-taking behaviour. Language profiles and personalities varied across participants and affected the results of the study (see Table 3 for detail regarding language profiles and personality).

Sub-aim 1: Frequency of turn-taking

Turns offered spontaneously

The numbers of conversational turns offered spontaneously during each session, across the four phases of the study are presented in Figure 1A – 1E for all five participants. Values indicate the total number of turns offered spontaneously without being asked a question or prompted by another child or teacher during the morning ring routine.

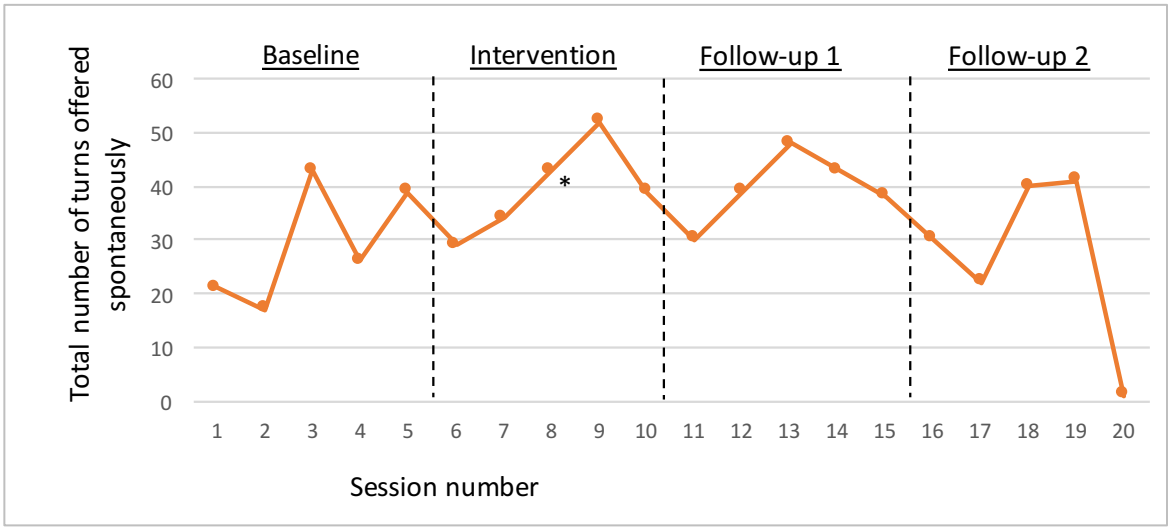


Figure 1A: Turns offered spontaneously – Child A

* Child A was absent for session 8. A mid-point between the session 7 and 9 score was used for simplicity.

Child A demonstrated good ability to offer a turn spontaneously, even during the baseline phase. An improvement in spontaneous turn-taking was observed towards the end of the intervention phase, specifically in sessions 9 and 10. During the first follow-up phase, similar high scores for spontaneous turn-taking were generally maintained. During the second follow-up phase, child A deteriorated slightly in terms of turns offered spontaneously in sessions 16 and 17, but then made an improvement in sessions 18 and 19. The trend of child A's data indicates a fair amount of variability or fluctuation, with steep slopes of improvement in sessions 3, 9, 13 and 19 with declines in the target skill being observed in sessions 11, 17 and 20. These peaks and troughs occurred during all four phases. On the days when child A offered many turns spontaneously, the notes taken by the researcher often mentioned that he was distracted and less able to focus. During these times he would speak out and offer more information yet these were also often turn-taking violations in the form of interruptions and hogging the floor (this will be discussed later on in the section on violations). Child A was already proficient in taking turns spontaneously before the research began; therefore it will be of great interest to examine his turn-taking violations such as interruptions, grabbing the floor and hogging the floor during the four phases, to note if any improvement in terms of turn-taking violations was observed as a result of the intervention over time.

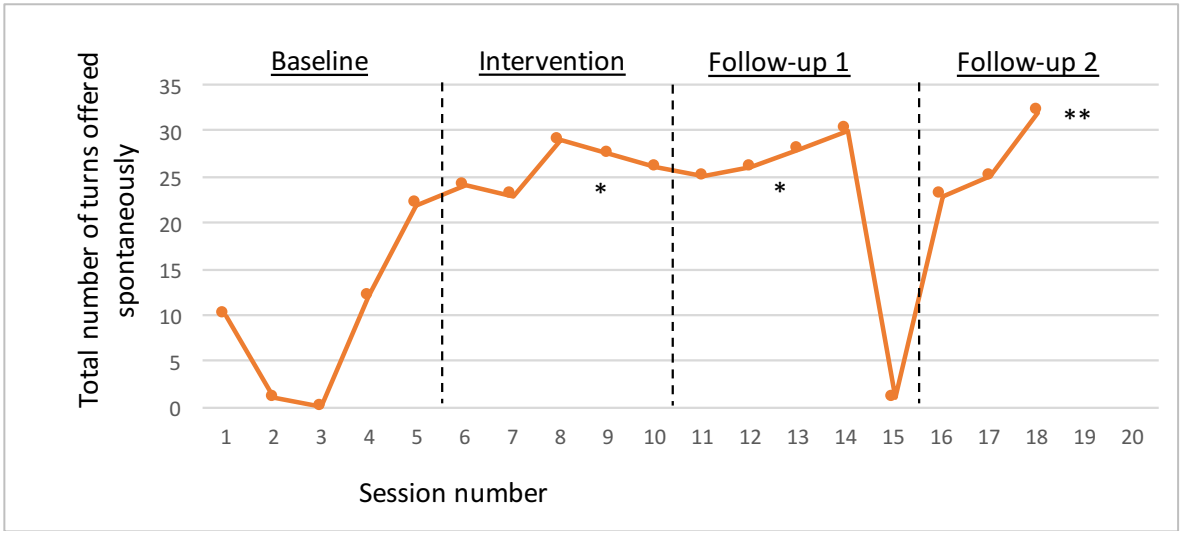


Figure 1B: Turns offered spontaneously by child B

*Child B was absent for sessions 9 and 13. The mid-point of sessions before and after was used.
** Child B was absent for sessions 19 and 20.

Child B demonstrated a clear treatment effect since his spontaneous turn-taking scores were low during the baseline phase, improved during the intervention phase and were maintained during the follow-up phase. During the second follow-up phase, he was able to generalise these skills and maintain high scores. One low score was noted on the 15th session during the first follow-up phase; however, when reviewing the researcher's notes for that session, child B was reported to be very angry with his class teacher in that session since she had taken away his watch which she felt was distracting him. He was sulking and refused to take part during the morning ring and was eventually told by his teacher to sit in time out, in a separate section of the classroom, so the low score on that particular day needs to be excluded. The trend of child B's data indicates very little fluctuation or variability, with a steady inclined slope of improvement noted from baseline, through intervention and maintained during both follow-up phases.

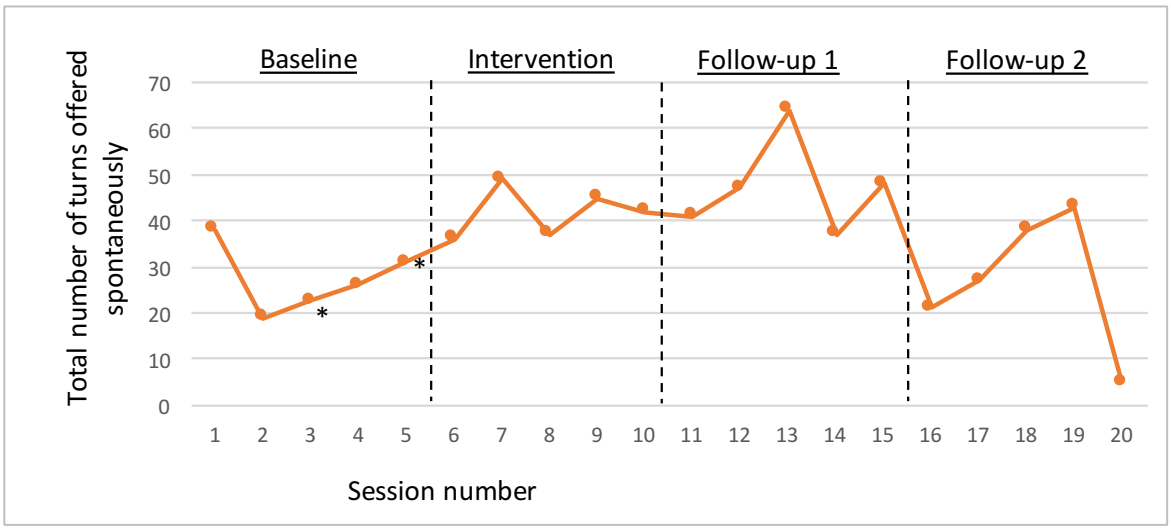


Figure 1C: Turns offered spontaneously by child C

* Child C was absent for sessions 3 and 5, the mid-point of the session before and after was used.

Child C demonstrated a fairly good ability to offer a turn spontaneously, even during the baseline phase. An improvement in spontaneous turn-taking was observed during the intervention phase. During the first follow-up phase, similar high scores for spontaneous turn-taking were generally maintained. During the second follow-up phase, child C deteriorated slightly in terms of turns offered spontaneously in session 16, but then improved in sessions 18 and 19. The trend of child

C's data indicates a fair amount of variability or fluctuation, with steep slopes of improvement in sessions 7 and 13 and declines in the target skill in sessions 16 and 20. During session 20, the teacher introduced a different format to the morning ring and chose to lead a question and answer session on the animal theme, rather than the children taking turns to offer what they know in a speech format at the board. All children were observed to offer dramatically fewer turns spontaneously during this session, and this should be taken into account when interpreting results for this particular day. Child C demonstrated a similar picture to child A since he was already fairly proficient at taking turns spontaneously before the research began, it will be of great interest to examine his turn-taking violations such as interruptions, grabbing the floor and hogging the floor during the four phases, to note if any improvement in terms of turn-taking violations was observed as a result of the intervention over time.

