# The Use of Video Modelling to Reduce Fear, and Teach Appropriate Response and Safe Behaviours in Children with Autism Spectrum Disorder with a Fear of Dogs

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## Abstract

The aim of this research was to investigate whether video peer modelling and video self modelling (VSM) were effective treatments in reducing fear of dogs in children with autism spectrum disorder (ASD). This study also examined whether video modelling could be used as an effective tool to increase knowledge of dog behaviour and dog safety in individuals with ASD. Participants were recruited with a poster that was distributed through the national ASD organisations and ASD support groups. Four participants were recruited; they were aged between 9 and 17 years, had a formal diagnosis of ASD, and had a fear of dogs. This study used two single-case design experiments; one pair of participants experienced an A-B sequence (a VSM), and a second pair of participants experienced an A-B-C sequence (video peer model followed by VSM). Participants met with the researcher five times: three baseline sessions, and two post-intervention sessions. All four participants showed some increase in steps achieved in their Behavioural Avoidance Test (BAT) scores, with two participants experiencing large changes. The VSM intervention appeared to have had more effect on increasing BAT scores/reducing fear than the video peer model, though this was not proven conclusively. There was little evidence to support video peer modelling or VSM as an effective tool to increase knowledge of dog behaviour and dog safety. Limitations on this study include the small number of participants, and the single case design in the form of AB/ABC sequences used.

## Introduction

Experiencing fear and adapting the associated emotions is all part of typical development in children (Lydon, Healy, Callaghan, Mulhern & Holloway, 2015). Typically fears experienced in childhood are mild, age specific and short-lived (King, Muris & Ollendick, 2005). However, fears and phobias are significantly more prevalent and severe among children with autism spectrum disorder (ASD) (Lydon et al., 2015). Children with ASD and their families experience a unique set of challenges including deficits in communication, social interaction, and behaviours (Lai, Lombardo, & Baron-Cohen, 2013). Fears experienced by children with ASD are problematic due to their persistence, magnitude and interference in daily life (King et al., 2005; Lydon et al., 2015). Children with ASD experience fears and phobias towards a larger variety of stimuli and with more prevalence than their typically developed peers (Lydon et al., 2015).

Whilst there are several effective treatments for fears and phobias in typically developed children, there is little for children with ASD. Video modelling is an intervention tool that shows the individual a video of either a peer or themselves successfully completing a desired skill or behaviour (Dowrick, 1999). This allows the individual to imitate the targeted skill or behaviour through observation (Dowrick, 1999). Video modelling is an effective intervention for children with ASD because it reduces attentional and language demands, eliminates the need for social interaction and is a primarily visual intervention (Delano, 2007). The use of video modelling to reduce fears and phobias in children with ASD is an under-researched topic, which is investigated in this current study.

### Autism Spectrum Disorder

ASD refers to a multifaceted set of neurodevelopmental conditions. Complex and pervasive, ASD is typically characterised by early-onset impairments in communication, social interaction,

and behaviours (Lai et al., 2013; Masi, DeMayo, Glozier, & Gustella, 2017). Because of its complexity, pervasiveness, and life-time course, ASD can be extremely challenging for both the individual and their family.

**Definition and Diagnosis**

ASD is a lifelong neurodevelopmental disability that can vary greatly in its expression between individuals and within individuals over their life course. Therefore, the condition is defined by the presence of specific characteristics and referred to as a spectrum based on individual severity. The Diagnostic and Statistical Manual of Mental Disorders [DSM-5] (American Psychiatric Association [APA], 2013) defines the latest diagnostic criteria for ASD. These are summarised below.

(1) Individuals display "persistent deficits in social communication and social interaction across multiple contexts" (APA, 2013, p. 50). This includes deficits in social-emotional reciprocity (inability to have back and forth conversations, reduced emotion and interest sharing, failure to take part in social interactions), deficits in non-verbal communicative behaviours (abnormal eye contact and body language, lack of facial expressions), and deficits in developing, maintaining, and understanding relationships (difficulties adjusting behaviours to social contexts, difficulty in sharing imaginative play or making friends, disinterest in peers) (APA, 2013).

(2) Individuals also show "restricted, repetitive patterns of behaviour, interests, or activities" (APA, 2013, P. 50). These patterns could be stereotyped or repetitive movements, speech, or object use (lining up objects, echolalia, idiosyncratic phrases), insistence on sameness, uncompromising routine, and ritualised behaviour (extreme reactions to small changes and transitions, strict task rituals), abnormally intense fixated interests (strong

attachment or preoccupation with certain objects), hyperactivity or unusual interest in sensory input (adverse response to specific sounds, lights, textures, or excessive touching, smelling, and visual fascination with particular objects) (APA, 2013).

(3) These disturbances should not be better explained by intellectual disability or global developmental delay. Symptoms must be present in the early developmental period, and must cause clinically significant impairment in social, occupational, or other important areas of functioning (APA, 2013).

Despite the similarities in their core profiles, individuals with ASD show enormous variability in the expression and severity of symptoms (Mash & Wolfe, 2015; Goodall, 2013). For a diagnosis of ASD the DSM-5 instructs that two severity levels are to be recorded for the categories 'social communication' and 'restricted repetitive behaviours' (APA, 2013, p. 51). Severity ranges from level one 'requiring support', level two 'requiring substantial support' and level three 'requiring very substantial support' (APA, 2013, p. 51). An individual's placement on the spectrum is also commonly referred to as "high functioning" or "low functioning" depending on the severity of symptoms and ability to function independently. However, many individuals on the spectrum strongly disagree with this terminology (Goodall, 2013).

An overhaul of the diagnostic criteria for ASD saw significant changes from the DSM-IV to the DSM-5. Perhaps the most important change to note is that it no longer distinguishes Autistic Disorder, Asperger Syndrome, Childhood Disintegrative Disorder (CDD), and Pervasive Developmental Disorder – Not Otherwise Specified (PDD-NOS) as separate subtypes. Instead, the DSM-5 subsumes these conditions under the single diagnosis of ASD (Ministries of Health and Education, 2016; APA, 2013). When reviewing ASD literature published prior to the 2013 release of the DSM-5, where the terms Asperger Syndrome, CDD, and PDD-NOS are used, they could be read as referring to ASD (Ministries of Health and Education, 2016).

It is also worth noting that the International Statistical Classification of Diseases and Related Health Problems, tenth revision [ICD-10] (2016), published by the World Health Organisation [WHO], still distinguishes between Childhood ASD, Atypical ASD, CDD, Asperger Syndrome, and PDD-NOS. There are ongoing discussions in the ASD community about whether the grouping classification displayed by the DSM-5 or the individual classifications of the ICD-10 are more appropriate (Goodall, 2013). Preferences vary across Aotearoa New Zealand and among agencies; in this research the DSM-5 definitions will be followed.

**Epidemiology**

The current recognised worldwide prevalence of ASD, as stated in the DSM-5, is 1% of the population (APA, 2013). However, recent large-scale surveys have suggested these estimates could be increased to as much as 2-3% (as cited by Lai et al., 2013). The prevalence of diagnosed ASD has increased progressively since the first attempted epidemiological study by Lotter in 1966 which reported an estimate of 4.5 per 10,000 people in the UK had ASD (0.045%) (as cited by Williams, Higgins, & Brayne, 2006). Presently the United Kingdom National Health Service [NHS] (Brugha, 2012) reports the overall prevalence of ASD as 1.1-1.2%.

Trends of increasing ASD prevalence can be seen globally, including in the USA where the Centers for Disease Control and Prevention [CDC] (Christensen et al., 2016) reports that 1 in 68 children have been identified with ASD, compared to 1 in 150 in the year 2000. There is currently no definitive information on the prevalence of ASD in Aotearoa New Zealand. The New Zealand Ministries of Health and Education (2016) estimates that there are more than 40,000 individuals in Aotearoa New Zealand with ASD. However, other organisations suggest prevalence is much higher; Autism NZ (2018) report that ASD affects approximately 65,000 New Zealanders.

The widely observed global increase in ASD prevalence is theorised by some to be a result of changes in diagnostic criteria, improved awareness and recognition, study methodology, and earlier age of diagnosis, rather than a true significant increase in incidence (Lai et al., 2013; Ministries of Health and Education, 2016). However, this remains undetermined, and a true increase in prevalence cannot be ruled out.

Male predominance is a consistent epidemiological finding in ASD research. The DSM-5 states that ASD is diagnosed four times more frequently in males than in females (APA, 2013). However, females with ASD are suspected to be greatly under-diagnosed and misdiagnosed, and there is evidence to suggest that the diagnostic criteria of ASD are gender-biased (Haney, 2016). In other respects, there is no evidence to suggest prevalence should vary according to geographic location, ethnicity or socioeconomic factors, though the ability to detect possible impacts is hindered by a lack of comprehensive datasets from low-income countries (Masi et al., 2017).

**Risk Factors**

When ASD was first described in Kanner's (1943) paper, followed closely by Asperger's (1944) paper, it was suggested that ASD was caused by mothers being too cold and distant with their children (Goodall, 2013). However, recent research has proven that autistic children are born with neurological differences, showing that the brains of neonates who later receive the diagnosis of ASD are different from those of typically developing neonates, indicating that the core neurological features of ASD develop during gestation and perinatally (Goodall, 2013).

Meta-analyses of epidemiological studies examining the link between potential risk factors and ASD analysed prenatal, perinatal, and neonatal factors. The prenatal factors identified as associated with ASD risk were advanced parental age at birth (both paternal and maternal age),

maternal prenatal medication use, gestational bleeding, gestational diabetes, and being firstborn (Guinchat et al., 2012; Gardner et al., 2009; Wang, Geng, Liu and Zhang, 2017).

Predominant perinatal risk factors were pre-term birth, breech presentation, caesarean section, and prolonged labour (Guinchat et al., 2012; Wang et al., 2017). Neonatal risk factors identified were low Apgar scores, neonatal encephalopathy, hyperbilirubinemia, birth defect, low birthweight, and baby being small for gestational age (Guinchat et al., 2012; Wang et al., 2017). While studies have identified various risk factors, there is insufficient evidence that any single factor causes ASD (Gardner, Spiegelman & Buka, 2009; Lai et al., 2013).

**Co-Morbidity**

As well as the defining deficits experienced by people with ASD, there are often co-occurring difficulties, many of which are also chronic and debilitating (Matson & Goldin, 2013). An estimated 70% of individuals with ASD have a comorbid condition, while 40% may have two or more (as cited in Lai et al., 2013; APA, 2013). Comorbid disorders can be challenging physical, psychiatric, intellectual, developmental, and behavioural conditions (Matson & Goldin, 2013).

Common co-morbid physical conditions include epilepsy, sleep disorders, gastrointestinal issues, and autoimmune disease, highlighting the importance of medical examinations for those identified as having ASD (Matson & Goldin, 2013). Behavioural challenges that individuals with ASD could potentially experience include aggression, self-injurious behaviours, suicidal ideations, pica, and disruptive behaviour (Matson & Goldin, 2013; Lai et al., 2013).

Co-morbid psychiatric conditions common in individuals with ASD include anxiety, depression, schizophrenia, obsessive compulsive disorder, eating disorders, and oppositional defiant disorder (Matson & Goldin, 2013; Lai et al., 2013; Leyfer et al., 2006). Individuals with ASD can also have co-morbid attention-deficit/hyperactivity disorder (ADHD) (Matson & Goldin, 2013; Lai

et al., 2013). Previous diagnostic criteria stipulated that individuals could not have co-morbid ADHD and ASD. However, the DSM-5 states that when criteria for both disorders are met, both diagnoses should be given (APA, 2013). As a result of this diagnostic change, recent prevalence data has revealed rates of ADHD in ASD individuals to be over 50%, making it one of the most likely co-morbid conditions (Matson & Goldin, 2013; Leyfer et al., 2006).

Individuals diagnosed with ASD may also experience cognitive and intellectual disabilities, such as low IQ and language disorders. Low IQ has long been studied as a common feature of individuals with ASD and as a potential predictor and indicator of the condition (Bishop, Farmer & Thurm, 2015). Previous investigations into the prevalence of intellectual disability in children with ASD have produced varying prevalence rates of 55% to 75% (Bertrand et al., 2000; Chakrabarti & Fombonne, 2005; Schalock et al., 2007; Yeargin-Allsopp et al., 2003; as cited in Charman et al., 2011). The most recent investigations have found that approximately half of individuals with ASD have an intellectual disability and fewer than 20% have a moderate to severe disability (Charman et al., 2011).

It is also estimated that half of all individuals with ASD are functionally non-verbal (Leyfer et al., 2006) Alongside these communication difficulties, individuals with ASD have issues in complex information processing, central coherence, and executive functioning (Leyfer et al., 2006). These challenges combined with communication difficulties make it difficult for individuals with ASD to understand and describe their mental states and experiences and express emotion, especially negative emotion, appropriately (Leyfer et al., 2006; Lydon et al., 2015).

Anxiety is commonly reported as the highest comorbid condition in individuals with ASD, with prevalence ranging from 42% to 56% (as cited by Lai et al., 2013). Several investigations into anxiety conditions in individuals with ASD have found specific phobia to be the most common (Mayes et al., 2013; Leyfer et al., 2006).

## Fears and Phobias

Fear is an unpleasant yet necessary emotion that leads organisms to avoid and respond to threats (Marks, 1987). Fear is produced by the perception of danger and is a natural response in appropriate situations (Marks,1987). Experiencing fear and learning to cope with the subsequent emotions is part of typical development; however, if fears and related coping strategies do not develop in a typical manner they can become maladaptive and challenging (Lydon et al., 2015; Evans, Canavera, Kleinpeter, Maccubbin, & Taga, 2005). Any consistent fear that is unrealistic and out of proportion to the danger of a situation is a phobia (Marks, 1987). Explanation or reasoning can not reduce phobias; they are involuntary, irrational, and lead to avoidance of the feared stimulus and to anxiety in anticipation of encountering the feared situation or related stimuli (Marks, 1987).

Marks (1987) identifies and outlines the main defence strategies exhibited when an individual is threatened and fearful. These include withdrawal, such as flight, escape and avoidance from the feared stimulus context; immobility or "freezing up" and being unable to move away; aggressive defence, such as threatening and attacking the stimulus; and deflection of attack and appeasement (e.g. becoming submissive) (Marks, 1987).

According to Lang (1968), the fear response has cognitive, behavioural, emotional and physiological dimensions which can all occur simultaneously in the presence of a feared stimulus (as cited in Lydon et al., 2015). Cognitive reactions include false perceptions of danger, such as the belief that the stimulus poses a greater threat than it does in reality (Lydon et al., 2015). Fear expressed through behavioural reactions could be wincing, crying, shaking, and escape and avoidance behaviours (e.g., running away) (Lydon et al., 2015). Emotional reactions include apprehension/anticipation of catastrophe, harm, injury, shame, and being overwhelmed and unable to cope. The physiological impacts can include activation of the autonomic nervous system

(resulting in increased heart rate, blood pressure and skin conductance) and activation of the limbic-hypothalamic-pituitary-adrenal axis (release of the stress hormone cortisol) (Lydon et al., 2015).

According to the DSM-5 (APA, 2013), individuals must meet the following criteria to receive a diagnosis of a specific phobia.

(1) The individual must experience intense or severe fear or anxiety about a specific object or situation (APA, 2013).

(2) The specific phobic object or situation must provoke immediate fear or anxiety almost every time the individual comes into contact with the stimulus (APA, 2013).

(3) The individual actively avoids or endures the phobic stimulus with intense fear (APA, 2013).

(4) The fear or anxiety is disproportionate to the actual danger posed by the specific object or situation and to the individual's sociocultural context (APA, 2013).

(5) The fear, anxiety or avoidance reactions and behaviours are persistent, and last for six months or more (APA, 2013).

(6) The fear or anxiety must cause clinically significant distress or impairment to social, occupational or other important areas of functioning (APA, 2013).

(7) Symptoms cannot be better explained by another mental disorder, e.g. posttraumatic stress disorder (APA, 2013).

The DSM-5 reports the prevalence of specific phobia in adults in the USA to be approximately 7% - 9%, with rates of 6% reported in European countries, and lower rates reported in Asian, African, and Latin American countries (2% – 4%) (APA, 2013). The most recent investigations report adult prevalence rates as 7.4% and lifetime prevalence rates of 5.5%, with both rates higher in females (9.8% and 7.7%) than males (4.9% and 3.3%) (Wardenaar et al., 2017). The prevalence rates in children are approximately 5% to 16% for 13 to 17-year-olds (APA, 2013).

World health surveys show a lifetime prevalence of 10.9% for specific phobias in Aotearoa New Zealand (Wardennar et al., 2017). These prevalence rates make specific phobias one of the most prevalent and chronic psychological disorders (Lydon et al., 2015; LeBeau et al., 2010; Kessler, Chiu, Demler & Walters, 2005).

Specific phobias are specified based on phobic stimulus features, namely animal (e.g. dogs), natural environment (e.g. heights), blood-injection-injury (e.g. needles), situational (e.g. elevators), or other (e.g. loud sounds) (APA, 2013). Animal phobia is one of the most prevalent specific phobias with lifetime prevalence estimates ranging from 3.3 - 7% (LeBeau et al., 2010). Collation of world health survey data shows specific phobia of animals as having the highest cross-national lifetime prevalence at 3.8%, and a 5% lifetime prevalence of animal fear in Aotearoa New Zealand (Wardenaar et al., 2017). Of those who seek treatment for specific animal phobia, 36% have a phobia of dogs or cats (Rentz, Powers, Smits, Cougle & Telch, 2003).

Fear of dogs (or cynophobia) can result in significant life impairment, especially in a country, such as Aotearoa New Zealand, where dogs are the second most popular pet with nearly 700,000 registered dogs (New Zealand Companion Animal Council, 2016) in a human population of approximately 4.5 million. Given the omnipresence of dogs, a fear of these animals could be detrimental to the daily lives of individuals who experience significant distress at their presence.