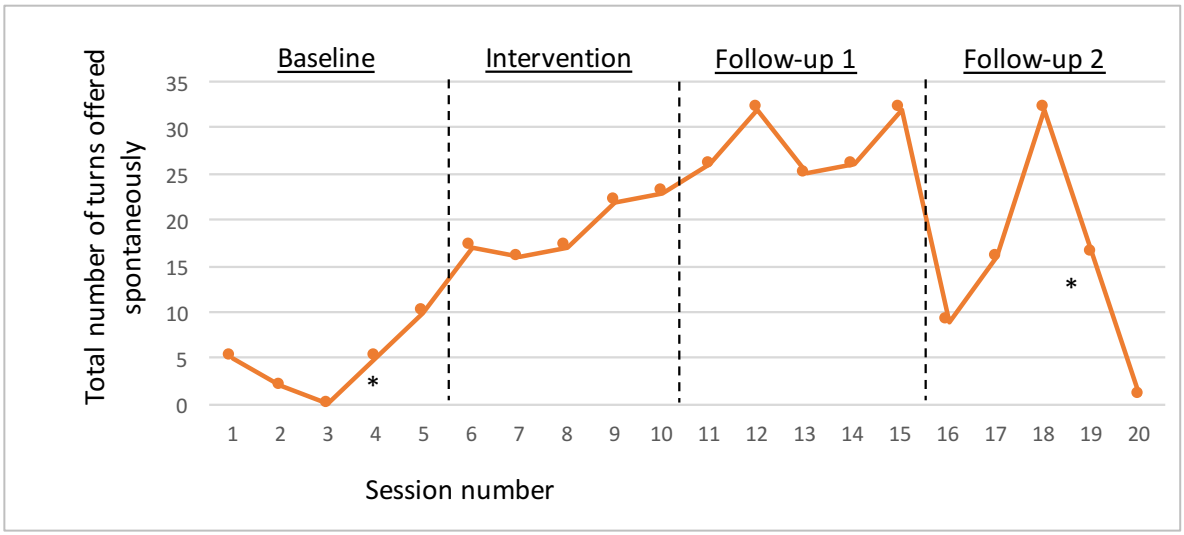


Figure 1D: Turns offered spontaneously by child D

* Child D was absent for sessions 4 and 19, the mid-point of the session before and after was used.

Child D demonstrated a clear treatment effect since his spontaneous turn-taking scores were low during the baseline phase, improved during the intervention phase and increased further during the follow-up phase, however, during the second follow-up phase, he had difficulty generalising these skills, with scores declining in sessions 16 and 17. One high score was noted in the 18th session during the second follow-up phase, which was promising in terms of carryover. The trend of child D's data indicates very little fluctuation or variability with a steady inclined slope of improvement

noted from baseline through intervention and the first follow-up phase. A significant decline in the target skills was noted during the second follow-up phase, during sessions 16 and 17, and then a steep improvement once again in session 18 of the second follow-up phase.

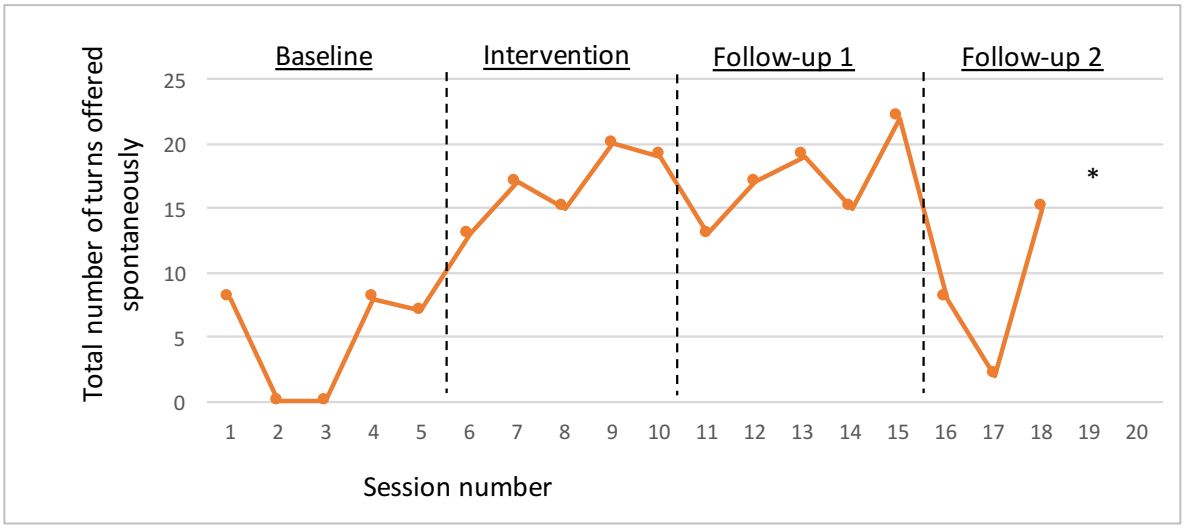


Figure 1E: Turns offered spontaneously, child E

* Child E was absent for sessions 19 and 20.

Child E also demonstrated a clear treatment effect since his spontaneous turn-taking scores were low during the baseline phase, improved during the intervention phase and were maintained during the first follow-up phase. However, during the second follow-up phase, he had difficulty generalising these skills, with scores declining in sessions 16 and 17. One average score was noted in the 18th session, during the second follow-up phase, which was promising in terms of carryover. The trend of child E's data indicates very little fluctuation or variability, with a steady inclined slope of improvement noted from baseline, through intervention which was maintained during the first follow-up phase. A trough of decline in the target skills was noted during the second follow-up phase, during sessions 16 and 17, and then a steep improvement once again in session 18 of second follow-up phase was observed.

Figure 1F below depicts the average number of turns offered spontaneously across all five participants:

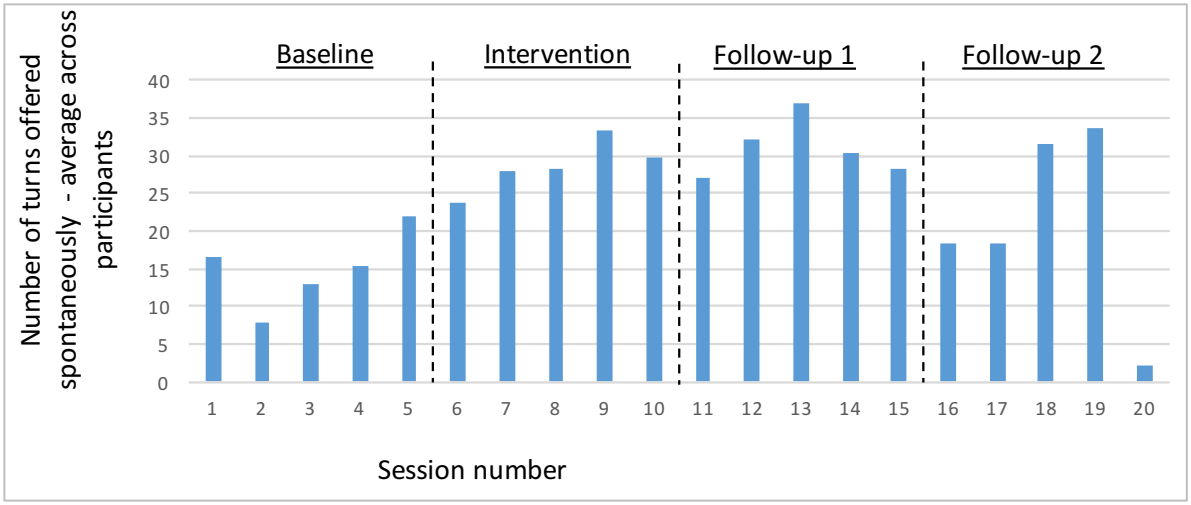


Figure 1F: Turns offered spontaneously, average across participants

In summary, all five participants showed large and clinically significant treatment effects. Children B, D and E demonstrated the most immediate, consistent and substantial effects. Children A and C were better at spontaneous turn-taking, even at the start of the research process and demonstrated gradual improvements during treatment, but were more inconsistent in terms of their performance. All five children demonstrated good short-term carryover of skills since their improvement continued into the first follow-up session. However, the second follow-up phase, two months after the intervention phase, depicts a general decline in spontaneous turn-taking for all five children. Overall, the data suggests that all five participants displayed improvements in their ability to take turns spontaneously during the intervention and first follow-up phase, however, the responses of the five participants to the intervention differed substantially.

Sub-aim 2: Nature of turn-taking

Turn-taking violations

The number of turn-taking violations noted during each session across the four phases of the study are presented in Figures 2A – 2E for all five participants. Values are coded as I for interruptions, O for overlaps, G for grabbing the floor, H for hogging the floor and S for inappropriate silence. The definitions for each turn-taking violation can be referred to in Appendix K.

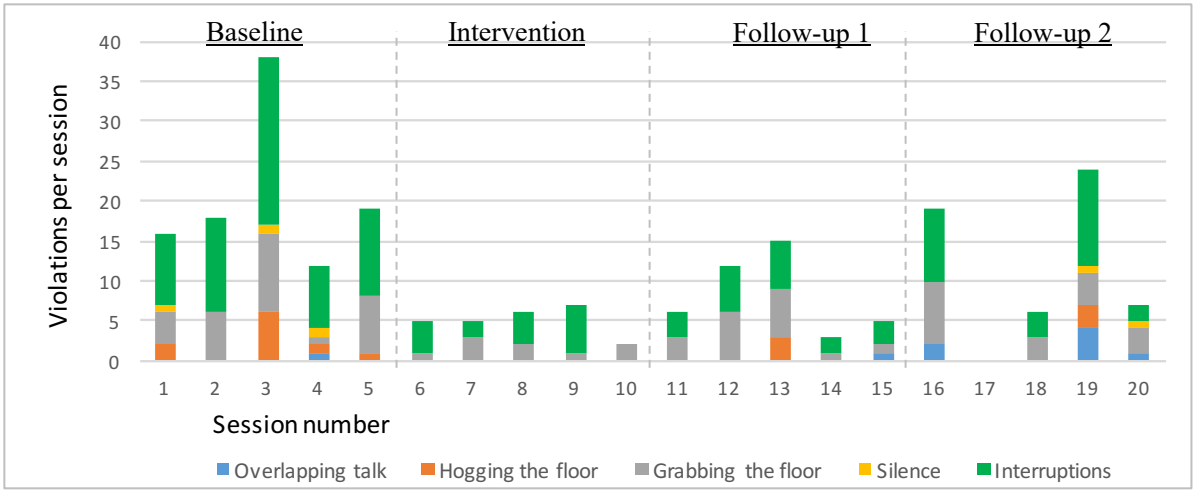


Figure 2A: Violations, child A

* Child A was absent for session 8, the mid-point between the score for sessions 7 and 9 was used for simplicity.

Child A presented with a significant amount of interruptions and grabbing the floor, with little or no instances of hogging the floor, overlaps or silence. In terms of interruptions, child A was noted to interrupt fairly often during the baseline phase. The number of interruptions reduced significantly during the intervention phase. Child A maintained a low level of interruptions during the first follow-up phase. During the second follow-up phase, he interrupted a little more frequently. Therefore, a clear treatment effect can be noted, with fewer interruptions occurring during the intervention and follow-up phases and, two months later, the generalisation of this skill was noted to decline slightly. In terms of grabbing the floor, child A demonstrated a fair number of times when he grabbed the floor while another child was speaking during the baseline phase. The number of times he grabbed the floor was less during the intervention. Child A had difficulty maintaining this low level of grabbing the floor during follow-up phases, suggesting little carryover of this skill once intervention terminated. In terms of hogging the floor, only a few instances were noted in the baseline phase (particularly in session 3 where child A was particularly distracted), no instances of hogging the floor were observed during the intervention phase, a few instances were noted in session 13 during follow-up 1 and a few in session 19 of follow-up 2. Hogging the floor was not a common violation for child A and, during the intervention phase, this violation did not occur at all. In terms of overlaps, only one instance was noted in the baseline phase, none during the intervention, one instance of overlapping talk during the first follow-up

phase and a few instances during the second follow-up phase. Therefore, overlaps were not a common violation for child A and, during the intervention, this violation did not occur at all. In terms of inappropriate silence, child A presented with only a few instances during the baseline phase, none during the intervention and follow-up 1 phases and only a few during follow-up 2. Therefore, inappropriate silence was not a common violation for child A and did not occur at all during the intervention or follow-up 1 phases.

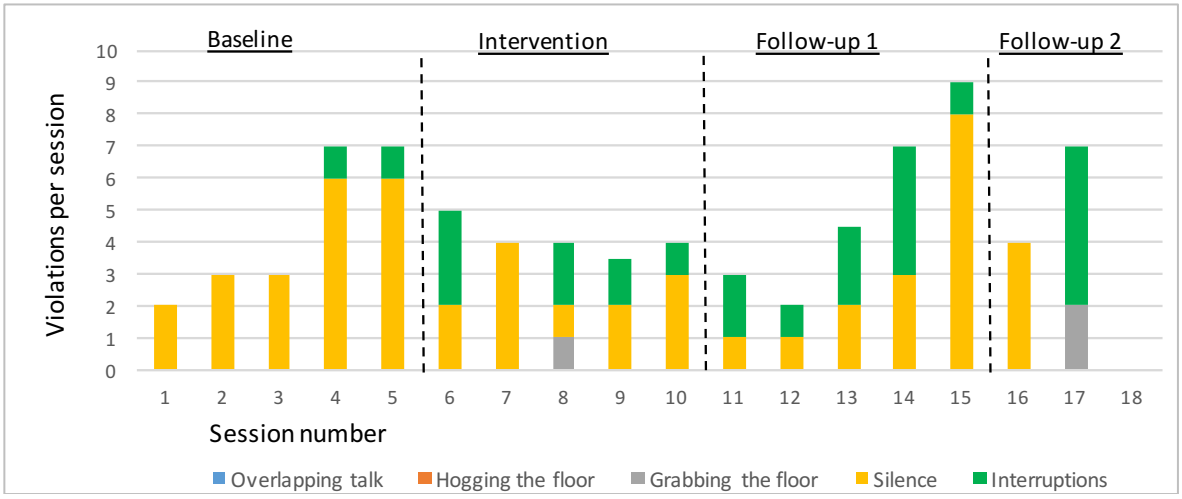


Figure 2B: Violations, child B

* Child B was absent for sessions 9 and 13, the mid-point of the sessions before and after was used.
** Child B was absent for session 19 and 20.

Child B presented with a significant number of inappropriate silences, a few instances of interruptions, very few instances of grabbing the floor and no overlaps or hogging the floor were observed at all. In terms of inappropriate silence, child B demonstrated a clear treatment effect; however, limited long-term carryover of these skills was observed. A fair amount of silence at inappropriate moments during the baseline phase was noted. During the intervention, child B improved slightly in terms of inappropriate silence. During follow-up 1, he maintained fairly low scores for inappropriate silence, however little long-term carryover was noted. In terms of interruptions, child B interrupted more during the intervention and first follow-up phases. Although was unexpected, this negative result may actually suggest that, for a very quiet child such as child B, these interruptions are not necessarily a negative behaviour, since they go hand-in-hand with an increase in the number of turns taken spontaneously, which is a positive

interaction, which we were aiming for in the turn-taking intervention for this child. A large number of interruptions were noted in session 17 of the second follow-up phase, and the comment section indicated that child B was particularly interactive that session. In terms of grabbing the floor, only two instances were noted, one in session 8 during the intervention phase and one in follow-up 2 during session 17. This was the same session where interruptions were prevalent since child B was noted to be particularly interactive. No overlaps or hogging the floor were noted in any of the sessions.

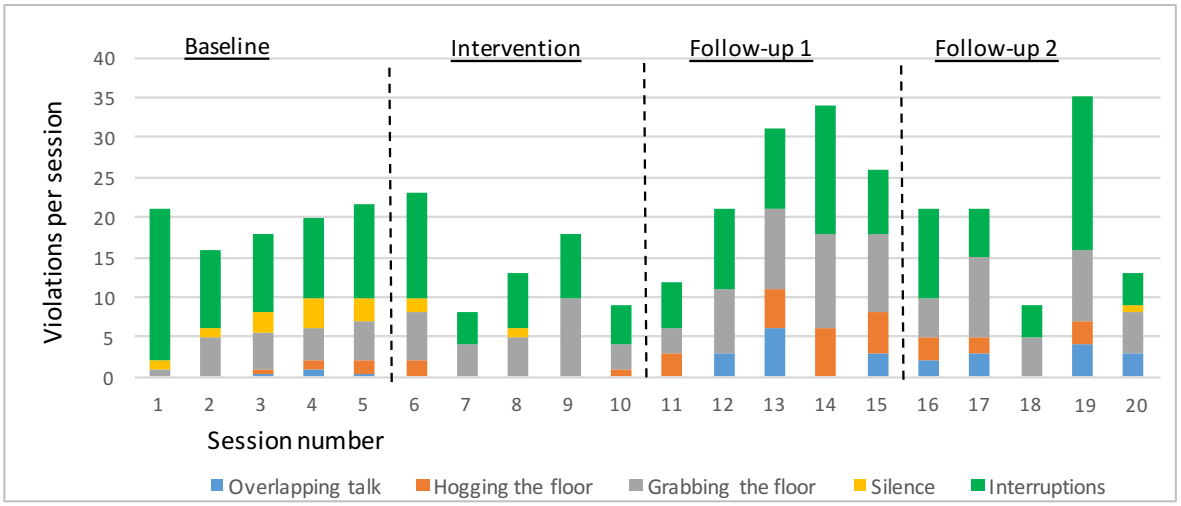


Figure 2C: Violations, child C

* Child C was absent for sessions 3 and 5, the mid-point of the session before and after was used.

Child C presented with a significant amount of interruptions and floor-grabbing, with a few instances of hogging the floor and overlaps and very few instances of inappropriate silence. In terms of interruptions, child C was noted to interrupt fairly often during the baseline phase. The number of interruptions reduced significantly during the intervention and follow-up 1 phase. One session in the intervention phase (session 6) and one in the follow-up 1 phase (session 14) indicated more interruptions than the others. In the comment section, it was noted that the child was particularly disruptive on those days. Child C maintained a low level of interruptions during the second follow-up phase. A clear treatment effect can be noted with fewer interruptions occurring during the intervention and follow-up phases and, two months later, the generalisation of this skill was noted to be maintained at a low level. In terms of grabbing the floor, results were inconclusive as to whether there was any treatment effect. Child C increased the number of times he grabbed

the floor while another child was speaking during both the intervention and follow-up phases. This suggests intervention was not successful for child C in terms of improving his turn-taking violation of grabbing the floor. In terms of hogging the floor, only one instance was noted in the baseline phase and only a few during the intervention phase, however, the most number of times noted for hogging the floor occurred during the follow-up phases. Hogging the floor was not a common violation for child C during baseline and intervention, but it increased during the follow-up phases, which was, once again, an unexpected result. In terms of overlaps, only one instance was noted in the baseline phase, none were observed during the intervention, and a few were noted during the first and second follow-up phases. Overlaps were not a common violation for child C and, during the intervention, this violation did not occur at all. In terms of inappropriate silence, child C presented with only a few instances during the baseline phase, one instance during the intervention phase and none during follow-ups 1 and 2. Inappropriate silence was not a common violation for child C and improved during the intervention and follow-up phases.