**ASD and Phobias**

As noted above, research investigating fears and phobias show that they are significantly more prevalent among children with ASD than among typically developing and developmentally disabled peers (Lydon et al., 2015; Evans et al., 2005). Specific phobia incidence among children with ASD is typically high and varies from 31% (Sukhodolsky et al., 2008), 34% (Mattila et al., 2010), 44% (Leyfer et al., 2006) and as much as 64% (Muris et al., 1998) (as cited in Mayes et al., 2013). In comparison, specific phobias among children in the general population range from 5%

(Ollendick et al., 2002), 9% (Lichtenstein & Annas, 2000), to 18% (Muris & Merckelbach, 2000) (as cited in Mayes et al., 2013).

A greater correlation between fears, phobias and challenging behaviours has been identified in children with ASD compared to typically developing and developmentally disabled peers (Evans et al., 2005). As well as the "traditional" shared presentations of anxiety symptoms, such as sweating, increased heart rate, shaking, avoidance, escape, and distraction, fearful individuals may display challenging behaviours specific to their ASD (Kerns et al., 2015). In the presence of a feared stimulus, individuals with ASD may experience changes to repetitive or ritualistic behaviours and sensory behaviours, increases in socially inappropriate behaviours, and increases in challenging behaviours, such as self-injury, aggression, and property destruction (Lydon et al., 2015; Kerns et al., 2015).

**Treating Phobias in Autistic Children**

The interventions used to treat typically developing children for fears and phobias (see Kendall, Furr, & Podell, 2010 for a recent review) are not necessarily appropriate for children with ASD. Lydon et al. (2015) conducted a review of the treatments of fears and phobia in children with ASD. The 16 studies reviewed investigated a variety of interventions including exposure, contingent reinforcement, reinforced practice, systematic desensitisation, parent training, cognitive-behavioural therapy [CBT], social stories, response blocking, and modelling (Lydon et al., 2015). All the studies reported a reduction, or elimination, of the fear or phobia being targeted (Lydon et al., 2015).

In addition, all 12 studies that reported challenging behaviours in the presence of a feared stimulus reported a decrease in, or elimination of, these challenging behaviours as a result of intervention (Lydon et al., 2015). In conclusion, based on criteria outlined by Chambless and Hollon (1998) (as cited by Lydon et al., 2015), treatments such as reinforcement procedures,

modelling, and exposure can be considered empirically supported for the treatment of fears and phobias among people with ASD (Lydon et al., 2015).

**Modelling**

A significant proportion of human learning occurs through the observation of others (Mazur, 2017). Modelling, or observational learning, was first introduced as a behavioural intervention technique by Albert Bandura as part of his work on social learning theory (Bandura, 1971; Bellini & Akullian, 2007). Bandura defined observational learning as the cognitive and behavioural change that occurs as a consequence of observing others engage in similar actions (Corbett & Abdullah, 2005). As developed by Bandura, modelling involved an interaction of some kind between two individuals; the model possessed the capacity to perform a particular action and did so on at least one occasion, while the second individual, the observer (or learner) did not currently possess the capacity to perform the action but was able to observe the model's performance (Bandura, 1971). After watching the model, the observer then also performed the action with some degree of fidelity (Bandura, 1971). Bandura's research demonstrated the profound impact that modelling has on the development of children and advocated the use of modelling procedures to modify unwanted behaviours (Bellini & Akullian, 2007; McLeod, 2014).

Modelling has been identified as an empirically supported treatment of fears and phobias, and as an intervention procedure is a powerful tool for learning new, and improving already developed, behaviours (Lydon et al., 2015; Nikopoulos & Keenan, 2006). The process of using modelling to change challenging behaviours involves the correct behaviour being demonstrated for the learner who first observes and later replicates the model's actions. This newly-performed behaviour then eventually replaces the observer's previously incorrect/unwanted/inappropriate

behaviour (Nikopoulos & Keenan, 2006). As Bandura (1971) and Dowrick (1999) stress observational learning can often take place independent of any reinforcement.

The main ways a model can influence an observer are to facilitate responses that the observer already knows how to perform, or the observer may learn to produce completely new behaviours, or undesired behaviours/responses (e.g. fear reactions) can be reduced or eliminated (Mazur, 2017).

To investigate the modelling of aggression, Bandura, Ross and Ross (1961) expanded their research to see whether children would imitate film-mediated aggressive models. Initial research by Bandura and colleagues (Bandura, Ross & Ross, 1961) involved in vivo modelling with live models. Subsequent research investigated if film-mediated models were as effective as live models and whether film-mediated human models or non-human cartoon characters were effective as models (Bandura et al., 1961; Hart, Scholar, Kristonis, & Alumnus, 2006). This research demonstrated that the modality of the model had little effect on the outcomes of observational learning (Bandura et al., 1961; Hart et al., 2006).

Due to Bandura's work and the resulting widespread research into observational learning, modelling is now considered one of the major tools available to behaviour therapists (Mazur, 2017). Advantages of modelling are that it is a natural method of learning that occurs regularly in everyday life (Nikopoulos & Keenan, 2006); it can be used with young children and individuals who have difficulty understanding instructions or interpreting situations (Mazur, 2017); it is a form of rapid learning, meaning it takes little time for effects to occur;  and observers will imitate behaviours with or without a separate reward being experienced by the observer/learner (Bellini & Akullian, 2007). Modelled behaviours can be presented in vivo (live), via video (filmed), or imagined (Corbett & Abdullah, 2005). The realistic nature of modelling may mean better generalisation to real-world

scenarios, and observers may perform behaviours in settings other than where the new behaviour was originally observed (Bellini & Akullian, 2007; Mazur, 2017; Nikopoulos & Keenan, 2006).

There are four mediating processes that Bandura's (1986) theory identifies: attention, retention, reproduction, and motivation (Corbett & Abdullah, 2005; McLeod, 2016). The attentional process refers to the intake of sensory stimuli and specific focus on a task or event; the extent to which we are exposed to and notice behaviour (Corbett & Abdullah, 2005; McLeod, 2016). People observe a multitude of behaviours daily; a behaviour, therefore, needs to grab our attention to be imitated (McLeod, 2016). If a person does not attend to a model they will not be able to imitate the model's behaviour (Bellini & Akullian, 2007). Bandura found that children are most likely to attend to a model that they perceive as competent and who are similar to themselves in some way; since children are likely to attend closely to any representation of themselves, the best model would, therefore, be a copy of the observer with a change in perceived ability or behaviour (Bellini & Akullian, 2007; Dowrick, 1999).

Retention is how well an observed behaviour is remembered; the observer must not only recognise the behaviour but also be able to recall it at a later time (Corbett & Abdullah, 2005; McLeod, 2016). Retention occurs when the modelled behaviours are effectively remembered (Corbett & Abdullah, 2005; McLeod, 2016). The retention of material, such as specific behaviours, is improved through concurrent visual monitoring, cognitive rehearsal, and behavioural reproduction (Corbett & Abdullah, 2005).

Production is the ability to perform the behaviour that has been observed; that is, the observer must possess the cognitive and motor capacity to reproduce the topography of the observed response or a functionally equivalent form of it (Corbett & Abdullah, 2005; McLeod, 2016).

Lastly, motivation refers to the observer's desire to perform the behaviour (McLeod, 2016). Whether an individual will choose to imitate a behaviour is highly dependent upon the likelihood of that behaviour resulting in a desired outcome (Corbett & Abdullah, 2005). A behaviour has a greater chance of being imitated if it is seen as being reinforced either externally, vicariously, or via self-produced reinforcement (Corbett & Abdullah, 2005; McLeod, 2016).

Self-efficacy is an important concept that ties in closely with behaviour change and observational learning, and plays an important role in modelling interventions. Self-efficacy was defined by Bandura (1994) as "people's beliefs about their capabilities to produce designated levels of performance that exercise influence over events that affect their lives. Self-efficacy beliefs determine how people feel, think, motivate themselves and behave." (p. 2, as cited in Bellini & Akullian, 2007). Bandura also stated that self-efficacy can be gained through external support and encouragement, and in particular through observation of a person's own successes (Bellini & Akullian, 2007). An observer's level of self-efficacy with regard to the performance of the observed behaviour will modulate the degree of observational learning demonstrated. Some of the factors known to facilitate observational learning (e.g., seeing the model rewarded) may influence observational learning by changing the observer's self-efficacy, as will what they experience when first attempting to imitate (Bandura, 1994).

**Video Self Modelling**

Early research had shown video modelling to be an effective intervention; in which the models featured in these videos were different from the observer (Dowrick, 1999). This early research also showed that model and observer similarity (gender, age, etc.) tended to facilitate learning (Kazdin, 1974). The most likely individuals to be similar to an observer are their peers:

peer modelling. However, the largest degree of model and observer similarity is achieved when the model and the observer are the same individual: self modelling (Dowrick, 2012a).

The pioneering study of self modelling was by Creer and Miklich (1970), who investigated modifying inappropriate social behaviour in a 10-year-old asthmatic boy (Dowrick, 1999). Creer and Miklich (1970) noted a lack of an appropriate modelling video for the child's specific situation, and that the presence of natural peer models in the hospital had not induced change. Consequently, they created a video in which the young boy role-played himself. Their reports showed that although role-playing the appropriate behaviour had no effect on the boy's behaviour, viewing the role-play video did (Creer & Miklich, 1970). The study became one of the first of its kind in the literature to use the term 'self modeling' (Dowrick, 1999).

Similarly, Hosford (1980) developed an approach dubbed 'self-as-a-model', through work in the behavioural counselling of adults (Dowrick, 1999). Hosford (1980) focused on exploring the similarity between the model and the observer and its contribution to behavioural interventions, and concluded that the self would be the ultimate in similarity and therefore the most powerful model (Hitchcock, Dowrick & Prater, 2003). It was due to this early research that terms such as 'self-as-a-model' and 'self modeling' began to appear increasingly in behavioural intervention literature, and further investigation into self modelling began.

Self modelling implements behaviour change through observation of oneself as the model performing model behaviours (Dowrick, 1991). Self modelling can be implemented through imaginal self modelling, mental rehearsal, cognitive self modelling, photographical/pictorial series, self-in-print, bibliographical self modelling, audio self modelling, role-play, and in-vivo modelling (Dowrick, 1999; Dowrick, 2012b; Hitchcock et al., 2003).

The most common way to implement self modelling is by videos called video self modelling (VSM) (Dowrick, 2012a). VSM is modelling that uses the individual as the model and allows them

to imitate targeted behaviours by observing him/herself successfully performing the desired behaviour through the medium of edited videos, where the editing often involves the synthesis of a modelled behaviour that is not currently part of the individual's repertoire (Dowrick, 2012a). This technique involves the (often synthetic) demonstration of desired behaviours by the participant which when captured on video as short vignettes, may be repeatedly viewed by and eventually imitated by the participant (Bellini & Akullian, 2007; Dowrick, 1999).

The use of VSM as a behavioural intervention strategy was initially slow to progress due to the complexity and expense of the technology required to make and edit videos, but technological advances in video recording, audio, editing software, and computing equipment over the last 40 years has created opportunities for people to observe themselves in ways that were previously impossible (Dowrick, 2012a; Nikopoulos & Keenan, 2006). These advances in capability, availability, and affordability have contributed to a considerable rise in the amount of VSM research appearing in the literature (Dowrick 2012a).

VSM has been used across multiple disciplines to teach a variety of skills including motor skills, social skills, relationship development, communication, self-monitoring, functional skills, vocational skills, emotional regulation, and athletic performance (Bellini & Akullian, 2007; Dowrick, 2012b). VSM as a treatment procedure has been effective in a range of situations including with typically developing children, individuals with developmental disabilities, adults who are mentally disabled and those of typical abilities, patients with various mental illnesses, parents, and children with ASD (Bellini & Akullian, 2007; Nikopoulos & Keenan, 2006).

**Feedforward and Positive Self-Review**

Most recently VSM and self modelling have been further developed by researchers, such as Dowrick, who has expanded these modelling theories into modern applications and

implementations that are widely used and respected behavioural intervention techniques. Dowrick is a key researcher in the development of self modelling and VSM, and he introduced several new approaches and concepts including feedforward and positive self-review (PSR) (Hitchcock et al., 2003).

Most VSM is produced by first maximising the individual's performance as they attempt a target skill (usually through incentives and rehearsals) so a best performance can be captured on film. Then errors are edited out along with other distracting footage (Dowrick, 1999). This results in a short video of desired behavioural responses as fine-tuned examples of the best performance the individual has been able to produce (Dowrick, 1999). This procedure of capturing images of an individual successfully completing the desired behaviour, and then reminding them of their abilities through having them watch the video, is called positive self-review (PSR) (Dowrick, 1999). PSR is the procedure of revisiting the best examples of past performance; it improves the rate of a behaviour that is below a desired level, whether the behaviour has not yet reached that level or has failed to be maintained at such a level, acting in the latter instance as an *aide memoire* (Dowrick, 1999; Hitchcock et al., 2003).

By comparison VSM can also be used to depict a skill not yet acquired, or a skill not previously performed in a particular setting. This form of VSM is labelled feedforward (Dowrick, 1999; Dowrick 2012b). Feedforward VSM often requires editing of footage to make it appear as if the individual is performing a behaviour in an advanced manner, i.e. synthesising a novel performance (Dowrick, 1999; Dowrick, 2012a). It usually involves component skills already within the individual's ability, but in editing the components are re-arranged in a new sequence to give the appearance of a complete, finished skill (Dowrick, 1999). Feedforward allows an individual to see how they could be performing; it provides images of a 'future self' completing the desired behaviour (Dowrick, 1999; Dowrick 2012a).

PSR vs. feedforward can be described as re-constructive vs. constructive: "PSR re-constructs an achieved, exemplary behaviour, presumably in need of strengthening; Feedforward constructs a previously unachieved but possible future, or target, behaviour" (Dowrick, 1999, p. 26).

**Video Modelling and ASD**

Video modelling is an effective intervention strategy for individuals with ASD to address social, communication, functional, and behavioural problems (Bellini & Akullian, 2007; Delano, 2007). Video modelling is an important tool that effectively promotes skill acquisition to individuals with ASD (Bellini & Akullian, 2007; Delano, 2007).

Individuals with ASD appear to respond positively to video modelling due to the way the technique is uniquely suited to certain characteristics, namely significant language deficits, difficulty attending to relevant information, and social interaction challenges (Delano, 2007). Video modelling is an effective intervention for ASD individuals because it reduces attentional and language demands, eliminates (at least during the core learning moments) the need for social interaction, and is primarily visual (Delano, 2007). Also, through editing, irrelevant/distracting stimuli can be removed; this helps those individuals with ASD who exhibit over-selective attention and attend to irrelevant details in the environment, making it easier for them to focus on the skill or behaviour being exhibited (Bellini & Akullian, 2007).

It has also been suggested that children with ASD have strengths in processing visual rather than verbal material and attend more closely to video models as opposed to live models (Bellini & Akullian, 2007; Corbett & Abdullah, 2005). This could be due to the anxiety and stress experienced in the social interactions accompanying many teaching situations, which in turn could be impacting their ability to attend to the task the live model is teaching (Bellini & Akullian, 2007; Corbett & Abdullah, 2005). There is also evidence of increased motivation for individuals with ASD to watch

video models, as it is suggested that watching videos is a highly preferred activity for children with ASD (Bellini & Akullian, 2007; Corbett & Abdullah, 2005). This preference for watching videos has been shown to lead to increased motivation, self-efficacy and attention to the video contents, and these effects can be enhanced by the portrayal of positive and successful behaviours (Bellini & Akullian, 2007; Corbett & Abdullah, 2005).

A further advantage for ASD individuals is that video modelling is a relatively brief intervention strategy; it typically takes a small number of sessions, and the videos are usually short (Bellini & Akullian, 2007). Furthermore, video modelling may lead to faster acquisition of skills, which are acquired and maintained over time, and there may be greater generalisability with learnt behaviours successfully transferring across settings (Bellini & Akullian, 2007; Corbett & Abdullah, 2005). The combination of a powerful learning modality, video cued instruction with a well-studied intervention strategy, and modelling, makes video modelling and VSM highly impactful tools for individuals with ASD (Bellini & Akullian, 2007).

Video modelling has been used with success as an intervention for multiple issues facing children with ASD. This includes studies of anti-bullying (Rex, Charlop & Spector, 2018), toilet training (Lee, Anderson & Moore, 2014; McLay, Carnett, van der Meer & Lang, 2015), pretend play and play skills (MacDonald, Sacramone, Mansfield, Wiltz, & Ahearn, 2009; Jung & Sainato, 2015; Lee, Lo & Lo, 2017), social interaction and communication skills (Alzyoudi, Sartawi & Almuhuri, 2015; Charlop, Dennis, Carpenter & Greenberg, 2010), picture exchange communication systems (PECS) (Smith, Hand & Dowrick, 2014), functional skills and daily living skills (Meister & Salls, 2015), and behavioural functioning (Coyle & Cole, 2004). Video modelling is an effective intervention strategy for individuals with ASD to address social, communication, functional, and behavioural problems, but little research has investigated video modelling and the treatment of fears in children with ASD.

## Video Modelling and Treatment of Fears, Phobias and Anxieties

Video modelling has previously successfully been used as an intervention to treat fears, phobias and anxieties. To document existing research, a literature search using search terms relevant to video modelling as a treatment of fears, phobias or anxieties was conducted through the databases: PsycARTICLES, PsycINFO, Google Scholar, and the University of Canterbury Library Catalogue. Key search terms included 'video modelling' AND 'fear' OR 'phobia' OR 'anxiety'. Studies were included if they targeted a fear, phobia or anxiety of some kind, and the primary intervention used was video modelling. Table 1 displays the relevant research resulting from this literature search.

*Table 1: Using Video Modelling as a Treatment for Fear/Phobia/Anxiety*

| Author | Participants | Fear/Phobia/ Anxiety; Setting | Measures | Treatment | Results |
|---|---|---|---|---|---|
| Al-Namankany, Petrie & Ashley (2015) | 80 children aged 8 to 16 years | Dentally Anxious, fear of nasal mask; a dental clinic | The Abeer Children Dental Anxiety Scale, and the Visual Analogue Scale (VAS). | A modelling video of a young girl visiting the dentist and undergoing the procedure. | Children in the modelling video group had significantly less anxiety than those in the control group during the dental procedure and during the administration of the nasal mask. |
| Al-Namankany, Petrie & Ashley (2014) | 180 children aged 6 to 12 years old. | Dentally Anxious, fear of needles; a dental clinic | The Abeer Children Dental Anxiety Scale, and the VAS. | A modelling video of a young girl visiting the dentist | Children in the modelling video group had significantly less anxiety than those in the control |

| | | | | | |
|---|---|---|---|---|---|
| | | | | and undergoing the procedure. | group during the dental procedure and during the administration of the injection. |
| Andronico (2016) | 2 female children aged 7 years old | Mild to moderate dental anxiety; a dental clinic | The Children's Fear Survey Schedule-Dental Subscale, Heart rate, Behavioural Avoidance Test (BAT) | VSM of the participants coping with visiting the dentist. | Both children's anxiety levels during dental procedures decreased. BAT scores were lower for one participant. Heart rate did not change. |
| Bandura, Grusec and Menlove (1967) | 48 dog phobic children aged between 3 and 5 years | Marked fear of dogs; testing room | BAT | Peer modelling | Modelling group had stable and generalised reduction in avoidance behaviour towards dogs. |

| | | | | | |
|---|---|---|---|---|---|
| Bandura and Menlove (1968) | 48 dog phobic children aged between 3 and 5 years | Marked fear of dogs; testing room | BAT | Peer modelling with single models, peer modelling with multiple models. | Both single model and multi-model groups experienced significant reductions in avoidance behaviours. The multi-model treatment reduced fear enough to perform potentially threatening interactions with dogs. |
| Gilchrist (2013) | 10 high school students (3 male, 7 female) aged 16 to 18 years. | Public Speaking Anxiety; high school classroom | The Personal Report of Public Speaking Anxiety, Self-Statements During Public Speaking, Behavioural | VSM of the participants successfully speaking publicly | All participants decreased their level of behavioural anxiety. Seven participants decreased their level of self-reported speech anxiety, and six reported |

| | | | | | |
|---|---|---|---|---|---|
| | | | Assessment of Speech Anxiety, Heart Rate (4 students). | | more positive thoughts about public speaking. There was a decrease in heart rate for two students. |
| Hood (2004) | 16 participants aged 19 to 38 years. | Spider Phobic; university laboratory. | Watts and Sharrock Spider Phobia Questionnaire, Spider Phobic Beliefs Questionnaire, Hospital Anxiety and Depression Scale, the Generalised Self-Efficacy Scale, | VSMs or video peer models of the participants coping well during spider encounters | Self-efficacy level and strength were increased more after self modelling than peer modelling. Self modelling participants showed the most clinically significant improvement in avoidance. Self modelling participants showed more reductions in phobic |

| | | | | | |
|---|---|---|---|---|---|
| | | | Specific Self-Efficacy Inventory, Heart Rate, BAT. | | beliefs and self-reported symptoms. |
| Isong et al., (2014) | 80 children aged 7 to 17 years old with a diagnosis of ASD | Dental Fear; dental clinic | Venham Anxiety and Behaviour Scales, Heart Rate | Video peer model of typically developed child undergoing dental procedures, favourite movie via video goggles, video peer modelling plus video goggles | Anxiety and behaviour scores decreased significantly for participants in the video goggles and the peer modelling/video goggles group. The peer modelling group did not experience significantly reduced anxiety or behaviour scores. |

| | | | | | |
|---|---|---|---|---|---|
| Kruger (2013) | 2 female psychology undergraduate students. | Public Speaking Anxiety | The Personal Report of Confidence as a Speaker, Direct observation, Subjective Unit of Discomfort Scale | VSM of the participants successfully speaking publicly | VSM did not reduce the subjective perception of public speaking anxiety; there was no change in either of the participants. |
| Ladouceur (1983) | 36 participants aged 21 to 62 years. | Phobic to dogs or cats | BAT, self-efficacy rating, anxiety rating | Participant modelling alone, Participant modelling with self-instructional training, Participant modelling with self-verbalisations | All three peer modelling treatments produced substantial improvements in BAT. |

| | | | | | |
|---|---|---|---|---|---|
| Mullholland (2015) | 3 children aged 11 to 12 years with a diagnosis of ASD | Phobia of a dog, tissues, electric beater; local park, participants homes | The Fear Survey Schedule for Children – Revised, Questions About Behavioural Function, BAT, VAS | VSMs of the participants coping with their feared stimulus. | Two participants improved their BAT scores, and one participant reduced their levels of reported fear. |
| Swney (2013) | 3 children aged 7 to 13 years old. | Fear of dogs; participants at local park or beach. | Dog Scenario Questionnaire, Dog Scenario Scale, Dog Behaviour and Safety Quiz. | VSMs of the participants in the same environment as dogs. Dog behaviour and safety book. | An overall decrease in reported fear levels in two of the participants. The VSM in conjunction with the book had positive effects on participants' fear levels and knowledge about dog behaviour. |

As Table 1 indicates, 12 studies involving a wide range of participants were identified as using video modelling as the primary intervention to treat a fear, phobia or anxiety. Overall, the majority of findings from the studies indicate that video modelling was a successful intervention for reducing the participants' fears. In studies that used a combination of VSM and another form of video modelling, the VSM intervention was more successful in reducing fear. In studies that used a combination of VSM and another type of intervention, video modelling was the more successful intervention in reducing fear. The measure used most commonly across this literature is the Behavioural Avoidance Test (BAT), though it is frequently used in conjunction with other scales, such as self-efficacy scales and relevant questionnaires.

When the terms 'Autism' OR 'Autism Spectrum Disorder' OR 'ASD' were added to the key search terms used to search the databases only two relevant studies were found: Mulholland (2015) and Isong et al. (2014).

Isong et al. (2014) addressed dental fear in children with ASD using a combination of video peer modelling and video goggles. The eighty participants were children identified as having ASD, aged between 7 and 17 years, and having a history of dental fear. Participants were required to attend two dental visits where their anxiety and behaviour were measured on the Venham Anxiety and Behaviour Scales. After their first visit the children were assigned to one of the four treatment groups; (A) control, (B) video peer modelling (watched a DVD with a typically developed child undergoing a dental visit), (C) video goggles (goggles that played a favourite movie during the dental visit), and (D) video peer modelling and video goggles.

The results show that between dental visits the mean anxiety and behaviour scores decreased statistically significantly for participants in groups C and D. There were no significant changes for groups A and B, meaning that the video peer modelling alone had no

impact on anxiety or behaviour. The changes within the peer modelling and goggles group (D) could have potentially occurred due to the use of the video goggles alone. However, the researchers only requested that participants watch the peer model video once at home and once in the waiting room before their second dental visit. Between these viewings, participants could watch the video as many times as they liked. This resulted in participants watching the video between 1 and 5 times. This small number of video viewings could have impacted the effectiveness of the treatment since a meta-analysis by Bellini and Akullian (2007) found median treatment length to be nine and a half sessions. However, Isong et al. (2014) found that the participants in group D, who watched their peer video model more than once had lower mean scores, suggesting that perhaps video peer modelling was having an impact on anxiety and behaviour levels.

The main difference in this study in comparison to other studies that have successfully used video peer modelling (Ladouceur, 1983; Bandura, Grusec and Menlove, 1967; Al-Namankany, Petrie & Ashley, 2015; Al-Namankany, Petrie & Ashley, 2014) is the involvement of children with ASD. It could be that individuals with ASD do not attend to images of peers due to an avoidance of social interactions, or perhaps they attend more closely to images of themselves for this reason. Further investigation into the use of peer modelling versus self modelling to treat fears, phobias, and anxieties in children with ASD is needed.

Mullholland (2015) investigated VSM as a treatment approach for decreasing fears in children with ASD. The three participants had a formal diagnosis of ASD, were aged between 11 and 12 years, and had a fear or phobia of a common object (dog, tissues, egg beater). A BAT hierarchy was used along with a Visual Analogue Scale (VAS) to measure participants' fear. Two of the three participants increased the number of steps achieved in their BAT hierarchy, suggesting that fear levels had been reduced. One participant reported lower levels

of fear on the self-reported VAS ; however, the second participant was variable (the third participant was unable to complete the study). The high variation in the results makes it difficult to report effects from this treatment. The small number of participants, variations in their abilities and skills, reliance on parent reporting, lack of measures during intervention administration, and the closeness in time of the two follow-up measures are all limitations of Mulholland (2015). High levels of variability are common in research involving individuals with ASD and potentially reflects the underlying diversity of these individuals.

**Aim of This Research**

Reasonably extensive literature supports the use of video modelling to reduce fears, phobias and anxieties, and separately supports the use of video modelling to target desired skills in individuals with ASD. However, there is little research bringing these findings together, therefore, this study proposed to investigate whether video modelling might be an effective treatment for reducing fears in children with ASD. The aim of this research is to measure the effects of video modelling (peer and self) as an intervention for fear of dogs in children with ASD. The overall aim is to reduce fear of dogs and increase knowledge about dog behaviour and dog safety. It is important, that while fear of dogs is reduced, participants knowledge of dog behaviour and safety practices is increased. Thus, participants will know how and when it is safe and appropriate to approach and interact with a dog.

The following research questions were investigated:

1. Can video self modelling and video peer modelling reduce dog fear in children with ASD?
2. Can video self modelling and video peer modelling improve knowledge of dog behaviour and dog safety in children with ASD?

These research questions were addressed within the framework of single-case research, while investigating these questions at the individual level.

# Method

## Design

The study consisted of two single-case experiments: one pair of participants experienced an A-B sequence of phases design wherein a baseline period (A) was followed by an intervention (B); and a second pair of participants experienced a A-B-C sequence, where baseline period (A) was followed by an intervention (B) which was then followed by a second intervention (C) when the first was ineffective/less effective than desired.

## Ethical Considerations

Prior to recruiting participants, ethical approval was obtained from the University of Canterbury Human Ethics Committee (Appendix A); this included Altogether Autism New Zealand reviewing the planned study and suggested changes being incorporated. Participants were recruited using a poster advertisement (Appendix B). Any interested parties were given a parental information sheet (Appendix C) and a children's information booklet (Appendix D). On agreement to participate, participants' parents gave informed consent (Appendix E), and participants gave informed assent (Appendix F). Participants' parents were required to be present at all phases of the study for interpretation and safety reasons. Participants' names have been replaced to ensure anonymity.

The main ethical concern for this study was the exposure of the participants to dogs; firstly because of physical safety of the participants from the dogs and the potential for the participants to hurt themselves as part of the fear response, and secondly because of the emotional stress this exposure would place on the participants. For this reason, all dogs were under the control of professional dog handlers, and exposure sessions were conducted in safe locations. Dog handlers, Heather Laanbroek and Shinneal Van Kampen of DOG-abled, and Jo Moody of Hawera Dog Training Association, have given consent for their names to be

used in this thesis. Locations for sessions were open spaces where other dogs were prohibited, and access to main roads was restricted.

**Recruitment and Informed Consent**

Recruitment of participants occurred over a two-month period. The recruitment poster was displayed on the Facebook pages of Autism NZ, Altogether Autism, Autism Aotearoa, Parent to Parent, Autism in NZ, and NZ ASD Friendly Page. Physical copies were also circulated at the Child Adolescent and Family Mental Health Services and Explore Specialist Services. Copies were also emailed to several Christchurch schools and Dog training companies.

Inclusion criteria such as age range, diagnosis, fears, and verbal ability were included on the poster. Interested parties were able to respond to the advertisement by either emailing or phoning the researcher. Once potential participants or their parents had expressed interest in taking part, the researcher sent information sheets, consent and assent forms, and an eligibility questionnaire (Appendix G) via either email or mail. The eligibility questionnaire was completed by participants' parents and included questions about participants' ASD diagnosis, fear of dogs, previous/current interventions, and availability.

**Participants**

Four participants were included in this study: 3 males and 1 female, aged between 8 and 17, all of whom had a formal diagnosis of ASD, diagnosed by a paediatrician. They all reported, along with their parents, that they were afraid of dogs. Various settings were used in the study, and these are described with each participant below. All participants watched their intervention videos at home.

**Participant One** was an 8-year-old female with a diagnosis of high functioning ASD. Participant One had no communication difficulties. Her mother reported that Participant One had been afraid of dogs since the age of 2 and that there was no specific incident that they

were aware of that started this fear. A typical reaction from Participant One when exposed to a dog was trying to back away from the dog and needing to know if the dog could get to her, sometimes accompanied by screams if a dog came close. Her Mum highlighted that dogs off the lead were particularly difficult for Participant One. Participants One's fear made it difficult to walk to the local pools or go to the local beach as she was scared she would see a dog. Participant One had never been treated for dog fear but did sometimes attempt to use deep breathing as a coping technique.

The setting for Participant One's BAT sessions and video-model recording was the local park near to her house and the pools. The sessions were conducted close to the playground where other dogs were unlikely to be seen due to restricted dog access, and away from the road. The dogs used for her BAT sessions were two large bearded collies (Ted and Ginny) who were handled by Jo of the Hawera Dog Training Association.

**Participant Two** was a 11-year-old male with a diagnosis of high functioning ASD and co-morbid Generalised Anxiety Disorder. He was prescribed Melatonin (Many) to help sleep and has recently discontinued taking Fluoxetine (Prozac). He has no communication difficulties. His mother reported that he has always been afraid of dogs and that there was no specific event that started this fear. A typical reaction from Participant Two when exposed to a dog was to either freeze in place or run away; if a dog was on a lead and controlled he would physically move away. His Mum highlighted that a more severe reaction occurred when a dog is pulling or jumping or is off the lead. Participant Two's fear meant that they actively avoided places where dogs might be, which made it difficult to visit his Aunt's house because they have a poodle. Participant Two became very stressed several hours before visiting and extremely stressed during the visit, and the dog owners felt they had to lock the dog away. He had participated in workshops to help anxiety and breathing, but his mother reported that these had little effect on his fight or flight reactions to dogs.

The setting for Participant Two's BAT sessions and video was the local school field. The field and school were restricted to other dogs and away from busy roads. The dogs used were a Miniature Schnauzer (Portia), Golden Retriever (Millie), and a Fox Terrier (Charlie Brown). All three dogs were provided by and handled by Shinneal from DOG-abled.

**Participant Three** was a 17-year-old male with a diagnosis of ASD. He was prescribed Clonidine (Catapres) and Fluoxetine (Prozac). He had communication difficulties. His mother reported that he had been afraid of dogs since the age of 4 when the family moved into his grandmother's house which had a Shih Tzu poodle which was territorial and would bark, bite and nip. A typical reaction to dogs from Participant Three was that he would move or walk away from the dog, and if a dog came too close, he would shout "help" or make other echolalic utterances, and high-pitched mumbling. Participant Three's fear reaction made it difficult to visit family and friends who have dogs as he can move really fast to escape making him unsafe in those situations and requiring his mother to leave her other children to chase after him. He had not previously been treated for dog fear.

The setting for Participant Three's BAT sessions and video-model recording was the lawn of a local library/recreation centre. The lawn was restricted to other dogs and was away from the road. The dogs used were a Miniature Schnauzer (Mo), Labrador (Django), and a Bull Mastiff Cross (Dyson). All three dogs were provided by and handled by Heather from DOG-abled.

**Participant Four** was a 12-year-old male with a diagnosis of ASD and language processing problems. His mother reported that he has always been afraid and could not identify a specific triggering event. A typical reaction to dogs from Participant Four was that he would give dogs a wide berth when walking past them, and he would also cross his arms and say "stand like a tree". If a dog rushed up to him, he might have kicked out if he had not had time to get away. It was difficult for Participant Four to visit people's houses who have

dogs and his mother often ended up asking for the dogs to be hidden, they also actively avoided off-leash areas of parks. Participant Four had taken part in the DOG-abled programme to help reduce dog fear; there he learnt to cross his arms and "stand like a tree".

The setting for Participants Four's BAT sessions and video-model recording was the lawn of a local library/recreation centre. The lawn was restricted to other dogs and was away from the road. The dogs used were a Miniature Schnauzer (Mo), Labrador (Django), and Bull Mastiff Cross (Dyson). All three dogs were provided by and handled by Heather from DOG-abled.

**Materials and Equipment**

**Video Equipment.** A Panasonic SDR-H85 SD/HDD digital hand-held camcorder and tripod was used for filming the BAT sessions. A Samsung Galaxy Note 5 16MP camera was used for filming of the video models. All video footage was downloaded onto a Microsoft Windows computer, and the video-model scenes were edited on Windows Movie Maker®. Video-models were uploaded to DropBox® and participants watched on home computers.

**Dog Trainers and Dogs.** A variety of dogs were used due to availability, variation, and participant locations. The BAT sessions for Participant One, Two and Three involved dogs provided and handled by DOG-abled;

> *DOG-abled is an organisation established to provide safe dog experiences for children with physical, emotional, behavioural or intellectual challenges or vulnerabilities…visits are run in conjunction with support from parents, teachers, and/or caregivers to offer audience appropriate experiences with a focus on pet therapy, animal companionship and animal assisted learning*. (DOG-abled Facebook Page).