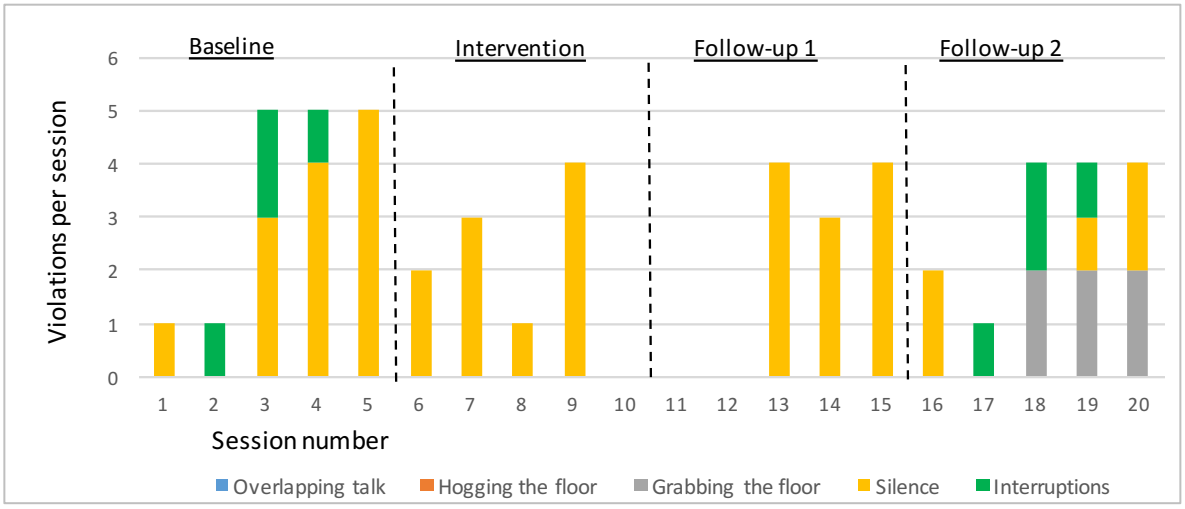


Figure 2D: Violations, child D

* Child D was absent for sessions 4 and 19, the mid-point of the sessions before and after was used.

As mentioned above, child D improved significantly in terms of turns offered spontaneously during the study and his turn-taking violations were minimal and generally insignificant. Child D presented with a fair number of inappropriate silences, a few instances of interruptions, very little instances of grabbing the floor and no overlaps or hogging the floor were observed at all. In terms

of inappropriate silence, child D demonstrated little or no treatment effect. Very little silence at inappropriate moments during the baseline phase was noted. During the intervention, the number of times he was inappropriately silent remained fairly constant. During follow-up 1, he maintained similar scores for inappropriate silence. However, he demonstrated an improvement in the skill during follow-up 2. In terms of interruptions, child D demonstrated a clear treatment effect; however, the scores were low and not significant. During baseline, child D interrupted between none and two times per session, during the intervention and follow-up 1 he did not interrupt at all. In follow-up 2 he interrupted between 0 and 2 times per session, indicating that carryover had not occurred. In terms of grabbing the floor, child D did not present with any instances of this violation during baseline, intervention or follow-up 1. Only two instances of grabbing the floor were observed during follow-up 2. This result is negligible. No overlaps or hogging the floor were noted in any of the sessions.

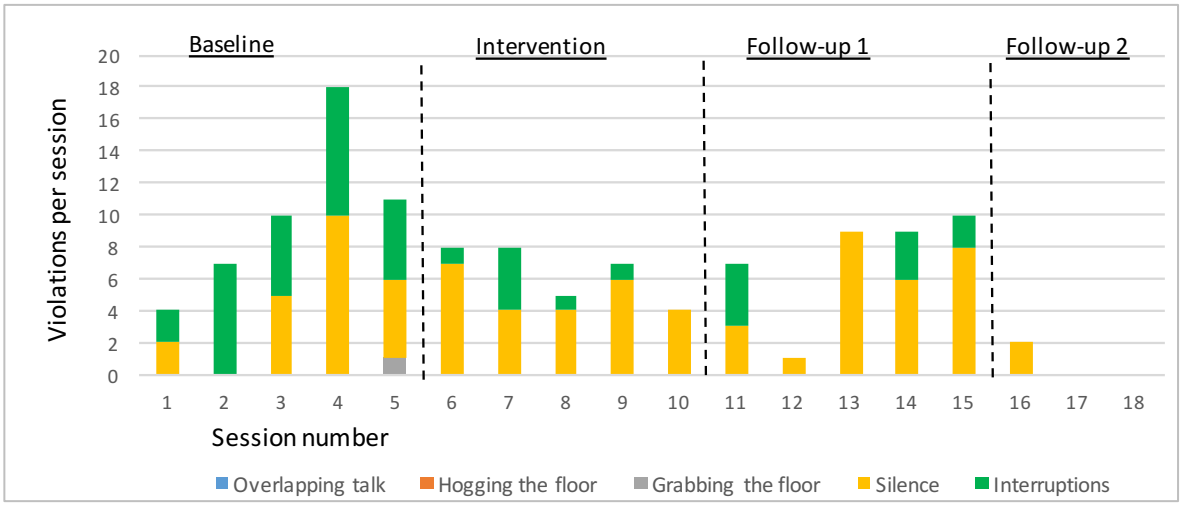


Figure 2E: Violations, child E

* Child E was absent for sessions 19 and 20.

Child E presented with a significant number of inappropriate silences, a few instances of interruptions, one instance of grabbing the floor and no overlaps or hogging the floor were observed at all. In terms of inappropriate silence, child E demonstrated a slight treatment effect, but limited carry-over of these skills was observed. A significant amount of silence at inappropriate moments during the baseline phase was noted. During the intervention, child E demonstrated some improvement. During follow-up 1, little short-term carry-over of this skill occurred, and long term

carryover was also limited. In terms of interruptions, child E demonstrated improvement over time. During the baseline phase, child E scored between two and eight for interruptions, during the intervention his score improved with interruptions occurring between 1 and 4 times per session and he demonstrated good carry-over of these skills. One instance of grabbing the floor in session 7 during intervention was noted, but this was negligible in terms of the rest of the data. No overlaps or hogging the floor were noted in any of the sessions.

Sub-aim 3: Relating personal profiles to the frequency and nature of turn-taking

All five participants showed different treatment effects when observing turn-taking violations over time. This correlated with their language profiles and personalities, as well as their strengths and weaknesses. The number of instances of hogging the floor and overlaps was generally negligible across all five participants during all phases. During the intervention phase, child A showed a decrease in interruptions and grabbing the floor; child B showed a decrease in inappropriate silence, children C and E demonstrated decreased interruptions and inappropriate silences and child D demonstrated a decrease in interruptions. Some positive short-term carry-over of skills was observed; however, long-term carryover was generally negative, suggesting that the intervention period needs to be lengthened, or repeated, for the skills to be maintained long-term.

Sub-aim 4: The South African context

A reflection on whether the VSM approach is applicable in the South African context follows under the discussion section.

6. Discussion

VSM allows participants to watch themselves performing at a higher level than they usually do (Litras et al., 2010). This study aimed to investigate the effectiveness of the VSM technique to improve turn-taking skills in five children with ASD in a government special needs school in Johannesburg.

The results of the study are discussed in relation to the aims of the study.

The results suggest clinically significant gains in the ability to take conversational turns appropriately in all five participants as a result of the intervention. Unique patterns of responses

for each participant were noted, based on their personalities, strengths, weakness and language profiles.

Frequency of turn-taking

In terms of the frequency of spontaneous turn-taking, all five participants showed large, clinically significant treatment effects. Children B, D and E demonstrated the most immediate, consistent and substantial effects. Children A and C were better at spontaneous turn-taking even at the start of the research process, and demonstrated gradual improvements during treatment but were more inconsistent in terms of their performance. The data suggests that all five participants displayed improvements in their ability to take turns spontaneously during the intervention and first follow-up phase, however, the responses of the five participants to the intervention differed substantially. Children A and C were already proficient at taking turns spontaneously before the research began; therefore, it was of greater interest to examine their turn-taking violations such as interruptions, grabbing the floor and hogging the floor during the four phases.

When looking at the data for turn-taking violations, all five participants showed different treatment effects when observing turn-taking violations over time, which correlated with their language profiles, personalities and strengths and weaknesses. The number of instances of hogging the floor and overlaps was generally negligible across all five participants during all phases. During the intervention phase, child A showed improvement in interruptions and grabbing the floor, child B demonstrated improvement in inappropriate silence, children C and E showed improvement in interruptions and inappropriate silence, and child D demonstrated an improvement in interruptions. The performance was variable between the children; however, this was directly related to their personal profiles, their strengths and weaknesses as well as personality. Brinton, Robinson and Fujiki (2004) argued for individualised social language treatment programmes since they believed prefabricated programmes for a general audience might not meet the needs of the individual with ASD since each child presents with a varied profile of strengths and challenges. Results for the nature of turn-taking from this study support Brinton, Robinson and Fujiki (2004) in terms of individualised treatment programmes being essential when working on social pragmatic skills in children with ASD.

Relating personal profiles to the frequency and nature of turn-taking

The language profiles and personality of each child affected the nature and frequency of their conversational turn-taking and improvement of skills through intervention. Participants A and C were more extroverted learners, who spoke out more during class and who had fairly strong expressive language skills. Both participants A and C had difficulties with pragmatic skills, specifically turn-taking, and often interrupted others taking over the conversation when peers were speaking and disrupting the morning ring. For these two participants, the results showed an improvement in the frequency of interruptions after VSM was implemented, which was a significant and important area of improvement when working with these two particular children. Participants B, D and E were quieter children who needed encouragement to offer information or take a turn in class as they were more introverted learners and had significant expressive language difficulties. For these three participants, the results showed an increase in spontaneous turn-taking and a decrease in inappropriate silence after VSM intervention, which were significant and important areas of improvement when working with these three particular learners.

In terms of interruptions, child B interrupted more during the intervention and first follow-up phase. Although this seemed unexpected, this negative result may suggest that, for a very quiet child such as him, these interruptions are not necessarily a negative behaviour. Interruptions go hand-in-hand with an increase in the number of turns taken spontaneously, which is positive and what we were aiming for with the turn-taking intervention for this child. Therefore, an increase in interruptions and grabbing the floor may be positive behaviour for a stage or period for quieter children while they are starting to take more turns spontaneously and being encouraged to speak out more. With time and practice, they would need to learn the boundaries for turn-taking, such as not interrupting or grabbing the floor when another person is speaking.

When looking at the data, the number of conversational turns taken spontaneously and the type of turn-taking violations recorded were closely linked to personality, confidence and strengths and weaknesses of each child in terms of their language profiles.

For both frequency of spontaneous turn-taking and turn-taking violations, short term carry-over of skills was observed; however, long-term carry-over and generalisation of skills after a two-month

period were less optimal than anticipated. The results of school-based VSM studies usually suggest maintenance and generalisation of skills (Hitchcock et al., 2003). However, other researchers have reported similar difficulties with maintenance when researching the effects of VSM. They have stated the necessity of adding direct training to video self-modelling to improve skill acquisition (Taylor, Levin & Jasper, 1999). The intervention period may have been too short to facilitate carry-over of skills in the long term and future studies, with a lengthened intervention phase and/or repeated intervention, would be beneficial for the skills to be maintained long-term. Combination of VSM with direct training would also boost performances and possibly improve long-term generalisation of skills.

The improvement in turn-taking skills noted was rapid and immediate, often occurring at the start of the intervention phase. This is consistent with previous findings on the effects of VSM in teaching social skills to children with autism (Buggey et al., 1999). VSM, therefore, provides a time and cost-effective intervention tool. Other behaviour improvements, specifically eye-contact, listening, imitation and speech, were areas which also reportedly improved after watching the video. This concurrent behaviour and speech improvements were recorded by both the class teacher and assistant teacher in their satisfaction questionnaires. The concurrent speech and behaviour improvements correlate with previous research findings, which demonstrate a positive effect of using VM to teach conversational skills. Litras and colleagues (2010) found that VSM can lead to improvements in other, non-targeted areas of functioning. In their study, the aim was to improve social initiation; however, the improvements were accompanied by other behaviour changes, such as increased levels of vocal communicative behaviour and social engagement. Therefore, VSM is a time-efficient therapy technique, which targets multiple aims within a fairly short time frame.

Video implemented interventions present a non-threatening teaching method and an activity enjoyed by the majority of participants (Buggey, 2005). Participants in this study at a Johannesburg government special needs school missed no instructional time and were exposed only to positive images. All participants enjoyed watching their videos and also attended well during the filming process. With the technology we have today, VSM interventions can now be easily implemented and readily employed by teachers, parents and practitioners in the mainstream school setting, in

therapy sessions or at home (Litras et al., 2010). Videos produced for self-modelling are portable and have been used successfully in other studies to prevent the deterioration or loss of skill during the school holidays (Dowrick, 1999). These are additional benefits of the VSM intervention method. During follow-up 2, the participants in this study were seen at school after a long school holiday during which they did not receive any interventions. This holiday break adversely affected the maintenance of skills by all five children during the second follow-up phase. Training of caregivers to implement intervention programmes during the school holidays may assist with the carryover of skills.

The South African context

The rate of acquisition of new skills and maintenance of learned skills is assumed to be influenced by the consistency of intervention. Within the South African context, transport difficulties result in poor school attendance or regular late school starting times by many pupils. This was noted during the follow-up 2 phase when participants B and E were both absent for sessions 19 and 20, and participant D was absent for session 19 due to transport issues preventing them from attending school on those particular days. Child B was also often late for school due to transport delays, which resulted in him being present for only part of the morning ring. These transport difficulties have a negative effect on the consistency of the intervention that the children receive, which will affect their progress and learning.

The government special needs school, which was used for this study, has few special needs personnel and few therapists for large numbers of children requiring intense therapy and intervention. Direct one-on-one therapy sessions are impossible with the learner-to-therapist ratio, which means that these children, who are all on the autism spectrum, are only receiving classroom-based therapy as a whole class and are not afforded individual or small group therapy sessions at all. Few children are receiving private therapy outside school as it is very expensive and, logistically, most parents are unable to transport children to private therapy in the afternoons. Parents are often forced to work longer hours to pay for private intervention. In the South African context, many families already require both parents to work to simply pay for everyday necessities and, in most families, private intervention is a luxury they simply cannot afford. As a result, children are often only seen by speech-language therapists in the classroom, as a group, or the

speech-language therapist will train teachers to work with the children on general language areas which need intervention. Training of teachers and caregivers to implement intervention programmes at school, home or both, would be extremely beneficial using the VSM approach.

Most teachers and parents of children within the study context should have access to a computer, cell phone with video feature or iPad. If video clips could be sent to teachers and parents via email or WhatsApp messages on their mobile phones or computers, the VSM intervention technique could prove to be an extremely powerful tool for them to implement at school and home within the South African context. Further research could focus on the practicalities of implementation of these techniques by teachers at school and caregivers at home. This would also be valuable, considering the implications of language barriers in intervention in the South African context and lack of resources to employ enough speech-language therapists in government institutions to provide individual therapy.

7. Conclusion

The use of VSM intervention techniques allows children with ASD to see themselves performing at a more advanced level than where they would generally function (Litras et al., 2010). With repeated experience, it appears that the children learn to increase positive and decrease unwanted behaviour after watching themselves being successful at that behaviour. The current study demonstrated the effectiveness of the VSM technique in improving turn-taking skills in five children with ASD.

VSM is a promising intervention tool since the technology for creating videos with minimal expertise has become increasingly accessible. VSM interventions can now be used by teachers, parents or therapists at school or in the home environment. VSM may be used for treating many behaviours, including the pragmatic skills involved with conversational turn-taking. VSM presents a tool which is appropriate for children with ASD, who often display visual strengths, and may be suitable for those with limited attention. It is expected to be a highly motivating and enjoyable activity for these children.

Limitations

There were some important limitations in this study that may have influenced the results and caution was exercised in the interpretation of the findings. First, intervention and filming were not always administered consistently for every child in the study, due to school holidays, transport difficulties and the children missing sessions due to illness. Absent sessions were recorded, and the midpoint of the previous and next sessions was used for data analysis and the graph representations. The data for baseline, intervention and follow-up 1 phases were all collected in the same school term, and follow-up 2 data collection took place after the school holiday, to determine whether or not any long-term carryover occurred. However, despite attempts to improve consistency, this was not always possible.

Three of the children in the study were on medication to improve their focus and ability to concentrate. Their medication was administered at school in the mornings before morning ring. The medication was not always given at exactly the same time every day, so these three children were, at times, less focused for the morning ring, which may or may not have been as a result of the timing of the medication given.

The interest level in the morning ring activity seemed to decrease with familiarity of the topic being discussed and affected the children's turn-taking behaviour. The same theme (for example, transport) was used every day for approximately four weeks before the new theme (wild animals) was introduced. At the beginning of the new theme, the children were excited about the new topic, and this seemed to improve their spontaneous turn-taking and enthusiasm during morning ring whereas, by week 4, the theme was now familiar and the children appeared less interested in the morning ring activity, which would possibly reduce their spontaneous turn-taking behaviour. Hence, this is primarily a study of effectiveness, where an intervention is applied in real-world settings rather than efficacy, where intervention is administered in ideal, laboratory settings (Prizant & Wetherby, 1998).

In addition, due to time constraints, the baseline, intervention and follow-up phases of this study were rather short (two weeks each), and therefore improvements, related to developmental maturation cannot be ruled out. The intervention period may have been too short to facilitate carry-

over of skills long-term and future studies, with a lengthened and/or repeated intervention phase would be beneficial for the skills to be maintained long-term. Some positive short-term carry-over of skills was observed; however, long-term carryover was generally negative, suggesting that the intervention period needs to be lengthened or repeated for the skills to be maintained long-term. Combination of VSM with direct training would also boost performances and possibly improve long-term generalisation of skills.

Although the sample size used in this study was small, case studies may offer valuable, rich insights which may assist in structuring future research (Merriam, 2009). Case studies play an important role in advancing the knowledge base in a particular field and the clinical and theoretical contribution to clinicians, teachers and parents cannot be underestimated (Merriam, 2009).

Theoretical and clinical implications

In terms of theoretical implications, VSM allows children to see themselves succeeding and increases their belief that they can succeed at a task, which supports Bandura's self-efficacy theories. Dowrick's (1999) concept of feedforward modelling is also supported by VSM since children learn to see themselves in a future, more competent state, that is, they learn from their future successes.

The findings of this study also suggest some valuable clinical implications for the use of VSM as a therapy tool to improve pragmatic skills. VSM appears to be a tool applicable to children of various ages, from various backgrounds with varying diagnoses (Buggey, 2005). VSM appears to address a wide array of behaviour, social and language areas based on the child's profile (Brinton et al., 2004). The effects of VSM appear to be immediate and dramatic (Buggey et al., 1999). Effects of VSM tend to generalise to other settings, people and activities (Wert & Neisworth, 2003). Video material is portable and can be used during the holidays or school breaks, to enhance maintenance. Instruction in VSM can be included in classrooms and at home, as a tool to improve communication, behaviour or academic skills, without relying on the direct one-on-one therapy context and presence of a therapist. These findings should lead to interesting new ideas for future research and applications of VSM.

Future research implications

Future research, investigating the use of the VSM intervention techniques, may include the effectiveness of parent- and/or teacher-implemented intervention, as well as research focusing on the practicalities of implementation of these techniques by teachers at school and caregivers at home. A similar study using VSM intervention, with a longer period for each phase (specifically intervention and maintenance phase) would be beneficial. It would also be useful to use these techniques with a larger sample size. Combination of VSM with direct training would also be useful to investigate whether a combined method may boost performance in terms of turn-taking and other pragmatic language skills. It would be interesting to investigate whether or not watching their own, as well as each other's, videos in a group, might boost personal performance when comparing their performance to that of their peers.

Concluding statements

The current study demonstrated the effectiveness of the VSM technique to improve turn-taking skills in five children with ASD. The use of VSM intervention techniques allows children with ASD to see themselves performing at a more advanced level than that at which they typically function. It appears that the children learn to increase positive behaviour and decrease unwanted behaviour after watching themselves being successful at that behaviour. The findings of this study should lead to interesting new ideas for therapy and research involving VSM.

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Appendix A

Parent Information Sheet and Consent Form:

Does Video Self-Modeling improve Turn Taking Skills in Children with Autistic Spectrum Disorders or Pragmatic Communication Disorders?