DOG-abled handlers, Heather Laanbroek and Shinneal Van Kampen, provided two Miniature Schnauzers (Portia and Mo), a Labrador (Django), a Bull Mastiff Cross (Dyson), a Fox Terrier (Charlie Brown), and a Golden Retriever (Millie).

Participant Four's BAT sessions involved two bearded collies (Ted and Ginny) provided and handled by Jo Moody of the Hawera Dog Training Association. Hawera Dog Training Association runs obedience training and agility classes, as well as holding a number of events throughout the year.

Footage of the dogs described above was available for use in all the participants' videos alongside additional footage captured of a German Sheppard and a Border Collie owned by acquaintances of the researcher. Stock footage was used of behaviours that were too difficult or dangerous to obtain (such as a snapping, angry dog).

**Dog Behaviour and Safety Book.** At the end of this research, a book donated to the study by DOG-abled on dog behaviour and safety was provided to each of the participants. The book '*I Will Not Growl; Dog Safety For Little Kid*s' by Pauline Blomfield (2017) consists of simple rhymes and illustrations to teach children to be safe around dogs. This book was given to all four participants to ensure that they all had the opportunity to learn about dog safety even if the research intervention failed. It should be noted that Participant Four received the book before the end of the research, but all other participants were given it at the very end to avoid interference.

## Measures

**Eligibility/Parent Questionnaire.** (Appendix G). The Eligibility/Parent Questionnaire was distributed to the parents of participants that asked questions regarding their child's diagnosis, fear of dogs, typical fear reactions, impacts of fear on daily life, previous treatments, and current coping techniques, as well as availability for BAT sessions.

**Dog Behaviour and Dog Safety Questionnaire.** (Appendix H). The first half of this questionnaire was the dog behaviour section; it consisted of 9 images of dogs displaying various behaviours. Participants were asked to circle the happy/playful dogs and cross out the upset/angry dogs. This part of the questionnaire measures a participant's knowledge of dog behaviours and their ability to identify these behaviours.

The second half of this questionnaire was the dog safety section; this consisted of 5 multiple choice questions related to dog safety, such as *What should you do if a dog you don't know or do not like comes running up to you? A. Run away as fast as you can. B. Try to hit it. C. Stand tall like a tree with crossed arms, face away, and arms down*. This section measures a participant's knowledge of dog safety and whether they know what the correct course of action is in these scenarios. This section was also presented in a visual-based format (Appendix I) to cater for participants who would benefit from picture based questions.

**Dog Scenario Questionnaire.** The Dog Scenario Questionnaire (Appendix J) was a 9-item questionnaire that asked participants to rate their fear of hypothetical scenarios involving dogs. The concept of this questionnaire is based on Swney's (2013) Dog Scenario Questionnaire which was originally developed from the Dog Phobia Questionnaire by Hong and Zinbarg (as cited in Swney, 2013). For this research, the questionnaire was adapted based on what the participants all identified as dog scenarios which scare them and included scenarios, such as 'when I think about going to the park with Mum and seeing a dog off the lead I feel ….'. Participants were asked to rate these scenarios on the Dog Scenario Scale.

It became clear during the baseline sessions that Participants One, Three and Four would not be able to complete this measure. Participants Three and Four struggled with the hypothetical imagining that was required for this task; Participant One stated several times that she did not want to choose any of the "sad faces" from the Dog Scenario Scale.

Participant Two successfully completed the Dog Scenario Questionnaire each session, and his results can be found in Appendix P.

**Dog Scenario Scale.** A VAS called the Dog Scenario Scale (Appendix K) was based on Swney's (2013) Dog Scenario Scale, which in turn was based on Hong and Zinbarg's work (as cited in Swney, 2013). It ranged from one (not scared at all) to five (extremely scared). It was designed to be used by participants to indicate how they feel in the scenarios in the Dog Scenario Questionnaire and at each stage of the BAT.

**Behavioural Avoidance Test (BAT).** (Appendix L). The BAT was used to behaviourally measure a participant's avoidance of the feared stimulus. It measured how close the participant allowed the dog to approach before they asked for the approach to stop. A fear hierarchy was developed, and a mark of completion was awarded for each completed step in the hierarchy. Three hierarchies were presented to all participants: (1) dog on the lead hierarchy, followed by (2) the same hierarchy with a dog off the lead, followed by (3) the dog barking and any additional steps (with the dog on the leash again). Participants Two and Four had 3 additional steps added to the third section of their hierarchy as they showed desire to interact more closely with dogs (Participant One also had Step 16 added to her hierarchy).

Hierarchy One:

1. Dog 50m away on lead
2. Dog 40m away on lead
3. Dog 30m away on lead
4. Dog 20m away on lead
5. Dog 10m away on lead
6. Dog standing beside on lead
7. Patting dog on lead

Hierarchy Two:

8. Dog 50m away off lead
9. Dog 40m away off lead
10. Dog 30m away off lead
11. Dog 20m away off lead
12. Dog 10m away off lead
13. Dog standing beside off lead
14. Patting dog off lead

Hierarchy Three:

15. Dog Barking
16. Feed dog treat on ground
17. Feed dog treat from hand
18. Sit next to dog

Each participant was also asked to rate each step of the fear hierarchy on the Dog Scenario Scale. Ideally this would provide a measure of emotional response to each step of the hierarchy; however, three of the four participants could not complete this task due to a reluctance to pick unhappy faces and a lack of comprehension of the task. Participant Two was the only participant to complete the emotional response section of the fear hierarchy; his results can be found in Appendix P.

**Video Diary Sheet.** A recording sheet (Appendix M) was used by parents to keep track of how often they watched the videos, and they noted any significant events that may have happened during the intervention.

**Parent Follow-Up Questionnaire.** The Parent Follow Up Questionnaire (Appendix N) was a six-question questionnaire that asked the participant's parents questions about the use of VSM to treat dog fear in their children and whether they were satisfied with the results

of the study. The questionnaire was distributed through SurveyMonkey®, and all responses were confidential and anonymous.

## Procedure

The following procedures were completed with each of the four participants. Once parents had expressed interest in having their child participate, consent and assent forms were sent out and returned signed. Then the Eligibility/Parent questionnaire was sent out via email or mail (depending on preference). Next the availability of the participants in conjunction with the availability of the dogs was confirmed, and a location to meet the researcher and conduct the sessions was agreed upon.

**Baseline Phase.** The baseline phase consisted of each participant completing three baseline sessions over three days. Each baseline session was video recorded. The researcher met the participant and their parent in the chosen location. Each session began with the researcher explaining to the participant and their parent what would be happening during the session. Then participants completed the Dog Behaviour and Dog Safety Questionnaire, and (when able) the Dog Scenario Questionnaire. Then any filming for the video-models was conducted (this is described in more detail in the Video-Model Filming section).

Next, participants were told that a dog and its handler were going to stand 50m away (researcher pointed to a close by object for clarity, e.g. at the end of the path). It was explained to each participant that the dog would get slowly closer and that they could ask for it to stop at any point. They were also provided with the option of a cardboard STOP sign which could be used to indicate they wanted the dog to stop if they did not feel they could speak out. Parents were also advised that they could ask for the sessions to be stopped if they felt their child was becoming too stressed.

Once the dog and handler were in position, and the participant was ready, the BAT started. The dog and handler moved gradually forward stopping at each step of the hierarchy. Participants were given a pass mark for each hierarchy step they successfully completed, and they were also asked to rate their emotions on the Dog Scenario Scale. The researcher also made notes of any significant body language and behaviour around the dogs. Once the BAT was finished, the researcher, handler, participant and parents discussed what would be best for the next session and any modifications that needed to happen.

Each participant completed the baseline session three times. A variety of dogs was used throughout for each participant. As noted above, it became clear during the baseline sessions that the sections requiring participants to indicate their emotional state (the Dog Scenario Questionnaire and self-reported fear levels during the BAT) were too difficult for Participants One, Three and Four. Therefore, these measures were not included in further sessions for these participants. Participant Two did complete these measures (Appendix P).

**Video-Model Filming.** The footage required for the participants' part of the video was captured at the beginning of each baseline session without the dogs present. The structure of the video-model and its content was planned and discussed with participants, and their parents and any suggestions were incorporated. Each participant was asked to stand in front of the camera and repeat phrases such as "dog is happy" and "dog is sad". They were also asked to act out scenarios, such as walking across the field towards the camera, stopping and standing like a tree, and repeating phrases such as "dog on a lead it's okay".

Separately from the participants, the researcher captured corresponding footage of the dogs. This footage consisted of the dogs the participants had met during baseline sessions as well as additional dogs. These dogs acted out the other half of the scenarios that the participants had, dog acting happy, dog walking across field on lead towards camera etc. Once all footage was captured, the videos of the participants and dogs were edited together

using Movie Maker to make it look as though they were filmed together and were successfully interacting. A full description of each participant's video is provided in Appendix O.

**Intervention – Phase One.** Approximately two weeks after the baseline sessions had been completed, participants were given their video-models to view at home. Videos were distributed via DropBox® and participants watched them on their home computers. Participants One and Two received a VSM, while Participants Three and Four received a peer-model video (Participants Three and Four acted as each other's peer models). Participants' parents were given a video diary sheet and asked to note the number of times the video was viewed. Each participant viewed their video between 7 and 10 times over the 10-day intervention phase one period. After each viewing, participants completed the Dog Behaviour and Dog Safety Questionnaire.

**Post Intervention – Phase One.** The first post-intervention phase was conducted immediately after the 10 day intervention window to measure the effect of the intervention. Each participant and their parent met the researcher again for a single follow up session. Once again the participant completed the Dog Behaviour and Dog Safety Questionnaire, and then the BAT. Participants were given a pass mark for each hierarchy step they successfully completed. The researcher also made notes of any significant body language and behaviour around the dogs.

The researcher, participants, and parents then discussed the results of the measures in comparison to the baseline results. It was decided that three of the four participants needed new video-models; Participants Three and Four had originally been given peer-models and would now be given VSMs (due to the lack of positive change seen in intervention phase one), while Participant One would receive another more specific VSM. Any additional filming needed for these videos was completed during this session.

**Intervention Phase – Two.** Approximately one week after post-intervention phase one sessions had been completed, participants were given their new video-models to view at home as before. Participants Three and Four received a VSM, while Participant One received a new VSM. Again, participants' parents were given a video diary sheet and asked to note the number of times the video was viewed. Each participant viewed their second video 10 times over the 10-day intervention phase two period. After each viewing, participants completed the Dog Behaviour and Dog Safety Questionnaire. Participant Two did not receive a second video as his results indicated his VSM had worked to the full extent. Instead, he was not exposed to any further intervention but was tested for the maintenance of his reduced fear.

**Post Intervention – Phase Two.** The second post-intervention phase was conducted immediately after the 10-day intervention phase two was completed to measure the effect of the second intervention and the maintenance of Participant Two's reduced fear. Each participant and their parent met the researcher again for a single follow-up session where each participant completed the Dog Behaviour and Dog Safety Questionnaire, and then the BAT. Each participant was then gifted the Dog Behaviour and Safety Book; *I Will Not Growl*.

**Parent Follow-Up Questionnaire.** Following the completion of the research, participants' parents were emailed the Parent Follow-Up Questionnaire.

**Participant Videos**. The videos created for each participant are described in detail in Appendix O.

## Results

All four participants completed this study; they all completed the required BAT sessions and answered all the Dog Behaviour and Dog Safety Questionnaire requirements at each testing and viewing session. However, only Participant Two was able to use the Dog Scenario Scale to report his emotional response during the BAT and to complete the Dog Scenario Questionnaire. For this reason, the measures of emotional response during the BAT and the Dog Scenario Questionnaire have been excluded, and Participant Two's results for these measures can be seen in Appendix (P).

The results for the BAT measure are presented first, followed by the Dog Behaviour and Dog Safety Questionnaire results, and lastly the Parent Follow-Up Questionnaire results. The BAT results for all participants are first presented in the form of modified Brinley plots (Blampied, 2017) displaying BAT steps achieved on the leash (Figure 1) and off the leash (Figure 2). Then individual participant BAT results are presented in table format where a tick indicates the participant completed that step in their BAT hierarchy. The results of the Dog Behaviour and Dog Safety Questionnaire are presented in line graphs, and the Parent Follow-Up Questionnaire results are presented in bar graph form.

### BAT Results

Modified Brinley plots are a type of scatter plot that compares individual participant scores on the dependent variable (the average BAT score from the baseline phases) with the same dependent variable but from different phases (the BAT score from post-intervention one and post-intervention two) (Blampied, 2017). The diagonal (45°) represents no change over time; the further from the diagonal the result is the more improved or deteriorated an individual is from the baseline average (Blampied, 2017). The BAT scores have been

converted into percentages because the number of possible hierarchy steps varied between participants: percentages allow these BAT hierarchies to be plotted together and compared.

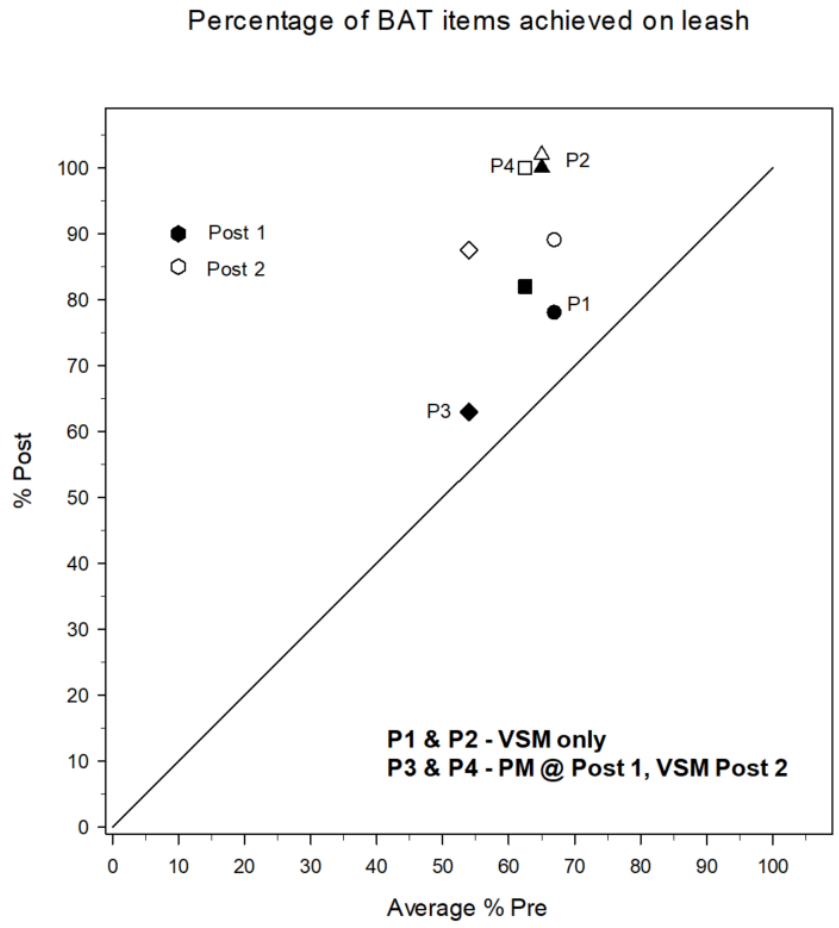


***Figure 1: Percentage of BAT hierarchy steps achieved with dog on the lead for each participant. Post intervention one and two scores are plotted against the average baseline scores***.

Figure 1 shows that for the dog on a leash BAT scores, all four participants experienced some increase from average baseline score at post-intervention phase one. All four participants showed increases from the average baseline score at post-intervention phase two. Three of the four participants showed increases from the post-intervention phase one to post-intervention phase two; the remaining participant did not show an increase between

these stages due to having achieved 100% at both intervention phases. Thus there was no change.

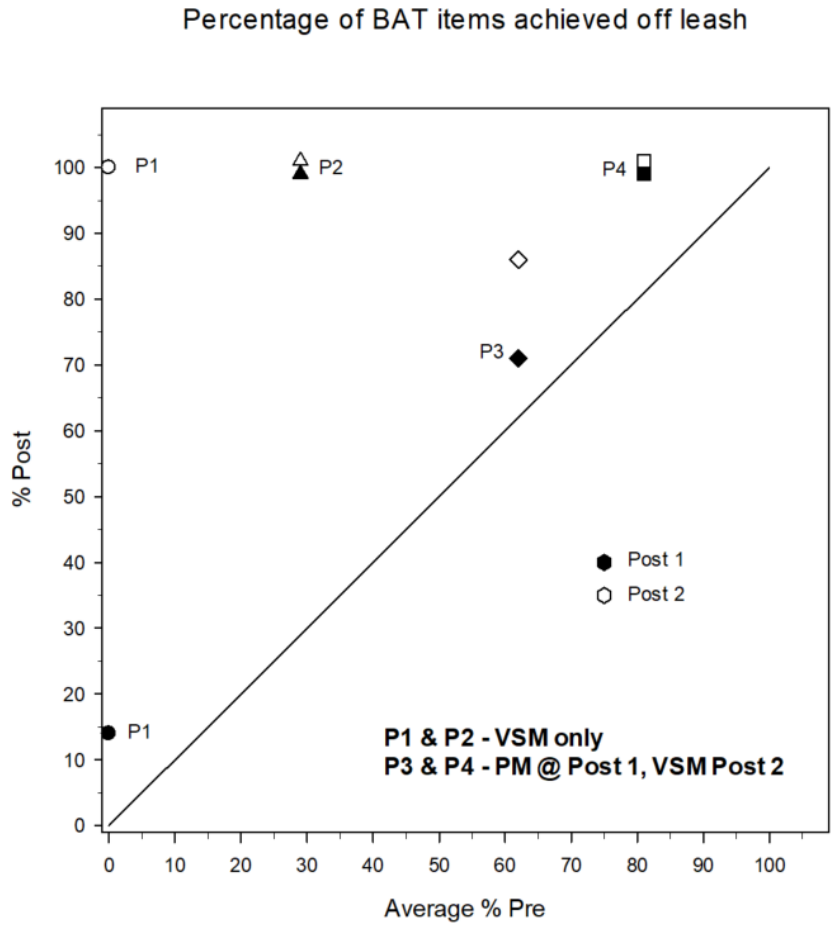


***Figure 2: Percentage of BAT hierarchy steps achieved with dog off the lead for each participant. Post intervention one and two scores are plotted against the average baseline scores***.