Dear parents,

My name is Mandy Hanouch. I am a qualified speech-language therapist, completing my masters degree at the University of the Witwatersrand. I am doing research on teaching children with ASD (ASD) to take turns in conversation. In this study I want to examine whether my technique to teach children with ASD turn taking skills is effective. The technique I am using is called VSM. VSM involves the child watching themselves on video recording performing a skill at an advanced level by showing them only their positive performances and editing out all their negative performances.

I am asking your permission to include your child in this research study. This would involve video recording your child in the classroom and in a group therapy setting for thirty minutes each twice a week over a period of six weeks. All video recordings will be done at school. The project will involve three phases, an assessment, therapy and follow up phase. In the assessment phase your child's conversational turn taking skills will be evaluated. Your child's Speech-language therapy assessment reports will be studied with permission from yourself and your child's Speech-language therapist. During the therapy phase a video will be made of your child being successful at conversational turn taking including three different examples. This will be done using editing software to remove any negative behaviour or therapist prompts. The final product will be formatted to DVD and a copy given to you as parents so that your child may watch their personalized DVD every evening at home for two weeks. I will need you as parents to ensure that your child watches their video every evening during this week period. You will also be asked as parents to complete a video observation checklist at this stage which will include items such as any distractions or interruptions and the time the video was watched each evening. The child will also watch their DVD each morning at school during this time with the researcher. During the follow up phase (2 weeks) the researcher will aim to determine whether or not any improvement in conversational turn taking has occurred. A second follow up phase will take place two months later (in November) to ensure that the child has retained the new skills over time. The second follow up phase will be exactly the same as the first follow up phase and will take place over 2 weeks.

Five children with ASD will be included in the study. This project will take place during Term 3 at school. It must be noted that this is an experimental technique and therefore has not been proven to work as yet. However, research using similar techniques has shown improvements in these skills. No foreseeable risks related to participation in this study are anticipated for your child. Possible benefits of taking part in the study are possible improvements in your child's conversational turn taking, which is important for social interaction. If VSM is proved to be a successful tool it may be used by your Speech-language therapist in therapy to focus on other areas of difficulty.

Please note that these sessions would occur in addition to your current Speech-language therapy sessions, and in no way serve as an alternative or replacement for your child's current Speech-language therapy.

You will be given more information on the study while involved in the project and after the results are available. Participation is completely voluntary and participants are free to withdraw from the project at any time, with no negative consequences.

With your permission, the researcher would like to video record all sessions to allow her to later analyse them. A second Speech-language therapist will be watching and scoring some of the video clips to ensure that our scoring is consistent and accurate. All efforts will be made to keep your child's information confidential. However, absolute confidentiality cannot be guaranteed. Personal information may be disclosed if required by law. Organizations that may inspect and/or copy research records for quality assurance and data analysis include groups such as the Research Ethics Committee. However, your child's name will not be written on the videotapes or used in the research report or any publications of the findings. The videos will be stored at the University of the Witwatersrand, in a locked cabinet, for a period of 5 years after which time they will be destroyed.

You will be given verbal feedback regarding your child's progress throughout the project and will receive a written report at the end of the study. With your permission a written report may also be provided to your child's Speech-language therapist and school.

Should you have any questions or require any further information please do not hesitate to contact me at ____.

Kind regards,

Mandy Hanouch
Speech and Language Therapist

_____

Dr. Sharon Moonsamy
Research Supervisor

_____

Dr. Anniah Mupawose
Co-research supervisor.

_____

Appendix B

Parent's Letter of Consent

I agree to take part in Mandy Hanouch's study of VSM to improve conversational turn taking. Hence I agree:

- to allow my child, (child's name) _____, to be observed and filmed over a period of six weeks at school.
- I agree to my child watching their personalized DVD at home every evening for two weeks during the intervention stage.
- I allow access to my child's previous speech/language assessment reports from the Speech-language therapist concerned.

- I have read the information sheet and understand that my child's information will be kept confidential and should I change my mind about taking part in this study at any time, I may withdraw with no negative consequences.

Name: _____

Designation: Parent / legal guardian / primary caregiver _____

Signature: _____

Date: _____

Appendix C

Letter of consent for video taping

I agree to allow my child, (child's name)_____, to take part in Mandy Hanouch's study of VSM to improve conversational turn taking. I agree to allow the researcher to videotape 30 minutes of classroom time and 30 minute group therapy sessions twice a week over a period of six weeks at school during Term 3. I understand that this videotape will be used to analyse my child's performance and monitor his/her progress. I understand that the video recordings will also be edited and used to create a personalized DVD for my child. I understand that this videotape will be stored in a locked cupboard at the University of the Witwatersrand. I understand that this video will not be stored, transmitted or in anyway be made available on the internet. I agree to allow this videotape to be used in the research project only under the direct supervision of Mandy Hanouch at the University of the Witwatersrand and that my child's information will be kept strictly confidential at all times.

Name: _____

Designation: Parent / legal guardian / primary caregiver _____

Signature: _____

Date: _____

Appendix D

Information sheet and consent form for recruitment – School Principal

Does Video Self-Modeling improve Turn Taking Skills in Children with Autistic Spectrum Disorders or Pragmatic Communication Disorders?

To whom it may concern,

Re: VSM study

My name is Mandy Hanouch. I am a qualified speech-language therapist, completing my masters degree at the University of the Witwatersrand. As part of my masters degree I am required to complete a research project for which I would like to invite any possible candidates from your school to participate. I am doing research on the efficacy of VSM as a therapy tool for teaching children with ASD (ASD) to take turns in conversation. VSM involves the child watching themselves on video recording performing a skill at an advanced level by showing them only their positive performances and editing out all their negative performances.

This study would involve video recording each child in the classroom and in a group therapy setting for thirty minutes each twice a week over a period of six weeks. All video recordings will be done at school. The project will involve three phases, an assessment, therapy and follow up phase. In the assessment phase the child's conversational turn taking skills will be evaluated. The child's Speech-language therapy assessment reports will be studied with permission from the parents, school and the child's Speech-language therapist. During the therapy phase a video will be made of the child being successful at conversational turn taking including three different examples. This will be done using editing software to remove any negative behaviour or therapist prompts. The final product will be formatted to DVD and a copy given to the parents so that their child may watch their personalized DVD every evening at home for two weeks. The child will also watch their DVD each morning at school during this time with the researcher. During the follow up phase the researcher will aim to determine whether or not any improvement in conversational turn taking has occurred.

Five children with ASD will be included in the study. This project will take place during Term 3 at school. It must be noted that this is an experimental technique and therefore has not been proven to work as yet. However, research using similar techniques has shown improvements in these skills. No foreseeable risks related to participation in this study are anticipated for the children. Possible benefits of taking part in the study are possible improvements in the child's conversational turn taking, which is important for social interaction. If VSM is proved to be a successful tool it may be used by Speech-language therapists in therapy to focus on other areas of difficulty.

Please note that these sessions would occur in addition to the child's current Speech-language therapy sessions, and in no way serve as an alternative or replacement for the child's current Speech-language therapy.

Parents will be given more information on the study while involved in the project and after the results are available. Participation is completely voluntary and participants are free to withdraw from the project at any time, with no negative consequences.

With the family's permission, the researcher would like to video record all sessions, in order to allow her to later analyse interactions. The child's identity will remain confidential at all times. Their names will not be written on the videotapes or used in the research report or any publications of the findings. The videos will be stored at the University of the Witwatersrand, in a locked cabinet, for a period of 5 years after which time they will be destroyed.

If you allow me to recruit possible candidates from your school, I will provide you with information sheets for potential families. The candidates will need to have a diagnosis of ASD, be between five to nine years old and be able to imitate turn taking behaviour. I would need the school Principal to deliver the information sheets to suitable candidates. The candidates may contact me directly or with your permission I may contact the families which are interested in participating. Parents will be informed that this intervention would be additional to any other services they are receiving and will not detract from these services in any way.

Should you have any questions or require any further information please do not hesitate to contact me on _____.

Kind Regards,

Mandy Hanouch
Speech and Language Therapist

Dr. Sharon Moonsamy
Research Supervisor

Dr. Anniah Mupawose
Co-research Supervisor

Appendix E

Principal's Letter of Consent: Recruitment

I _____, the principal of _____school agree to allow Mandy Hanouch to recruit possible participants for her VSM research project from my school. I have read the information sheet and understand that the children's information will be kept confidential at all times, that only Mandy Hanouch will have access to the children's information, and that I may change my mind about allowing participants to be recruited from my school at any time. I agree to distribute information sheets to possible participants and thereafter provide any interested candidates with Mandy Hanouch's contact information, or with the families consent, forward their contact information to Mandy Hanouch. I am aware that the research will take place in the classroom and during a group therapy session at school. I am aware that the candidates will be observed and filmed in these two settings twice a week over a period of six weeks during Term 3. I understand that if I have any questions at any time I may contact Mandy Hanouch.

Name: _____

Designation (Principal, etc.): _____

Signature: _____

Date: _____

Appendix F

Teacher information sheet and consent form:

Does Video Self-Modeling improve Turn Taking Skills in Children with Autistic Spectrum Disorders or Pragmatic Communication Disorders?

To whom it may concern,

Re: VSM study

My name is Mandy Hanouch. I am a qualified speech-language therapist, completing my masters degree at the University of the Witwatersrand. As part of my masters degree I am required to complete a research project for which I have invited candidates from your school to participate. I am doing research on the efficacy of VSM as a therapy tool for teaching children with ASD (ASD) to take turns in conversation. VSM involves the child watching themselves on video recording performing a skill at an advanced level by showing them only their positive performances and editing out all their negative performances.

This study would involve video recording each child in the classroom and in a group therapy setting for thirty minutes each twice a week over a period of six weeks. All video recordings will be done at school. The project will involve three phases, an assessment, therapy and follow up phase. In the assessment phase the child's conversational turn taking skills will be evaluated. The child's Speech-language therapy assessment reports will be studied with permission from the parents, school and the child's Speech-language therapist. During the therapy phase a video will be made of the child being successful at conversational turn taking including three different examples. This will be done using editing software to remove any negative behaviour or therapist prompts. The final product will be formatted to DVD and a copy given to the parents so that their child may watch their personalized DVD every evening at home for two weeks. The child will also watch their DVD each morning at school during this time with the researcher. During the follow up phase the researcher will aim to determine whether or not any improvement in conversational turn taking has occurred.

Five children with ASD will be included in the study. This project will take place during Term 3 at school. It must be noted that this is an experimental technique and therefore has not been proven to work as yet. However, research using similar techniques has shown improvements in these skills. No foreseeable risks related to participation in this study are anticipated for the children. Possible benefits of taking part in the study are possible improvements in the child's conversational turn taking, which is important for social interaction. If VSM is proved to be a successful tool it may be used by Speech-language therapists in therapy to focus on other areas of difficulty.

Please note that these sessions would occur in addition to the child's current Speech-language therapy sessions, and in no way serve as an alternative or replacement for the child's current Speech-language therapy.

Parents will be given more information on the study while involved in the project and after the results are available. Participation is completely voluntary and participants are free to withdraw from the project at any time.

The school's participation in the study has been given by the principal. Your participation in the study is voluntary and you are free to withdraw consent and discontinue your participation at any time. One child in your class will be video recorded in the classroom for thirty minutes twice a week over a period of six weeks during Term 3. The researcher will assume the role of a passive observer and will not interfere with the classroom routine and activities. Observations and filming will only begin once informed consent has been given by yourself, the parents of the child and by the child him/herself. Your identity as well as that of the child will remain confidential and names will not appear on the research report since you will be identified by number. Parents of the children concerned will be given feedback after the study has been completed. The videos will be stored at the University of the Witwatersrand, in a locked cabinet, for a period of 5 years after which time they will be destroyed.

Should you have any questions or require any further information please do not hesitate to contact me on _____.

Kind Regards,

Mandy Hanouch
Speech and Language Therapist
_____

Dr. Sharon Moonsamy
Clinical Supervisor
_____

Dr. Anniah Mupawose
Co-research Supervisor
_____

Appendix F

Assistant teacher information sheet and consent form:

Does Video Self-Modeling improve Turn Taking Skills in Children with Autistic Spectrum Disorders or Pragmatic Communication Disorders?

To whom it may concern,

Re: VSM study

My name is Mandy Hanouch. I am a qualified speech-language therapist, completing my masters degree at the University of the Witwatersrand. As part of my masters degree I am required to complete a research project for which I have invited candidates from your school to participate. I am doing research on the efficacy of VSM as a therapy tool for teaching children with ASD (ASD) to take turns in conversation. VSM involves the child watching themselves on video recording performing a skill at an advanced level by showing them only their positive performances and editing out all their negative performances.

This study would involve video recording each child in the classroom and in a group therapy setting for thirty minutes each twice a week over a period of six weeks. All video recordings will be done at school. The project will involve three phases, an assessment, therapy and follow up phase. In the assessment phase the child's conversational turn taking skills will be evaluated. The child's Speech-language therapy assessment reports will be studied with permission from the parents, school and the child's Speech-language therapist. During the therapy phase a video will be made of the child being successful at conversational turn taking including three different examples. This will be done using editing software to remove any negative behaviour or therapist prompts. The final product will be formatted to DVD and a copy given to the parents so that their child may watch their personalized DVD every evening at home for two weeks. The child will also watch their DVD each morning at school during this time with the researcher. During the follow up phase the researcher will aim to determine whether or not any improvement in conversational turn taking has occurred.

Five children with ASD will be included in the study. This project will take place during Term 3 at school. It must be noted that this is an experimental technique and therefore has not been proven to work as yet. However, research using similar techniques has shown improvements in these skills. No foreseeable risks related to participation in this study are anticipated for the children. Possible benefits of taking part in the study are possible improvements in the child's conversational turn taking, which is important for social interaction. If VSM is proved to be a successful tool it may be used by Speech-language therapists in therapy to focus on other areas of difficulty.

Please note that these sessions would occur in addition to the child's current Speech-language therapy sessions, and in no way serve as an alternative or replacement for the child's current Speech-language therapy.

Parents will be given more information on the study while involved in the project and after the results are available. Participation is completely voluntary and participants are free to withdraw from the project at any time.

The school's participation in the study has been given by the principal. Your participation in the study is voluntary and you are free to withdraw consent and discontinue your participation at any time. One child in your class will be video recorded in the classroom for thirty minutes twice a week over a period of six weeks during Term 3. The researcher will assume the role of a passive observer and will not interfere with the classroom routine and activities. Observations and filming will only begin once informed consent has been given by yourself, the parents of the child and by the child him/herself. Your identity as well as that of the child will remain confidential and names will not appear on the research report since you will be identified by number. Parents of the children concerned will be given feedback after the study has been completed. The videos will be stored at the University of the Witwatersrand, in a locked cabinet, for a period of 5 years after which time they will be destroyed.

Should you have any questions or require any further information please do not hesitate to contact me on _____.

Kind Regards,

Mandy Hanouch
Speech and Language Therapist
_____

Dr. Sharon Moonsamy
Clinical Supervisor
_____

Dr. Anniah Mupawose
Co-research Supervisor
_____

Appendix G

Teacher's Letter of Consent:

I _____, agree to allow Mandy Hanouch to to conduct research in my classroom. I have read the information sheet and understand that the children's information will be kept confidential at all times, that only Mandy Hanouch will have access to the children's information, and that I may refuse or withdraw my consent and discontinue participation at any time. I am aware that observation and filming will take place in the classroom twice a week for thirty minutes each time over a period of six weeks. I understand that if I have any questions at any time they will be answered.

Name: _____

Designation (Teacher Gr …. Etc.): _____

Signature: _____

Date: _____

Appendix H

Speech-language therapist information sheet and consent form:

Does Video Self-Modeling improve Turn Taking Skills in Children with Autistic Spectrum Disorders or Pragmatic Communication Disorders?

To whom it may concern,

Re: VSM study

My name is Mandy Hanouch. I am a qualified speech-language therapist, completing my masters degree at the University of the Witwatersrand. As part of my masters degree I am required to complete a research project for which I have invited candidates from your school to participate. I am doing research on the efficacy of VSM as a therapy tool for teaching children with ASD (ASD) to take turns in conversation. VSM involves the child watching themselves on video recording performing a skill at an advanced level by showing them only their positive performances and editing out all their negative performances.

This study would involve video recording each child in the classroom and in a group therapy setting for thirty minutes each twice a week over a period of six weeks. All video recordings will be done at school. The project will involve three phases, an assessment, therapy and follow up phase. In the assessment phase the child's conversational turn taking skills will be evaluated. The child's Speech-language therapy assessment reports will be studied with permission from the parents, school and the child's Speech-language therapist. During the therapy phase a video will be made of the child being successful at conversational turn taking including three different examples. This will be done using editing software to remove any negative behaviour or therapist prompts. The final product will be formatted to DVD and a copy given to the parents so that their child may watch their personalized DVD every evening at home for two weeks. The child will also watch their DVD each morning at school during this time with the researcher. During the follow up phase the researcher will aim to determine whether or not any improvement in conversational turn taking has occurred.

Five children with ASD will be included in the study. This project will take place during Term 3 at school. It must be noted that this is an experimental technique and therefore has not been proven to work as yet. However, research using similar techniques has shown improvements in these skills. No foreseeable risks related to participation in this study are anticipated for the children. Possible benefits of taking part in the study are possible improvements in the child's conversational turn taking, which is important for social interaction. If VSM is proved to be a successful tool it may be used by Speech-language therapists in therapy to focus on other areas of difficulty.

Please note that these sessions would occur in addition to the child's current Speech-language therapy sessions, and in no way serve as an alternative or replacement for the child's current Speech-language therapy.

Parents will be given more information on the study while involved in the project and after the results are available. Participation is completely voluntary and participants are free to withdraw from the project at any time.

The school's participation in the study has been given by the principal. Your participation in the study is voluntary and you are free to withdraw consent and discontinue your participation at any time. Five children from the school will be video recorded in the classroom as well as during a group therapy session for thirty minutes twice a week over a period of six weeks during Term 3. The researcher will assume the role of a passive observer and will not interfere with the classroom or therapy routine and activities. Observations and filming will only begin once informed consent has been given by yourself, the parents of the child, the teacher and by the child him/herself. Your identity as well as that of the child will remain confidential and names will not appear on the research report since you will be identified by number. You, the parents of the children concerned and the school principal will be given feedback after the study has been completed. The videos will be stored at the University of the Witwatersrand, in a locked cabinet, for a period of 5 years after which time they will be destroyed.

Should you have any questions or require any further information please do not hesitate to contact me on _____.

Kind Regards,

Mandy Hanouch
Speech and Language Therapist

Dr. Sharon Moonsamy
Clinical Supervisor

Dr. Anniah Mupawose
Co-research Supervisor

Appendix I

Speech-language therapist's Letter of Consent:

I _____, agree to allow Mandy Hanouch to to conduct research during my group therapy sessions. I have read the information sheet and understand that the children's information will be kept confidential at all times, that only Mandy Hanouch will have access to the children's information, and that I may refuse or withdraw my consent and discontinue participation at any time. I am aware that observation and filming will take place in the classroom twice a week for thirty minutes and during group Speech-language therapy sessions over a period of six weeks. I understand that during the therapy phase personalized videos will be made of each child being successful at conversational turn taking using editing software to remove any negative behaviour or therapist prompts. The final product will be formatted to DVD and a copy given to the parents so that their child may watch their personalized DVD every evening at home and each morning at school with the researcher for a period of two weeks. I agree to allow Mandy Hanouch to access recent Speech-language therapy reports relating to the children involved in the study. I understand that if I have any questions at any time they will be answered.

Name: _____

Designation (Speech-language therapist): _____

Signature: _____

Date: _____

Appendix J

Subject information sheet and assent form

My name is Mandy Hanouch and I'm doing a project at your school which your parents and teachers know about already. I would like to ask you to be part of my project.
You do not have to say yes and you will not be in trouble with anyone if you say no.