Figure 2 shows that for the BAT dog off a leash scores, all participants experienced an increase from average baseline score at post-intervention phase one. All four participants also showed increases from the average baseline score at post-intervention phase two. Two of the four participants showed increases from post-intervention phase one to post-intervention phase two; the remaining two participants did not show an increase between these stages due to having achieved 100% at both intervention phases. The results are discussed separately for each participant below.

## Participant One BAT Results

***Table 2: Participant One BAT Dog On A Lead***

| | Hierarchy Step | Baseline 1 | Baseline 2 | Baseline 3 | Post-Intervention 1 | Post-Intervention 2 |
|---|---|---|---|---|---|---|
| 1 | 50m | ✓ | ✓ | ✓ | ✓ | ✓ |
| 2 | 40m | ✓ | ✓ | ✓ | ✓ | ✓ |
| 3 | 30m | ✓ | ✓ | ✓ | ✓ | ✓ |
| 4 | 20m | ✓ | ✓ | ✓ | ✓ | ✓ |
| 5 | 10m | ✓ | ✓ | ✓ | ✓ | ✓ |
| 6 | Standing Beside | - | - | - | ✓ | ✓ |
| 7 | Patting Dog | ✓ | ✓ | ✓ | ✓ | ✓ |
| 8 | Dog Barking | - | - | - | - | ✓ |
| 9 | Feed Treat | - | - | - | - | - |

Table 2 shows the results of the BAT measure for Participant One at the three baseline sessions and the two post-intervention phases when the dog had a lead on. During baseline sessions Participant One was able to complete six of the nine steps in her hierarchy. Participant One stopped the measure when she was asked to stand beside the dog and instead chose to pat the dog by reaching over from a distance. After intervention phase one, where she watched a VSM of her coping with dogs; Participant One was able to complete seven steps of the hierarchy, including standing beside the dog. After intervention phase two, in which Participant One received a new VSM, she was able to complete eight of the nine steps and stopped the measure only when she was asked to feed the dog a treat. Figure 1 displays the improvement from post-intervention one where she completed 78% of the hierarchy, to post-intervention two where she completed 89%, in contrast to her average baseline score of 67%. Participant One watched her VSM 10 times during the respective intervention periods.

***Table 3: Participant One BAT Dog Off A Lead***

| | Hierarchy Step | Baseline 1 | Baseline 2 | Baseline 3 | Post-Intervention 1 | Post-Intervention 2 |
|---|---|---|---|---|---|---|
| 1 | 50m | - | - | - | ✓ | ✓ |
| 2 | 40m | - | - | - | - | ✓ |
| 3 | 30m | - | - | - | - | ✓ |
| 4 | 20m | - | - | - | - | ✓ |
| 5 | 10m | - | - | - | - | ✓ |
| 6 | Standing Beside | - | - | - | - | ✓ |
| 7 | Patting Dog | - | - | - | - | ✓ |

Table 3 shows the results of the BAT measure for Participant One at the three baseline sessions and the two post-intervention phases with the dog off the lead. Participant One did not complete any of the 7 steps in her hierarchy during the three baseline sessions as she stopped the measure as soon as taking the dog off the lead was mentioned. After watching her first VSM, Participant One was able to complete one step in her hierarchy before stopping the measure. After receiving a second VSM targeted specifically at her fear of dogs off the lead, Participant One successfully completed all seven steps of her hierarchy during post-intervention phase two. This increase in achieved hierarchy steps can be seen in Figure 2 where Participant One's post-intervention phase one score of 14% sits close to her average baseline score of 0%, in contrast to her post-intervention phase two score of 100%.

**Participant Two BAT Results**

Table 4 displays the results of the BAT for Participant Two at baseline and post-intervention phases when the dog was on a lead. Participant Two's baseline results vary to quite a substantial degree (note that different dogs were used during the baseline sessions).

For his first baseline session, Participant Two successfully completed nine of the eleven hierarchy steps

***Table 4: Participant Two BAT Dog On A Lead***

| | Hierarchy Step | Baseline 1 | Baseline 2 | Baseline 3 | Post-Intervention 1 | Post-Intervention 2 |
|---|---|---|---|---|---|---|
| 1 | 50m | ✓ | ✓ | ✓ | ✓ | ✓ |
| 2 | 40m | ✓ | ✓ | ✓ | ✓ | ✓ |
| 3 | 30m | ✓ | ✓ | ✓ | ✓ | ✓ |
| 4 | 20m | ✓ | ✓ | ✓ | ✓ | ✓ |
| 5 | 10m | ✓ | - | ✓ | ✓ | ✓ |
| 6 | Standing Beside | - | - | ✓ | ✓ | ✓ |
| 7 | Patting Dog | ✓ | - | ✓ | ✓ | ✓ |
| 8 | Dog Barking | ✓ | - | - | ✓ | ✓ |
| 9 | Feed Treat Ground | ✓ | - | ✓ | ✓ | ✓ |
| 10 | Feed Treat Hand | - | - | - | ✓ | ✓ |
| 11 | Sit Beside | ✓ | - | - | ✓ | ✓ |

However, in baseline session two the participant stopped the measure when the dog was 20m away and so only completed four steps of the hierarchy. In baseline session three Participant Two completed eight of the eleven steps and did not want to hear the dog bark, sit beside the dog, or feed the dog a treat from his hand. After watching his VSM, Participant Two completed all eleven steps in his hierarchy during the post-intervention one test. This participant did not receive a second VSM due to the success of the first one and instead did not watch any videos during intervention phase two. When tested in the post-intervention phase two, Participant Two successfully completed all eleven steps of his hierarchy again. Participants Two's score of 100% from both follow-up sessions can be seen in Figure 1,

which displays the results in comparison to the average score of 64% from his baseline sessions. Participant Two watched his VSM nine times during intervention phase one.

***Table 5: Participant Two BAT Dog Off A Lead***

| | Hierarchy Step | Baseline 1 | Baseline 2 | Baseline 3 | Post-Intervention 1 | Post-Intervention 2 |
|---|---|---|---|---|---|---|
| 1 | 50m | ✓ | - | - | ✓ | ✓ |
| 2 | 40m | ✓ | - | - | ✓ | ✓ |
| 3 | 30m | ✓ | - | - | ✓ | ✓ |
| 4 | 20m | ✓ | - | - | ✓ | ✓ |
| 5 | 10m | ✓ | - | - | ✓ | ✓ |
| 6 | Standing Beside | - | - | - | ✓ | ✓ |
| 7 | Patting Dog | ✓ | - | - | ✓ | ✓ |

The results for Participant Two's BAT with a dog off the lead are displayed in Table 5. Participant Two successfully completed six out of seven hierarchy steps during the first baseline session. However, during the two remaining baseline sessions, Participant Two did not complete any of the seven steps as he stopped the measure as soon as it was suggested that the dog be off the lead. After watching his VSM during intervention phase one, Participant Two successfully completed all seven steps of his hierarchy in post-intervention one. After intervention phase two, in which he did not receive any intervention, Participant Two also successfully completed all seven steps in post-intervention two. Figure 2 shows that Participant Two's post-intervention one and post-intervention two scores of 100% are a large change from his baseline average of 29%.

**Participant Three BAT Results**

Table 6 shows the results of the BAT measure for Participant Three during the baseline and post-intervention sessions with a dog on the lead. During the first baseline session, Participant Three completed five of the eight hierarchy steps before stopping the test when asked to stand beside the dog. In the following two baseline sessions, he completed

four of the eight steps before stopping when the dog was 20m away. Participant Three then received a peer modelling video which he watched seven times during intervention phase one. When undergoing the BAT again in post-intervention one he completed five of the eight hierarchy steps; he stopped when asked to stand beside the dog. Participant Three then received a VSM which he watched ten times during intervention phase two. During post-intervention two, he was able to complete seven of the eight BAT steps. Figure 1 shows the increase in steps achieved in post-intervention one, 63%, and post-intervention two, 87.5%, as well as the contrast to the average baseline score of 54%.

***Table 6: Participant Three BAT Dog On A Lead***

| | Hierarchy Step | Baseline 1 | Baseline 2 | Baseline 3 | Post-Intervention 1 | Post-Intervention 2 |
|---|---|---|---|---|---|---|
| 1 | 50m | ✓ | ✓ | ✓ | ✓ | ✓ |
| 2 | 40m | ✓ | ✓ | ✓ | ✓ | ✓ |
| 3 | 30m | ✓ | ✓ | ✓ | ✓ | ✓ |
| 4 | 20m | ✓ | ✓ | ✓ | ✓ | ✓ |
| 5 | 10m | ✓ | - | - | ✓ | ✓ |
| 6 | Standing Beside | - | - | - | - | ✓ |
| 7 | Patting Dog | - | - | - | - | ✓ |
| 8 | Dog Barking | - | - | - | - | - |

Table 7 shows the results of the BAT measure for Participant Three during the three baseline and two post-intervention sessions with a dog off the lead. During baseline session one, Participant Three completed five of the seven hierarchy steps before stopping when asked to stand beside the dog off the lead. In the next two baseline sessions, he completed four of the seven steps before stopping when the dog was 20m away. Following the peer-model intervention, Participant Three completed five of the seven hierarchy steps; he stopped when asked to stand beside the dog off the lead. After receiving a VSM during intervention

phase two he was able to complete seven of the eight BAT steps in post-intervention follow up two. Figure 2 shows the slight change from the average baseline score of 62%, to post-intervention one score of 71%, as well as the slightly larger change to a post-intervention two score of 86%.

***Table 7: Participant Three BAT Dog Off A Lead***

| | Hierarchy Step | Baseline 1 | Baseline 2 | Baseline 3 | Post-Intervention 1 | Post-Intervention 2 |
|---|---|---|---|---|---|---|
| 1 | 50m | ✓ | ✓ | ✓ | ✓ | ✓ |
| 2 | 40m | ✓ | ✓ | ✓ | ✓ | ✓ |
| 3 | 30m | ✓ | ✓ | ✓ | ✓ | ✓ |
| 4 | 20m | ✓ | ✓ | ✓ | ✓ | ✓ |
| 5 | 10m | ✓ | - | - | ✓ | ✓ |
| 6 | Standing Beside | - | - | - | - | ✓ |
| 7 | Patting Dog | - | - | - | - | - |

## Participant Four BAT Results

***Table 8: Participant Four BAT Dog On A Lead***

| | Hierarchy Step | Baseline 1 | Baseline 2 | Baseline 3 | Post-Intervention 1 | Post-Intervention 2 |
|---|---|---|---|---|---|---|
| 1 | 50m | ✓ | ✓ | ✓ | ✓ | ✓ |
| 2 | 40m | ✓ | ✓ | ✓ | ✓ | ✓ |
| 3 | 30m | ✓ | ✓ | ✓ | ✓ | ✓ |
| 4 | 20m | ✓ | ✓ | ✓ | ✓ | ✓ |
| 5 | 10m | ✓ | ✓ | ✓ | ✓ | ✓ |
| 6 | Standing Beside | ✓ | ✓ | ✓ | ✓ | ✓ |
| 7 | Patting Dog | ✓ | ✓ | ✓ | ✓ | ✓ |
| 8 | Dog Barking | - | - | - | ✓ | ✓ |
| 9 | Feed Treat Ground | - | - | - | ✓ | ✓ |
| 10 | Feed Treat Hand | - | - | - | - | ✓ |
| 11 | Sit Beside | - | - | - | - | ✓ |

Participant Four's BAT dog on a lead results are shown in Table 8. Participant Four successfully completed seven of eleven steps in all three baseline sessions. Participant Four then received a peer modelling video which he watched seven times during intervention phase one. When undergoing the BAT in post-intervention one, he completed nine of the eleven hierarchy steps; he stopped the test when asked to feed the dog a treat from his hand. Participant Four then received a VSM which he watched ten times during intervention phase two. During post-intervention two, he was able to complete all eleven BAT steps. Figure 1 shows the increase in steps achieved from post-intervention one, 82%, to post-intervention two, 100%, as well as the contrast to the average baseline score of 64%.

***Table 9: Participant Four BAT Dog Off A Lead***

| | Hierarchy Step | Baseline 1 | Baseline 2 | Baseline 3 | Post-Intervention 1 | Post-Intervention 2 |
|---|---|---|---|---|---|---|
| 1 | 50m | ✓ | ✓ | ✓ | ✓ | ✓ |
| 2 | 40m | ✓ | ✓ | ✓ | ✓ | ✓ |
| 3 | 30m | ✓ | ✓ | ✓ | ✓ | ✓ |
| 4 | 20m | ✓ | ✓ | ✓ | ✓ | ✓ |
| 5 | 10m | ✓ | ✓ | ✓ | ✓ | ✓ |
| 6 | Standing Beside | ✓ | - | - | ✓ | ✓ |
| 7 | Patting Dog | ✓ | - | - | ✓ | ✓ |

Table 9 shows the results for the BAT measure with Dog off a lead for Participant Four. During baseline session one, Participant Four completed all seven steps of the hierarchy. In the following two baseline sessions, he completed five of the seven steps; he stopped when asked to stand beside the dog off the lead. After watching the peer model video during intervention one, he was able to complete all seven hierarchy steps during post-intervention one. After watching the VSM during intervention two, he completed all seven hierarchy steps during post-intervention two. Figure 2 shows the increase in steps achieved in post-intervention one and two, 100%, compared to the average baseline score of 81%.

## Dog Behaviour and Dog Safety Questionnaire Results

The following figures display the results from the Dog Behaviour and Dog Safety Questionnaire. The results from the Dog Behaviour section are presented first, followed by the Dog Safety results. The results are displayed in two groups: those who received self models (Participant One and Participant Two) and those who received a peer model and then a self model (Participant Three and Participant Four).

## Participant One and Two Dog Behaviour Results

Participant One and Participant Two's Dog Behaviour Questionnaire results are displayed in Figure 3. Participant One showed stable levels of dog behaviour knowledge at baseline and for the majority of the intervention but had improved consistently by an increase of two correct answers at the end of the VSM intervention. This result was maintained at post-intervention phase two. Participant Two consistently answered all of the Dog Behaviour Questionnaire questions correctly and did not deteriorate at all during the two post-intervention phases.

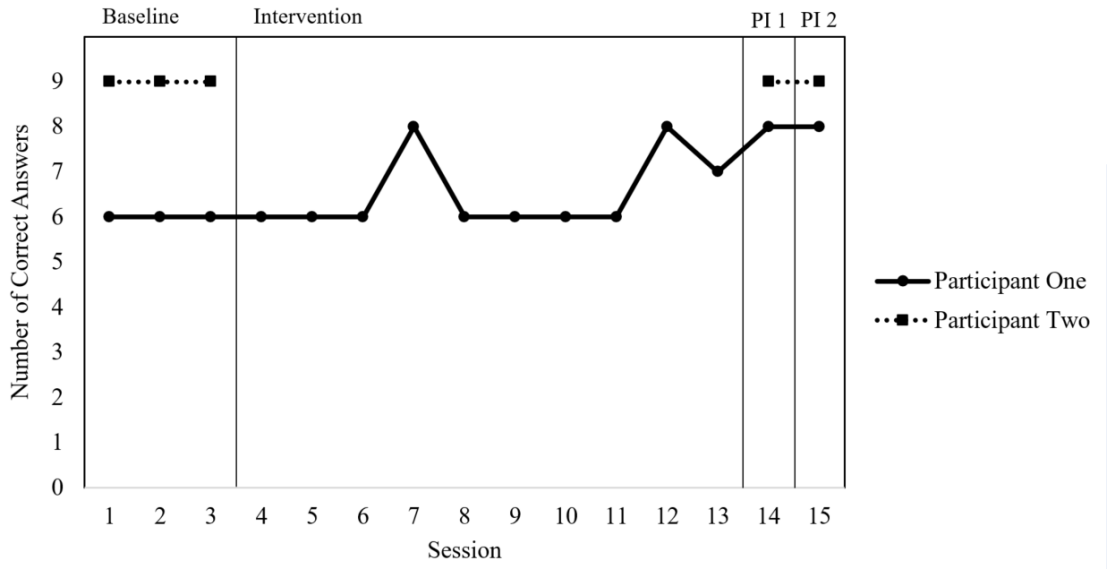


***Figure 3: Dog Behaviour Questionnaire Results for VSM Participants. (PI 1 - post-intervention phase one, PI 2 - post-intervention phase two).***

## Participant Three and Four Dog Behaviour Results

The Dog Behaviour Questionnaire results for Participants Three and Four are displayed in Figure 4. Participant Three consistently answered the majority of the Dog Behaviour Questionnaire questions correctly and briefly deteriorated during post-intervention phase one before returning to answering the majority correctly. Participant Four consistently answered five of the nine questions correctly on the Dog Behaviour Questionnaire and did not deviate at all during the two post-intervention phases.

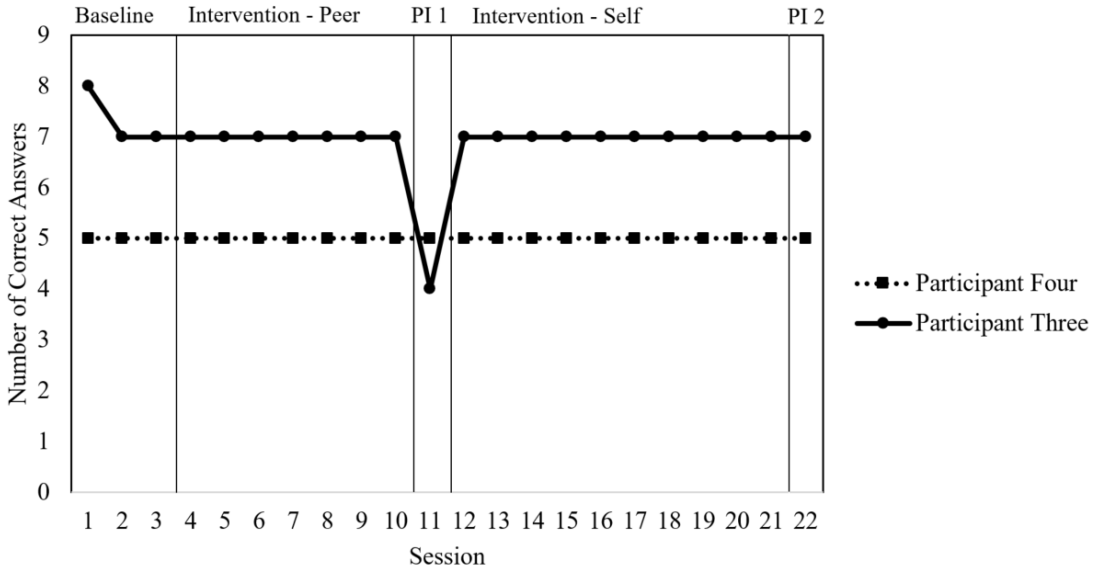


***Figure 4: Dog Behaviour Questionnaire Results for peer model then VSM Participants. (PI 1 - post-intervention phase one, PI 2 - post-intervention phase two).***

## Participants One and Two's Dog Safety Results

The results from the dog safety section of the Dog Behaviour and Dog Safety Questionnaire for Participants One and Two are shown in Figure 5. Participant One showed stable levels of dog safety knowledge at baseline and both post-intervention phases. Participant Two consistently answered all of the Dog Safety Questionnaire questions correctly and did not deteriorate at all during the two post-intervention phases.

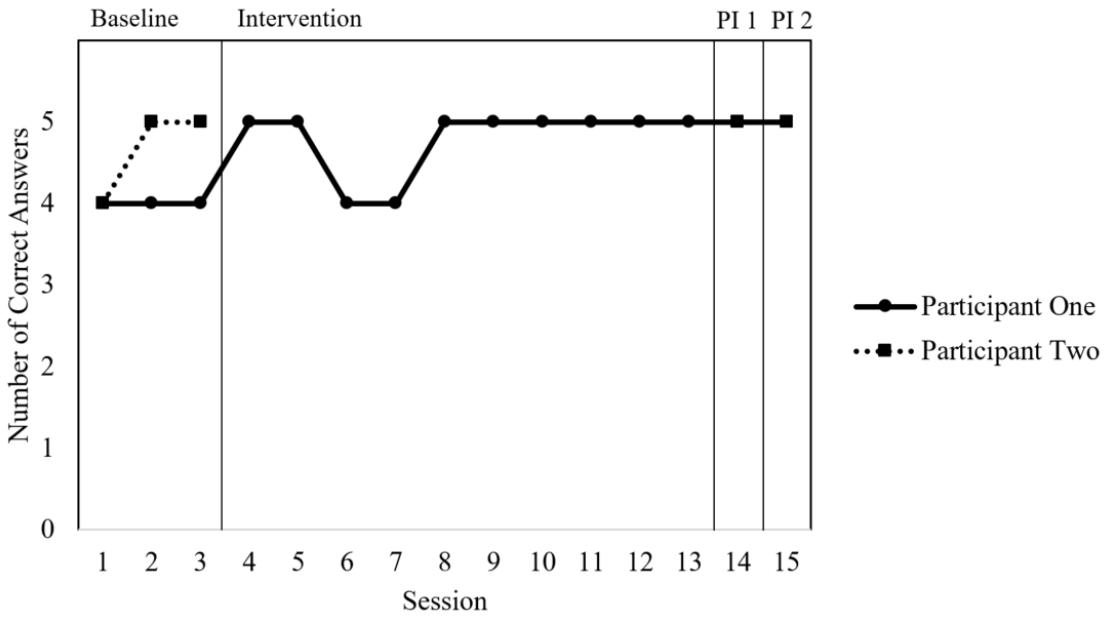


***Figure 5: Dog Safety Questionnaire Results for Self Model Participants. (PI 1 - post-intervention phase one, PI 2 – post-intervention phase two).***

## Participants Three and Four's Dog Safety Results

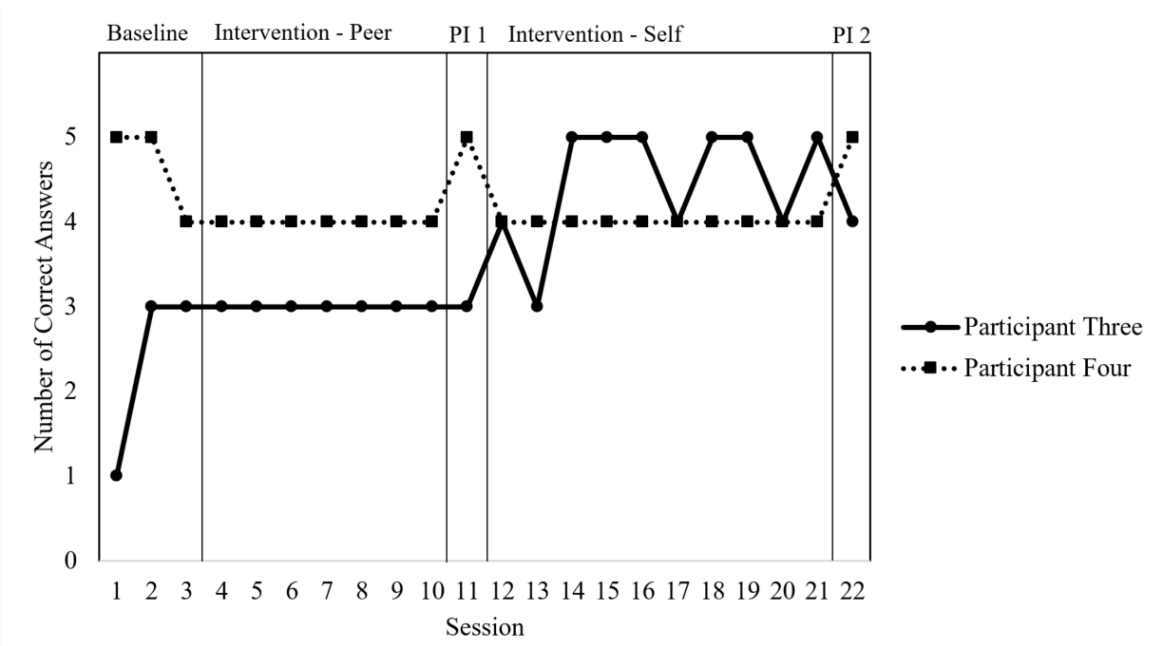


***Figure 6: Dog Safety Questionnaire Results for Peer Model then Self Model Participants. (PI 1 – post-intervention phase one, PI 2 - post-intervention phase two).***

The results from the dog safety section of the Dog Behaviour and Dog Safety Questionnaire for Participants Three and Four are shown in Figure 6. Participant Three showed stable levels of dog safety knowledge at baseline and for the duration of the peer modelling intervention but had improved by an increase of one to two correct answers at the end of the VSM intervention. Participant Four consistently answered the majority of the Dog Safety Questionnaire correctly and maintained these results through both interventions and post-intervention phases.

**Parent Follow-Up Questionnaire Results**

Figure 7 displays the results from three of the questions from the Parent Follow-Up Questionnaire that was issued at the end of the study to assess the success of the study from the perspective of the participant's parents involved. When asked if they thought video modelling had helped reduce their child's fear of dogs (Question 1), three of the four parents answered 'a great deal', and the fourth answered "a little'. When asked if they would use video modelling as a technique again (Question 4), all four parents answered yes. Three of the parents also reported that they were 'very satisfied' with the outcome of the research (Question 5) and the fourth parent said that they were 'satisfied'.

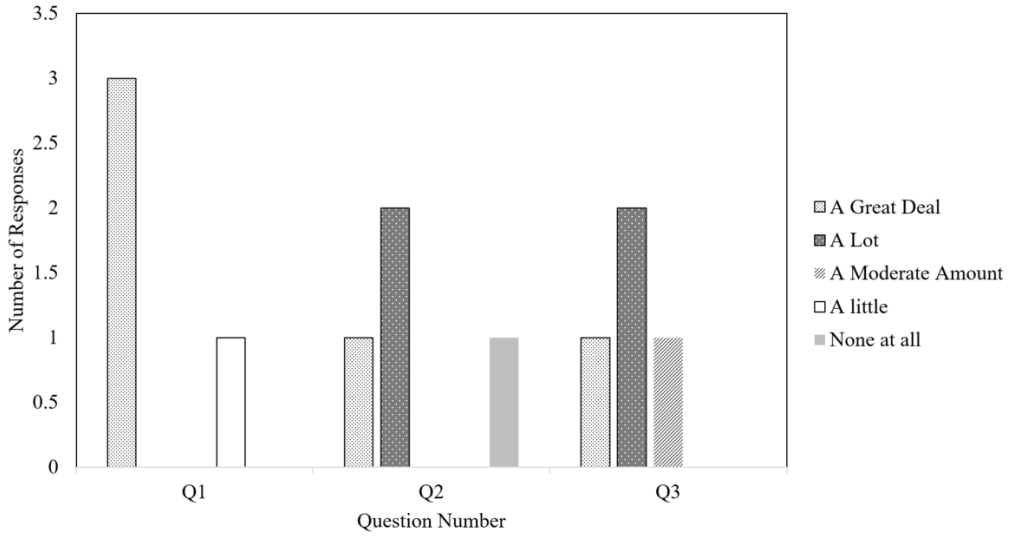


***Figure 7: Parent Follow-Up Questionnaire Results for Questions One to Three***

## Discussion

While there is evidence for the use of video modelling as an effective intervention for individuals with ASD, and for the use of video modelling as an effective intervention for treating fears, phobias and anxieties, hitherto there has been little evidence for its effective use as an intervention to treat fears in individuals with ASD. With the prevalence of fears and phobias being much higher in children with ASD compared with typically developed children, an effective intervention is needed that caters for the unique difficulties that individuals with ASD experience (Mayes et al., 2013).

The aim of this research was firstly to investigate the effects of video peer modelling and VSM as a treatment for a fear of dogs in children with ASD. The second aim was to investigate whether video peer modelling and VSM can improve knowledge of dog behaviours and dog safety in children with ASD.

### Effectiveness of Video Modelling

Data from the BAT baseline sessions and two post-intervention sessions show variability in the effectiveness of video modelling as an intervention for fear of dogs in children with ASD. The two participants who received only VSM showed substantial improvements in their BAT scores. The remaining two participants first showed minimal improvement after receiving a peer model video, and then showed greater improvement after receiving a VSM. There was little evidence of video modelling improving understanding of dog behaviours and dog safety. The effectiveness of video modelling as an intervention for each participant is discussed in detail below.

**Participant One.** Participant One showed the most change in her results for dog off the lead BAT. At baseline, Participant One was unable to complete any of the seven hierarchy steps with a dog off the lead. After the first intervention (VSM), she showed very

little improvement, only managing to complete one step of her hierarchy at post-intervention one. After the second intervention (a new VSM), Participant One completed all seven hierarchy steps for the dog off the lead BAT at post-intervention phase two.

Anytime it was suggested that the dog be let off the lead during baseline and post-intervention one, she expressed fear through crying, saying "stop! No, no, no", and physically grabbing the researcher. After intervention phase two, Participant One was calm when the dog was let off the lead; she allowed the dog to come right up to her and stood beside and patted it. Participant One even voluntarily played a game of fetch with the dog and asked if she could walk the dog around on the lead, which she did.

This lack of positive change after intervention one could have been due to the content of her VSM not targeting the appropriate behaviours. Her first video model attempted to cover scenarios with dogs on the lead, dogs off the lead, dog behaviour, and dog safety. After the results of post-intervention one, Participant One's VSM was changed to target only scenarios with dogs off the lead. After receiving the new VSM intervention, she completed all seven steps.

There is also the potential that the testing conditions during post-intervention one contributed to the negative results. All three baseline sessions and post-intervention phase two for Participant One were conducted outside at her local park. However, due to adverse weather conditions, post-intervention phase one was conducted inside at the local dog association training rooms. Participant One displayed high levels of fear when undergoing the BAT inside. When the handler appeared with the dog off of the lead, Participant One grabbed hold of the researcher and said "don't let him bark" and then immediately stopped the procedure. It is also worth noting that after the post-intervention one session was over, Participant One revealed that she had heard the dog barking in the car when she walked past on her way to the room.

The step ‘Feed Treat’ was the only BAT hierarchy step from both on the lead and off the lead that Participant One had not completed by the end of post-intervention phase two. Despite including a treat feeding scenario in both VSM interventions, she opted to instead throw her treat onto the ground for the dog. However, comments from Participant One about the dog’s mouth being “cold”, “wet”, and “slimy” suggested that this refusal to feed the dog a treat could be a sensory issue rather than a fear issue.

Since completing the study, Participant One received a school principal’s award for her attitude to dog safety during a dog training class. She has also successfully interacted with dogs since the conclusion of the study, even playing with her uncle’s dog while on holiday. Her Mum also reports that she has begun requesting a dog of her own. Overall VSM appears to have had a positive and enduring effect on reducing Participant One’s fear of dogs.

Any attempts at getting Participant One to indicate how she felt on the Dog Scenario Scale at each step of the hierarchy was met with “no, I don’t want to pick an angry face, but I am very very scared” and “let’s not talk about that”, and her consistently choosing the happiest face (“not scared at all”) despite displaying fear reactions. This meant that her self-reported fear levels could not be recorded.

Participant One’s VSM also attempted to teach her Dog Behaviour and Dog Safety knowledge. It was clear from her consistently correct scores that she already had a high understanding of dog safety. Her dog behaviour scores were also already reasonably high; she answered six out of nine dog behaviour questions correctly throughout the baseline. After the VSM intervention, her correct answers increased to eight out of nine. This suggests that the VSM was successful in teaching Participant One about dog behaviours. However, she also took part in a dog training at school, so the increase in correct answers from the baseline could have been due to this instead.

**Participant Two.** Participant Two had variable BAT baseline scores for both dog on and dog off the lead. During baseline one, he was able to complete nine of the eleven dog on a lead steps, and six of the seven dog off a lead steps; a high success rate for someone fearful of dogs. However, during the next two baseline sessions, he only completed four and eight of the dog on a lead steps and none of the dog off the lead steps. This variation in baseline may be explained by the variety of dogs used during these sessions.

The first baseline session involved a small, soft-haired Schnauzer, and when he first saw the dog, Participant Two described his stomach as going "boom boom" and stated he had tingly legs, he also sucked his fingers. He asked the handler if the dog would jump at him and was told it would not. This seemed to boost his confidence, and he was happy to have the dog come all the way up to him.

Because of the obvious liking that Participant Two had taken to the Schnauzer, during the second baseline session the dog was changed to a small short-haired Fox Terrier. This produced drastically different results from Participant Two. As soon as he saw the Fox Terrier he asked if it would jump at him and continued to ask throughout the session. He also performed the "flossing dance" out of nervousness. When the dog reached the 10m mark on the lead Participant Two stated "that's close enough". When it was suggested the dog was let off the lead Participant Two grabbed his Mum round the neck and hung on tightly stating he was scared of jumping and biting and that he did not want the dog let off. For the third baseline session, the dog was changed again to a Golden Retriever. Participant Two managed to complete more of the on the lead steps and stated "my friend has one so it's okay". He did show signs of fear when he grabbed his Mum but did slowly let go and become more interested, he even held the lead alongside the handler, but did not want the dog let off the lead.

For the two post-intervention sessions, the Fox Terrier was used again, and Participant Two successfully completed all the steps in both the on the lead and off the lead hierarchies. There were no signs of agitation, and he smiled and laughed throughout the sessions. One of the steps that Participant Two struggled with the most was feeding the dog a treat from his hand. Similarly to Participant One, it was suspected that this was more to do with the sensory factors involved rather than a fear of the dog. Participant Two did first feed the dog a treat off of his sleeve, then from his hand in a glove, and then from his bare hand.

An important feature of Participant Two's VSM was the footage of him reacting to his Aunt's dog. His Mum reported in the initial interview that visiting his Aunt's house was difficult as it caused Participant Two high amounts of stress and often they ended up locking the dog away. Footage of the Aunt's dog was provided, edited together with footage of Participant Two coping, and included in the VSM. After the VSM intervention, Participant Two visited his Aunt's house. His Mum provided a video clip of the two meeting and reported that after a slightly slow start, Participant Two was able to sit and hug the dog and try some tricks and feed him treats.

Participant Two was the only participant able to indicate how he felt on the Dog Scenario Scale at each step of his hierarchies (Appendix P). His self-reported fear for both the BAT and the Dog Scenario Questionnaire decreased from baseline to post-intervention phase two. This suggests that the VSM had a positive effect on his self-reported fear of dogs.

**Participant Three.** Participant Three had consistent results across all three baseline measures despite two different dogs being used. He managed to complete five of the steps in both on the lead and off the lead hierarchies for baseline session one, compared to four steps for each hierarchy in baseline sessions two and three. This could potentially be due to the dog being a small Schnauzer in session one, compared to the large Mastiff Cross used in the remaining sessions.

During baseline sessions, Participant Three was observed scratching his head and biting his nails, actions that increased in frequency and intensity as the dog came closer. He also verbally expressed fear of the dogs several times during these baseline sessions; “oh no what is she doing?”, “help me!”, “oh my gosh, what are you doing?” Participant Three constantly turned his back on the dog and would walk away if it came too close, and he would also often choose not to look at the dog and had to be gently directed to look directly at it by his Mum and the researcher.