I will be sitting in your class for a few lessons and in some of your Speech-language therapy sessions and taking a video using my phone. I will be make a video for you to watch at home and with me at school.

If you decide you don't want me to be there any more you just need to tell me and I will stop my project at any time.

Please color in the box 'yes' if you would like to be in my project or 'no' if you don't want to be in my project.





Name: _____

Date: _____

Appendix K

Codes and Definitions for Turn Taking Violations:

(Adapted from Coates, 2004).

I = Interruptions

O = Overlaps

G = Grabbing the floor

H = Hogging the floor

S = Silence

- Interruptions: When an interrupter inhibits the speaker from finishing their turn, viewed as a turn taking violation.
- Overlaps: When the next speaker overlaps the first speaker's turn; an anticipation before speaker is finished.
- Grabbing the floor: When a listener interrupts the current holder of the floor, thus taking over.
- Hogging the floor: When a speaker takes a long time on the floor and ignores others attempting to take the floor.
- Silence: Often a sign of turn taking violations, and can follow interruptions or when someone hogs the floor for too long.

Appendix L

Turn Taking tallying record sheet

Frequency of turn taking tallying record sheet

Phase:
Session number:
Date:
Length of video:

Name:	Turns Offered Spontaneously	Turns Directly Asked	Interruptions	Overlaps	Grabbing the floor	Hogging the floor	Silence
1.Child A							
2.Child B							
3.Child C							
4.Child D							
5.Child E							

Appendix M

Turn Taking Assessment Profile:

Classroom Observations:

Phase	Session Number	Actual Turns Taken	I	O	G	H	S	TOTAL
Baseline	1							
Baseline	2							
Baseline	3							
Baseline	4							
Intervention	5							
Intervention	6							
Intervention	7							
Intervention	8							
Follow up	9							
Follow up	10							
Follow up	11							

Follow up	12							
Follow up 2	13							
Follow up 2	14							
Follow up 2	15							
Follow up 2	16							
TOTAL:								

Appendix N

Procedural Checklist for Video Presentations:

Day	Video watched? (Yes/no)	Time watched	Interruptions/ distractions?	Other people present while watching?
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				

Examples of interruptions/ distractions:
Somebody arrives at the door during the video.
The phone rings during the video.
Siblings or family members interrupt the video.
The child needs to pause the video since they need the toilet or are hungry.
The child walks out of the room during the video.
The child refuses to watch the video.

Appendix O

Teacher Satisfaction Questionnaire

Circle the answer that most closely represents your feeling or opinion based on the VSM program:

1. Did you find the VSM program easy to follow?

   Yes No Maybe

2. Did you feel that watching the video was helpful for the children?

   Yes No Maybe

3. Did the children enjoy watching their videos?

   Yes No Maybe

4. Did you feel that the children's turn taking skills improved after watching the video?

   Yes No Maybe

5. Did you notice any other skills that improved after watching the video?

   _____

   _____

6. Do you feel that two weeks was a good time frame for the video watching?

   Yes No Maybe

   If the answer to question 6 was no, did you feel the video should be watched for a longer time or a shorter time?

   Longer Shorter

Do you have any other comments that may help to improve the program?

_____
_____
_____
_____

Thank you for your feedback,

Mandy Hanouch	Dr. Sharon Moonsamy	Dr. Anniah Mupawose
_____	_____	_____
(Speech-language therapist)	(Supervisor)	(Supervisor)

Appendix P

DSM-5 classification

The DSM-5 classification of ASD, specifies the following Diagnostic Criteria:

- Persistent deficits in social communication and social interaction across multiple contexts, as manifested by the following, currently or by history:
    - Deficits in social-emotional reciprocity, ranging, for example, from abnormal social approach and failure of normal back-and-forth conversation; to reduced sharing of interests, emotions, or affect; to failure to initiate or respond to social interactions.
    - Deficits in nonverbal communicative behaviours used for social interaction, ranging, for example, from poorly integrated verbal and nonverbal communication; to abnormalities in eye contact and body language or deficits in understanding and use of gestures; to a total lack of facial expressions and nonverbal communication.
    - Deficits in developing, maintaining, and understanding relationships, ranging, for example, from difficulties adjusting behaviour to suit various social contexts; to difficulties in sharing imaginative play or in making friends; to absence of interest in peers.
- Restricted, repetitive patterns of behaviour, interests, or activities, as manifested by at least two of the following, currently or by history:
    - Stereotyped or repetitive motor movements, use of objects, or speech (e.g., simple motor stereotypes, lining up toys or flipping objects, echolalia, idiosyncratic phrases).
    - Insistence on sameness, inflexible adherence to routines, or ritualized patterns or verbal nonverbal behaviour (e.g., extreme distress at small changes, difficulties with transitions, rigid thinking patterns, greeting rituals, need to take same route or eat food every day).
    - Highly restricted, fixated interests that are abnormal in intensity or focus (e.g, strong attachment to or preoccupation with unusual objects, excessively circumscribed or perseverative interest).
    - Hyper- or hypo-reactivity to sensory input or unusual interests in sensory aspects of the environment (e.g., apparent indifference to pain/temperature, adverse

response to specific sounds or textures, excessive smelling or touching of objects, visual fascination with lights or movement).

- Symptoms must be present in the early developmental period (but may not become fully manifest until social demands exceed limited capacities, or may be masked by learned strategies in later life).
- Symptoms cause clinically significant impairment in social, occupational, or other important areas of current functioning.
- These disturbances are not better explained by intellectual disability (intellectual developmental disorder) or global developmental delay. Intellectual disability and ASD frequently co-occur; to make comorbid diagnoses of ASD and intellectual disability, social communication should be below that expected for general developmental level.

(American Psychiatric Association, 2013)

Appendix Q

The DSM-5 classification of Social (Pragmatic) Communication Disorder specifies the following Diagnostic Criteria:

- Persistent difficulties in the social use of verbal and nonverbal communication as manifested by all of the following:
  - Deficits in using communication for social purposes, such as greeting and sharing information, in a manner that is appropriate for the social context.
  - Impairment of the ability to change communication to match context or the needs of the listener, such as speaking differently in a classroom than on the playground, talking differently to a child than to an adult, and avoiding use of overly formal language.
  - Difficulties following rules for conversation and storytelling, such as taking turns in conversation, rephrasing when misunderstood, and knowing how to use verbal and nonverbal signals to regulate interaction.
  - Difficulties understanding what is not explicitly stated (e.g., making inferences) and nonliteral or ambiguous meanings of language (e.g., idioms, humor, metaphors, multiple meanings that depend on the context for interpretation).
- The deficits result in functional limitations in effective communication, social participation, social relationships, academic achievement, or occupational performance, individually or in combination.
- The onset of the symptoms is in the early developmental period (but deficits may not become fully manifest until social communication demands exceed limited capacities).
- The symptoms are not attributable to another medical or neurological condition or to low abilities in the domains or word structure and grammar, and are not better explained by ASD, intellectual disability (intellectual developmental disorder), global developmental delay, or another mental disorder.

  (American Psychiatric Association, 2013)

Appendix R

The DSM-5 severity rating of ASD:

Level 3 - "Requiring very substantial support"

- Severe deficits in verbal and nonverbal social communication skills cause severe impairments in functioning, very limited initiation of social interactions, and minimal response to social overtures from others. For example, a person with few words of intelligible speech who rarely initiates interaction and, when he or she does, makes unusual approaches to meet needs only and responds to only very direct social approaches
- Inflexibility of behaviour, extreme difficulty coping with change, or other restricted/repetitive behaviours markedly interfere with functioning in all spheres. Great distress/difficulty changing focus or action.

Level 2 - "Requiring substantial support"

- Marked deficits in verbal and nonverbal social communication skills; social impairments apparent even with supports in place; limited initiation of social interactions; and reduced or abnormal responses to social overtures from others. For example, a person who speaks simple sentences, whose interaction is limited to narrow special interests, and how has markedly odd nonverbal communication.
- Inflexibility of behaviour, difficulty coping with change, or other restricted/repetitive behaviours appear frequently enough to be obvious to the casual observer and interfere with functioning in a variety of contexts. Distress and/or difficulty changing focus or action.

Level 1 - "Requiring support"

- Without supports in place, deficits in social communication cause noticeable impairments. Difficulty initiating social interactions, and clear examples of atypical or unsuccessful response to social overtures of others. May appear to have decreased interest in social interactions. For example, a person who is able to speak in full sentences and engages in communication but whose to- and-fro conversation with others fails, and whose attempts to make friends are odd and typically unsuccessful.Inflexibility of behaviour causes significant interference with functioning in one or more contexts. Difficulty switching between activities. Problems of organization and planning hamper independence.

(American Psychiatric Association, 2013).

Appendix S

Ethical Clearance Certificate

Research Office

HUMAN RESEARCH ETHICS COMMITTEE (NON-MEDICAL)
R14/49 Hanouch

CLEARANCE CERTIFICATE	**PROTOCOL NUMBER: H16/06/14**
PROJECT TITLE	Does video self-modeling improve turn taking skills in children with Austistic Spectrum Disorders?
INVESTIGATOR(S)	Mrs A Hanouch
SCHOOL/DEPARTMENT	Speech Therapy/
DATE CONSIDERED	24 June 2016
DECISION OF THE COMMITTEE	Approved unconditionally
EXPIRY DATE	17 July 2019

DATE 18 July 2016 **CHAIRPERSON** _____
(Professor J Knight)

cc: Supervisor : Drs Moonsamy S & Mupawose A

DECLARATION OF INVESTIGATOR(S)

To be completed in duplicate and **ONE COPY** returned to the Secretary at Room 10005, 10th Floor, Senate House, University.

I/We fully understand the conditions under which I am/we are authorized to carry out the abovementioned research and I/we guarantee to ensure compliance with these conditions. Should any departure to be contemplated from the research procedure as approved I/we undertake to resubmit the protocol to the Committee. **I agree to completion of a yearly progress report.**

_____ _____/_____/_____
Signature Date

PLEASE QUOTE THE PROTOCOL NUMBER ON ALL ENQUIRIES