During intervention phase one, Participant Three watched a video peer model starring Participant Four. His results did not improve in post-intervention one for either dog on the lead or dog off the lead hierarchies. His verbal expressions of fear were still occurring, and he still turned his back on the dog regularly. However, there did appear to be less finger biting and head scratching.

After receiving VSM during intervention phase two, Participant Three successfully completed seven of the eight dog on a lead steps (including patting the dog), and six of the seven dog off a lead steps. His verbal expressions decreased, and there were noticeably less finger biting and head scratching. He did not attempt to walk away from the session, and as he was leaving the finished session with his Mum, he walked past a dog on a lead without hesitation or apparent fear. His mum has also reported that he now likes to keep the back door open at home so he can see the neighbour’s dogs. Overall, peer modelling did not seem to have reduced fear of dogs in Participant Three, but the VSM did appear to have a positive effect in fear reduction.

When Participant Three was asked to indicate how he felt on the Dog Scenario Scale at each step of the hierarchy, his answers appeared random. He would choose the saddest face (“extremely scared”) and then for the next step choose the happiest face (“not scared at all”).

It was clear that he did not fully understand the task. Despite trying different visual representations, his self-reported fear levels could not be recorded.

Participant Three's peer model video and VSM also attempted to teach him Dog Behaviour and Dog Safety knowledge. It was clear from his baseline scores that he already had a reasonably good understanding of dog behaviours. However, neither the peer model nor the VSM increased this dog behaviour score. In contrast to his otherwise steady scores, Participant Three scored worst during post-intervention one session, getting only four answers correct. It is unclear why there was a sudden reduction in Participant Three's scores during this session, but it could have been due to being distracted or fearful as he was able to hear the dog barking while it waited in the carpark. His dog safety scores did improve after the VSM intervention though not consistently. Overall neither his peer model nor his VSM increased his dog behaviour knowledge, but the VSM does appear to have had a small positive impact on his dog safety knowledge.

**Participant Four.** Participant Four had consistent baseline scores for the on the lead hierarchy completing seven out of eleven steps for all three sessions. For his off the lead hierarchy he completed all seven steps in baseline session one, but only five steps in baseline sessions two and three. This variability could potentially be due to the type of dog used in each session. During baseline session one, the dog used was a small Schnauzer which Participant Four had met before. He was nervous when the dog jumped and recoiled away but was happy to pat him and have him off the lead.

As a result, the dog was switched to a large Mastiff Cross for the remaining sessions. He was more cautious around the Mastiff Cross and avoided the head area, jerking away if the dog swung his head near. He skirted around the dog and leant in from as far away as possible, patting first the jacket the dog was wearing and then the dogs lower back. Participant Three threw a treat onto the ground for the dog but did not want to feed from the

hand. He became visibly anxious when the dog whined, and jumped back and grabbed his Mum when the dog barked.

During intervention phase one, Participant Four watched a video peer model starring Participant Three. During post-intervention one he completed nine of the eleven possible steps for dog on the lead and successfully completed all his off the lead steps. During post-intervention one, he still expressed nervousness about the dog whining saying "quiet, quiet, quiet". He stood close to the dog and patted him on the fur and nearer his head, but still jerked away if the dog moved its head towards him. He crouched down out of arms reach from the dog and did not want to sit directly beside the dog. Participant Four still wanted to throw the treats (though this could have been so he could see the dog jump for them) and did place one on the ground in front of the dog and instructed him to "go for it", but did not want to feed the dog from his hand.

Participant Four's Mum reported that he was pointing dogs out to her while in the car and he had begun to repeat the key phrases from his video peer model such as "stand like a tree" and "help me Mum". This was a positive effect as one of the aims of the video was to get Participant Four to stop and stand like a tree and start asking for help when scared.

A VSM was made for Participant Four, and he watched it during intervention phase two. After, Participant Four successfully completed all of the dog on a lead and dog off a lead steps. He stood beside the dog without being asked and fed him a treat directly from his hand. He still backed away slightly when the dog barked but did not run. Participant Four also threw a ball for the dog, and as it ran after the ball, he went and "stood like a tree" beside his Mum.

Whilst Participant Four's BAT scores did improve after each intervention, these changes were smaller than those of other participants; partly because he was already able to complete most steps of his hierarchies at baseline, that is, there was a ceiling effect. This

could have been because Participant Four had previously completed sessions with Dog-abled which included exposure to dogs. Another factor could be that the same handler from his Dog-abled sessions was used for his sessions in this study. The friendship between the participant and handler meant that Participant Four was excited to see her at each session and may have trusted her more than he would have had it been an unknown handler. Knowing the handler may have reduced Participant Four's fear of the dog she was handling.

Participant Four also received the dog education book '*I Will Not Growl'* between his peer modelling intervention and VSM intervention. All other participants did not receive this book until the research had finished. There is a possibility that the dog education book had an impact on his BAT scores in post-intervention two.

Whenever Participant Four was asked to indicate how he felt on the Dog Scenario Scale at each step of the hierarchy, he consistently chose the happiest face ("not scared at all") despite displaying fear reactions. It was clear that Participant Four had an objection to the angry or unhappy faces on the Dog Scenario Scale, and, despite trying different visual representations, his self-reported fear levels could not be accurately recorded.

Participant Four's peer model video and VSM also attempted to teach him dog behaviour and dog safety knowledge. He already appeared to have knowledge of dog safety procedures. For the dog behaviour section, Participant Four circled every dog as happy in every session resulting in the consistent five out of nine correct answers. Neither the peer model nor the VSM had any impact on Participant Four's dog safety or dog behaviour scores.

**Participant Differences**

An important difference worth noting is the results in relation to the participants' ASD diagnoses. The two participants who improved the most in terms of BAT scores were Participants One and Two. Both these participants were described as "high-functioning" ASD individuals. They displayed less of the "classic" ASD traits that make traditional

interventions so difficult for those with ASD. There is the possibility that these two participants had the cognitive skills and knowledge available to better understand their fear and process the intervention.

Participants One and Two were also highly motivated to reduce their dog fears. They both expressed a desire to interact with dogs and were enthusiastic about the sessions and seeing the dogs. They both expressed delight when told their "favourite" dog was in attendance. They have both successfully interacted with dogs since the end of this research and have even requested dogs of their own. Participant Four also showed a keen interest in participating in the sessions, but as noted before, it is suspected that this was more to do with his friendship with the handler and his previous interactions with her dogs.

Family involvement could have also been a factor in the effectiveness of the intervention as a whole. Participant One's sibling attended every session with her and also showed a keen interest in meeting the dogs. Watching her sister being enthusiastic about meeting the dogs may have helped Participant One reduce her fear (this could have been an observational learning effect in vivo). Participant Three also had siblings attend his post-intervention phase two. During his post-intervention phase two hierarchy, he was patting the dog's fur on his lower back, but when his sister came forward and patted the dog on the neck he placed his hand on top of hers and then after a moment, he also patted the dog on the neck. It is possible that peer modelling occurred for these participants through watching their siblings interact with the dog.

**Limitations**

There were several limitations to this research. Firstly, the number of participants involved was small. There was difficulty with recruitment potentially due to the research requiring the exposure of participants to dogs. There were multiple inquiries about the study but when parents were informed of participant exposure to dogs most decided not to take

part. Location was also an issue in recruitment. This study was originally based in Canterbury, but the majority of responses came from the Auckland and Taranaki regions. Due to the amount of travel and scheduling required, the number of sessions involving the researcher with participants was limited. This small number of participants also meant that only two participants could be assigned to each type of modelling. For a true comparison between video peer modelling and VSM, a larger number of participants is needed in order to provide for more replications of any treatment effect (Kazdin, 2011).

While a strength of this study was that the VSM participants had a long period of time without an intervention between post-intervention one and post-intervention two sessions, a limitation was that the video peer model/VSM group did not have a further follow-up after their VSM post-intervention to see if the effects maintained over time. A further strength would have been to have a longer time period and more post-intervention phases between the end of the video peer model intervention and the start of the VSM intervention. This would allow for a more accurate analysis of any changes over time from both types of modelling.

The research could be further strengthened by including a functional behaviour assessment of participants' fear, rather than relying on parent reports as used in this study. By identifying why participants reacted a certain way, the interventions can be tailored more towards tackling these causes.

Another limitation of this study was the majority of the participants could not use the Dog Scenario Scale successfully during BAT or for the Dog Scenario Questionnaire. This meant that the self-reported fear levels were not collected for three of the four participants. The self reported fear levels would have been a strength in this study and could have given insight into the role that self-efficacy plays in video modelling interventions for fear. Further research into the methods required to get individuals with ASD to indicate their feelings are needed.

The single case design used, in the form of AB/ABC sequences, also posed some limitations to this study. The pre and post BAT data for each intervention (post video peer model and post VSM) detect that there has been a treatment effect. The reduced effect of peer modelling for two participants (relative to the effect of VSM for the other participants), with subsequent improvement when given VSM, suggests that VSM may be superior to peer modelling, but exposure to the whole procedure is confounded by the treatment sequence so any conclusions are tentative. Using a more rigorous single-case design, such as a multiple-baseline across subjects, and having more within and between-case replications, would permit stronger causal inferences to be drawn.

**Future Research**

Future research could develop and expand on this study in several ways. If a similar study to the current research was to be undertaken again, each group of participants could receive either VSM or video peer modelling, not a combination of both, such as in the current study. A better study design, such as a single subject multiple-baseline across subjects could be used. A better study design could help show more accurately which variable had a greater impact on dog fear and could mean strong causal inference could be drawn. Single case designs are better used for VSM investigations than group designs which assume homogeneity of symptoms.

Research involving VSM and children with ASD should take into consideration the participants' cognitive ability. Investigations into the effectiveness of VSM in conjunction with individual's characteristics may help explain the variability experienced in VSM results. Future research should also consider functional behaviour assessment and severity measures of phobias.

Future research into the use of VSM could investigate whether video modelling has more impact when filmed as a point of view VSM as opposed to a VSM featuring the

individual. Point of view VSM could solve the issue of time needed to edit individual videos without resorting to video peer modelling. Point of view VSM could mean that the same video could be used to treat multiple individuals or teach a new skill to a large group of people. As technology advances and virtual reality becomes more available, skills learnt through point of view VSM could be practised in virtual reality environments. Point of view VSM and Exposure to feared stimulus or skill acquisition tasks via virtual reality could be easily accessible to all participants no matter their location, resources or budget.

Further investigations could also explore the positive self review aspect of VSM and whether it could help maintain treatment effects following the intervention, or re-establish treatment effect if it is lost (e.g. after a negative interaction with a feared stimulus).

Future research into the use of video modelling as an intervention for fears in children with ASD would be highly beneficial to the ASD community. Successful interventions for the treatment of fears and phobias have significant positive impacts on the daily lives of those with ASD. Dog phobia, in particular, is an important fear for these individuals to overcome, not only because of the prevalence of dogs in Aotearoa communities, but also because of the impacts that a positive relationship with dogs can have on children with ASD (e.g. increased social skills) (Carlisle, 2015; Solomon, 2010).

## Conclusions

The aim of this study was to investigate the effects of video peer modelling and VSM as an intervention for a fear of dogs in children with ASD. It was also to investigate whether video peer modelling and VSM can improve knowledge of dog behaviour and dog safety in children with ASD. The results showed that neither video peer modelling nor VSM conclusively improved understanding of dog behaviours and dog safety. There was also not enough evidence to support peer modelling as an effective intervention for dog fear in

children with ASD. However, all four participants increased their BAT scores, and thus this study did demonstrate that VSM has rapid positive effects on dog fear in children with ASD.

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# Appendix

## Appendix A

UNIVERSITY OF CANTERBURY
*Te Whare Wānanga o Waitaha*
CHRISTCHURCH NEW ZEALAND

HUMAN ETHICS COMMITTEE
Secretary, Rebecca Robinson
Telephone: +64 03 369 4588, Extn 94588
Email: human-ethics@canterbury.ac.nz

Ref: HEC 2017/112

20 November 2017

Holly Smith
Psychology
UNIVERSITY OF CANTERBURY

Dear Holly

The Human Ethics Committee advises that your research proposal "The Use of Video Modelling to Reduce Fear and Teach Appropriate Response and Safe Behaviours in Autistic Children with a Specific Phobia of Dogs" has been considered and approved.

Please note that this approval is subject to the incorporation of the amendments you have provided in your emails of 2 November and 13 November 2017.

Best wishes for your project.

Yours sincerely

*pp.* R. Robinson

Associate Professor Jane Maidment
***Chair***
***University of Canterbury Human Ethics Committee***

**Appendix B – Recruitment Poster**

**College of Arts**

**Department of Psychology**

UNIVERSITY OF CANTERBURY
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CHRISTCHURCH NEW ZEALAND

***Do you know a child with autism who has a severe fear of dogs?***

***The Use of Video Modelling to Reduce Fear and Teach Appropriate Response and Safe Behaviours in Children with Autism with a Severe Fear of Dogs.***

**Research Subjects Wanted:**

- **Formal Diagnosis of Autism**
- **Severe Fear of Dogs**
- **Aged 5-12 Years**
- **Ability to understand and respond to verbal requests**

For More Information

Contact: Holly Smith

Hes38@uclive.ac.nz 0210625663

**Appendix C – Parental Information Sheet**

Department of Psychology
Telephone: 0210625663

Email: hes38@uclive.ac.nz

01/09/2017

## Information Sheet for Parents

### *The Use of Video Modelling to Reduce Fear and Teach Appropriate Response and Safe Behaviours in Children with Autism with a Severe Fear of Dogs.*

My name is Holly Smith, I am a UC student studying towards my Masters in Psychology. I am the principal researcher for this thesis study. The purpose of this research is primarily to investigate the use of video modelling techniques to reduce fear of dogs in children with autism and teach these individuals appropriate responses and safe behaviours towards dogs. Additionally, this study will also investigate the differences between using videos of the self and videos of peers as models in intervention techniques.

To participate in this study your child needs to be aged between 5 and 12 years old, have a formal diagnosis of autism, a severe fear of dogs, and the ability to understand and respond to verbal requests.

If your child chooses to take part in this study, as a participant their involvement in this project will be:

1. Participants will first undergo three one hour observation sessions in which they will be observed and recorded by the researcher while in the same environment as a dog so that an initial level of fear can be documented. Participants will be asked to rate their fear levels on a hierarchy as the dog acts out different scenarios. The dog will be under effective control at all times and participants can stop the observation at any point, by simply saying or signalling STOP. During these observation sessions participants will also be asked to complete two questionnaires. Each observation session will take approximately one hour (actual exposure to the dog during this time will be minimal) and all three will occur over the course of one to two weeks.

2. To create the video models, footage of the participants pretending to interact with a dog will be recorded in an agreed setting separately to the dogs. At this step participants will not directly confront dogs in real circumstances, instead interaction will be simulated and participants will act out scenarios with a soft toy. The researcher will then edit the video footage to make it appear as though interaction happened, from this the video models will be produced. Video footage capturing will happen in a single 1-2 hour session.
3. Participants will then take part in the intervention phase where they will be given either their own video model or another participants video model to watch. Over the course of a week participants will be asked to take approximately 10 to 15 minutes a day to watch the video and complete two questionnaires.
4. Immediately after the week-long intervention has concluded the researcher will conduct a follow up session. Participants will undergo another session of observation where they are in the same environment as a dog. They will rate their fear levels and complete the two questionnaires again.
5. Approximately 4 to 6 weeks after the intervention has concluded the researcher will conduct another follow up session. Participants will undergo another session of observation where they are in the same environment as a dog. They will then rate their fear levels and complete the two questionnaires again.

If you choose to take part in this study, as a parent of a participant your involvement in this project will be:

1. Parents will accompany the participants during all interactions with the researcher. This means you will need to be present during the observation sessions, the video creation, and the two follow-up sessions. You will also be required to monitor and assist the participant during the intervention phase to ensure that they are watching their video and completing the two questionnaires once a day for the week.
2. Parents will also be asked to complete a before and after interview. These interviews will be paper based and will take approximately 10 minutes to complete.

There is the potential for physical risk to participants of this study. To minimize any possible risk from the dogs any physical contact will be optional and minimal, and they will be leashed at all times during sessions. They are professionally trained animals under the control of a dog handling professional. There is also the potential for physical risk due to the unpredictable physical responses of a child with autism experiencing an extreme phobic response. As part of the preparation for each observation session you will be consulted in depth on what you think the appropriate response to extreme physical reactions from your child would be, and resources unique to your child's needs will be made available.

There is also a risk of emotional distress as participants will be exposed to dogs which will prompt a phobic response. Participants and their parents can end the exposure to dogs at any point, by simply saying or signalling STOP. Before each session begins participants will be told how to stop proceedings and reminded that there are no penalties for doing so. They will then be asked to demonstrate how they would ask for the observation session to stop to ensure understanding. As part of the preparation for these sessions you will be consulted as to what you think the process should be when your child becomes stressed and appropriate systems and resources will be put in place.

Participation is voluntary and you and your child have the right to withdraw at any stage without penalty. You may ask for your raw data to be returned to you or destroyed at any point. If you withdraw, I will remove all information relating to you and your child.

The results of the project may be published, but you may be assured of the complete confidentiality of data gathered in this investigation: yours and your child's identity will not be made public without your prior consent. To ensure confidentiality, all participants and their parents will be assigned a corresponding code for the purposes of data collection and analysis. All names will be changed for the purpose of reporting the data.

No one other than the researcher and supervisor will have authorized access to the data. All storage facilities (including electronic equipment) will be in rooms that can be locked. All data will be stored in password-protected files and on computers that are password protected. Data will be backed up or stored on the University servers. Identifying data will be kept separate from non-identifying data to ensure confidentiality.

Data from the research project will be kept securely and then destroyed after 5 years. A thesis is a public document and will be available through the UC Library. The final research may be reported in journal articles, newsletters, websites and in conference presentations. Please indicate to the researcher on the consent form if you would like to receive a copy of the summary of results of the project.

The project is being carried out as a requirement for the completion of a Master of Arts in Psychology by Holly Smith, who can be contacted at hes38@uclive.ac.nz, under the supervision of Professor Neville Blampied, who can be contacted at neville.blampied@canterbury.ac.nz. They will be pleased to discuss any concerns you may have about participation in the project.

This project has been reviewed and approved by the University of Canterbury Human Ethics Committee, and participants can address any complaints to The Chair, Human

Ethics Committee, University of Canterbury, Private Bag 4800, Christchurch (human-ethics@canterbury.ac.nz).

If you agree to participate in the study, you are asked to complete the consent form and return it to Holly either via email or post it in the enclosed prepaid envelope.

Thank you for considering participation in this research.

Yours Sincerely

Holly Smith

**Appendix D – Children's Information Booklet**

NAME: _____

# Children's Information Booklet

Sometimes when I see a dog I get very scared.
Holly is doing a school project to help children who are scared of dogs just like me.

Hi, my name is Holly!
What is your name?
_____

I am able to take part in Holly's study if I can tick all the boxes:

- I am between 5 and 12 years old ☐
- I have autism ☐
- I am scared of dogs ☐
- I can listen and respond to people when I am asked to do something. ☐

We will go to where I usually see lots of dogs.
It might be the park or the beach.

There will be a dog on a lead walking around the park, Holly will record my reaction and ask me some questions to see how scared I am. Mum or Dad will be with me the whole time and I can ask to STOP at any time and I wont be in trouble.



One of the days that we go to the park with Holly there will not be any dogs. Holly will ask me to pretend there are dogs there and that I am not scared, she will film me acting.


Holly will give me the video of me acting and I will watch it a few times and Mum or Dad will help me answer some questions.


After I have seen my video a few times we will go back to the park with Holly and see the dog on a lead again. Holly will record my reaction and ask me some questions to see how scared I am.



Only Holly and her teacher will watch the recordings of me being scared. The video of me acting brave might be seen by another child, but Holly will ask me first. Holly won't tell anyone my name.

I can say NO if I don't want to do something. I can tell Holly, or my Mum and Dad, if I want to STOP at any time or if I don't want to do the project anymore and that will be OKAY.


**Appendix E – Parental Informed Consent Form**

Department of Psychology

Researcher: Holly Smith

Telephone: 0210625663

Email: hes38@uclive.ac.nz

## Consent Form for Parents

***The Use of Video Modelling to Reduce Fear and Teach Appropriate Response and Safe Behaviours in Children with Autism with a Severe Fear of Dogs.***

- ☐ I have been given a full explanation of this project and have had the opportunity to ask questions.
- ☐ I understand what is required of me if I agree to take part in the research.
- ☐ I understand what is required of my child if they agree to take part in the research.
- ☐ I understand that participation is voluntary and I or my child may withdraw at any time without penalty. Withdrawal of participation will also include the withdrawal of any information I or my child have provided should this remain practically achievable.
- ☐ I understand that any information or opinions I provide will be kept confidential to the researcher and supervisor and that any published or reported results will not identify parents or participants.
- ☐ I understand that a thesis is a public document and will be available through the UC Library.
- ☐ I understand that the video model of my child may be shown to another child and their accompanying parent/guardian, but will be kept confidential and not be shared outside of the study.
- ☐ I understand that all data collected for the study will be kept in locked and secure facilities and/or in password protected electronic form and will be destroyed after five years.
- ☐ I understand the physical risks associated with taking part and how they will be managed.
- ☐ I understand the mental and emotional risks associated with taking part and how they will

be managed.

- ☐ I understand that I can contact the researcher Holly Smith (hes38@uclive.ac.nz) or supervisor Professor Neville Blampied (neville.blampied@canterbury.ac.nz) for further information. If I have any complaints, I can contact the Chair of the University of Canterbury Human Ethics Committee, Private Bag 4800, Christchurch (human-ethics@canterbury.ac.nz)
- ☐ I would like a summary of the results of the project.
- ☐ By signing below, I agree to participate in this research project.
- ☐ By signing below, I agree to my child participating in this research project.

Name:_____ Signed:_____ Date:_____

Name of Child:_____

Email address *(for report of findings, if applicable)*:

_____

Please complete this form and return it to the researcher via email, or post in the enclosed prepaid envelope.

**Appendix F – Participant Informed Assent Form**

UNIVERSITY OF CANTERBURY
*Te Whare Wānanga o Waitaha*
CHRISTCHURCH NEW ZEALAND

***Holly's Dog Project***

**Children's Assent Form**

***The Use of Video Modelling to Reduce Fear and Teach Appropriate Response and Safe Behaviours in Children with Autism with a Severe Fear of Dogs.***

The project that Holly wants to do about dogs has been explained to me. I know I don't have to be a part of it if I don't want to. If I have any questions I can ask my parents.

- I am happy to be part of the project and to do some activities with dogs with Holly and some other children, so I have colored in the happy face.

**OR**

- I don't want to be part of the project or do the activities with dogs and Holly, so I have colored in the sad face.

My name: _____

**Appendix G - Parent/Eligibility Questionnaire**

Parent Questionnaire

Your Name:

Your Childs Name: Childs D.O.B:

Questions regarding child's ASD:

What is your child's diagnosis?

When was your child diagnosed with ASD?

Who diagnosed your child?

Does your child have any secondary diagnoses?

Is your child currently on any medication?

Questions regarding your child's fear:

How long has your child been afraid of this object? And was there a specific event that this behaviour started from?

What is a typical reaction from your child towards the object?

Does this behaviour occur every time your child sees the object?

Does this behaviour occur only when certain people are present?

Are there any service or support providers currently providing intervention for your child's fear?

Has your child previously been treated in any way for fear? If yes, what was tried and what were the results?

How does this fear impact family life?

Where does your child encounter this object and how frequently?

How long does the reaction last?

What do you do when the behaviour occurs? What happens after/ what stops the behaviour?

Does your child currently use any coping techniques (e.g. self-talk, deep breathing) to deal with either their fear of this object or in other parts of their lives?

What is the ideal result for you and your child regarding their fear of the object?

## Availability Auckland

If you live in Auckland please write a time that you would be available for an hour on at least three of the days on the table below.

| Sat 21st April | Sun 22nd April | Mon 23rd April | Tues 24th April | Wed 25th April | Thur 26th April |
|---|---|---|---|---|---|
| | | | | | |

## Availability Hamilton

If you live in Hamilton please write a time that you would be available for an hour on at least three of the days on the table below.

| Fri 27th April | Sat 28th April | Sun 29th April | Mon 30th April | Tue 1st May |
|---|---|---|---|---|
| | | | | |

## Availability Taranaki

If you live in Taranaki please write a time that you would be available for an hour on at least three of the days on the table below.

| Wed 2nd May | Thur 3rd May | Fri 4th May | Sat 5th May | Sun 6th May |
|---|---|---|---|---|
| | | | | |

If you are not available during these days then please let me know so we can make alternative arrangements.

**Appendix H - Dog Behaviour and Dog Safety Questionnaire**

Illustrations Provided by Abi Smith.

Participant #: Viewing Session #: Date:

Dog Behaviour and Dog Safety Questionnaire

1. From the dog pictures below can you circle all the dogs who are happy or playful?

2. From the dog pictures below can you cross out all the dogs who are upset or scared or angry?

Please circle the answer you think is correct:

3. What should you do if a dog you don't know or do not like comes running up to you?
   A. Run away as fast as you can.
   B. Try to hit it.
   C. Stand tall like a tree with crossed arms.

4. If you want to move away from a dog what should you do?
   A. Yell at the dog to go away.
   B. Run.
   C. Stand tall like a tree and walk away calmly with Mum.

5. What should you do if you want to pat a dog?
   A. When the dog comes near ask the owner if you can pat their dog, if they say yes offer your hand to the dog to sniff and then pat it.
   B. Go up and pat any dog on a lead.
   C. Run up to any dog and give it a pat.

6. Where should you pat the dog?
   A. On the head.
   B. On the neck and upper back.
   C. On the bottom.

7. What should you do if you hear a dog barking?
   A. Scream or yell for it to be quiet.
   B. Get upset.
   C. Remember that the dog is just trying to talk to us and calmly walk away with mum.

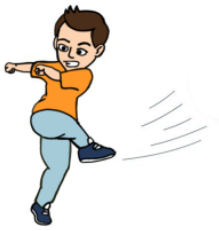
**Appendix I – Dog Behaviour and Dog Safety Questionnaire VISUAL BOOKLET**

Illustrations Provided by Abi Smith.

What should you do when a dog you don't know comes up to you:

**A.**
- Run Away

**B.**
- Try to hit it



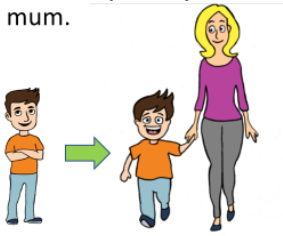
**C.**
- Stand tall like a tree

If you want to move away from a dog that has come running up to you what should you do?:

**A.**
- Run Away

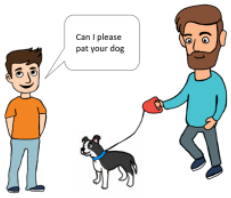
**B.**
- Yell at the dog

**C.**
- Stand tall like a tree and walk away calmly with mum.



What should you do if you want to pat a dog:

**A.**
- Ask the owner if you can pat the dog, if they say yes offer your hand to the dog to sniff and then pat it.




**B.**
- Go and pat any dog on a lead

**C.**
- Run up to any dog and give it a pat.

## Where should you pat a dog:

**A.**
- On the head

**B.**
- On the neck and upper back

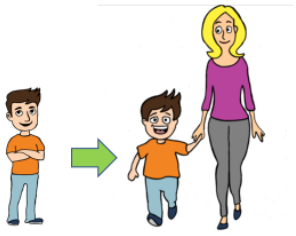
**C.**
- On the bottom

## What should you do if you hear a dog barking?

**A.**
- Scream or Yell for it to be quiet

**B.**
- Get Upset

**C.**
- Remember the dog is trying to talk to us, and calmly walk away with mum.



## Appendix J – Dog Scenario Questionnaire

Participant#: Session#: Date:

Dog Scenario Questionnaire

Using the visual scale please rate how you feel about each of these situations:

When I think about going to the park with mum and seeing a dog on a lead I feel:

When I think about going to the park with mum and seeing a dog off a lead I feel:

When I think about seeing a dog on a lead on the other side of the road when I am walking with mum I feel:

When I think about a dog on a lead walking on the same side of the road when I am walking down the street with mum I feel:

When I think about a dog on a lead walking past me I feel:

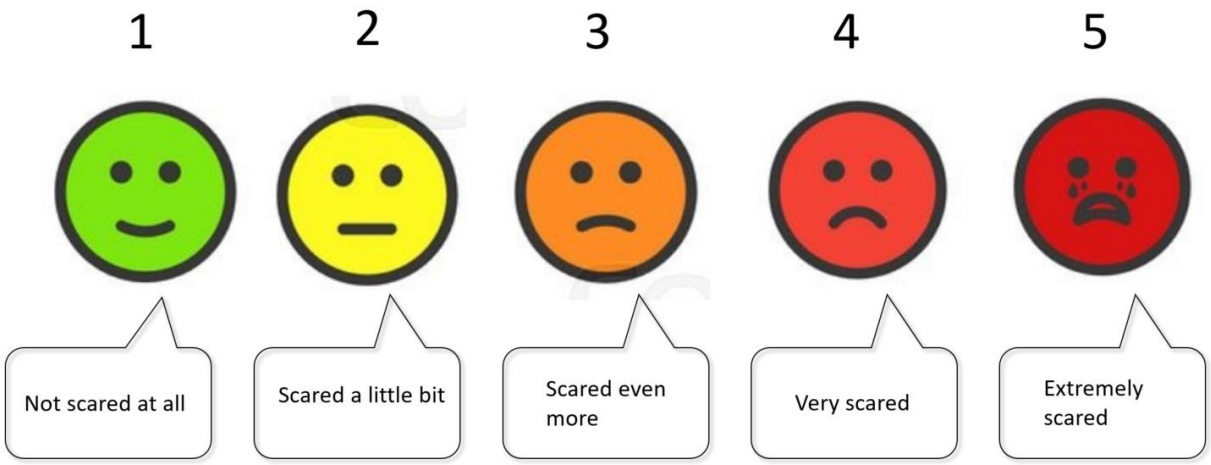
When I think about a dog I don't know running up to me I feel:

When I think about going to someone's house who has a dog I feel:

When I think about hearing a dog barking I feel:

When I think about seeing and hearing a dog who is barking I feel:

**Appendix K – Dog Scenario Scale**



## Appendix L – Behavioural Avoidance Test

Participant #: Session#: Date:

| | Hierarchy Steps – Dog ON LEAD | Completed yes/no? | Feeling Rating (1 to 5) |
|---|---|---|---|
| 1 | 50m Away | | |
| 2 | 40m Away | | |
| 3 | 30m Away | | |
| 4 | 20m Away | | |
| 5 | 10m Away | | |
| 6 | Standing Beside | | |
| 7 | Patting Dog | | |

| | Hierarchy Steps – Dog NOT ON LEAD | Completed yes/no? | Feeling Rating (1 to 5) |
|---|---|---|---|
| 8 | 50m Away | | |
| 9 | 40m Away | | |
| 10 | 30m Away | | |
| 11 | 20m Away | | |
| 12 | 10m Away | | |
| 13 | Standing Beside | | |
| 14 | Patting Dog | | |

| | Hierarchy Step – Dog Barking | Completed yes/no? | Feeling Rating (1 to 5) |
|---|---|---|---|
| 15 | Dog Barking | | |

## Appendix M – Video Dairy Sheet

Video Diary

Please tick the days and note the approximate times of viewing the video. (Please attempt to show participants the video once a day for 10 days).

| Day 1 | Day 2 | Day 3 | Day 4 | Day 5 |
|---|---|---|---|---|
| | | | | |
| Day 6 | Day 7 | Day 8 | Day 9 | Day 10 |
| | | | | |

Any Extra Notes or Extra Viewings:

| Date: | Comments: |
|---|---|
| | |

## Appendix N – Parent Follow Up Questionnaire

1. Do you think video-modelling has helped reduce your child's fear of dogs?

- ◯ A great deal
- ◯ A little
- ◯ A lot
- ◯ None at all
- ◯ A moderate amount
- ◯ Other (please specify)

2. Do you think video-modelling has helped teach your child dog body language?

- ◯ A great deal
- ◯ A little
- ◯ A lot
- ◯ None at all
- ◯ A moderate amount
- ◯ Other (please specify)

3. Do you think video-modelling has helped teach your child dog safety?

- ◯ A great deal
- ◯ A little
- ◯ A lot
- ◯ None at all
- ◯ A moderate amount
- ◯ Other (please specify)

4. Would you use video-modelling as a technique again?

- ◯ Yes
- ◯ No
- ◯ Other (please specify)

5. Are you satisfied with the outcome of this research?

- ◯ Very satisfied
- ◯ Dissatisfied
- ◯ Satisfied
- ◯ Very dissatisfied
- ◯ Neither satisfied nor dissatisfied
- ◯ Other (please specify)

6. Any further comments?

## Appendix O – Participant Video Descriptions

**Participant One. Video One.** Participant One's first video model was a self-model. Her video started with footage of her pointing to dogs displaying different behaviours (happy, playful, scared, upset) and identifying these behaviours e.g. "dog is happy". Then the video displayed different dogs barking and showed Participant One identifying why they are barking e.g. "dog is saying go away, I walk away with Mum". Next the video showed Participant One in different scenarios with dogs;

- The video first showed her and her Mum walking towards the camera, then a dog on the lead with its owner walked toward the camera. Participant One and her Mum are shown walking calmly as the dog walks past, and Participant One was heard saying "dog on a lead so it's okay". Her and her Mum are shown walking away calmly.
- The next shot was of a dog off the lead walking close to its owner and walking towards the camera. Then Participant One and her Mum walked towards the camera. As the off lead dog got closer Participant One stopped walking and stood with her arms crossed while saying "stand tall like a tree". The off lead dog then came all the way up to the camera and appears to sniff at Participant One. Participant One was shown staying calm and still standing like a tree. The dog was shown walking away with its owner still off the lead, and Participant One and her Mum continue walking.
- Next a dog walking in the park off the lead and quite far away from its owner is shown. Participant One walked alone, she saw the dog and stopped, and then stood with crossed arms while saying "stand tall like a tree". She continued to stand with her arms crossed while the dog passed by and wandered off, Participant One is then shown giving the thumbs up with a big smile.

- The very end of Participant One's video showed her with her hand stretched out flat with a dog treat in it from the dogs perspective. It then cut to the perspective of Participant One with a hand outstretched and the dog approached and ate the treat from the hand.

**Participant One. Video Two.** Participant One's second video was focused on scenarios of dogs off the lead. Three different dogs were shown off their leads and approaching the camera. Participant One was shown standing with arms crossed saying "stand tall like a tree" each time, followed by a thumbs up and smile when the dogs had sniffed her and walked away. The very end of Participant One's second video showed her again with her hand stretched out flat with a dog treat in it from the dogs perspective. It then cuts to the perspective of participant One with a hand outstretched and the dog approaches and eats the treat from the hand.

**Participant Two. Video One.** Participant Two only received one video model and it was a self-model. His video did not start with footage of different dog behaviours or dogs barking because his baseline results indicated he was already knowledgeable of this. Instead his videos focused on different scenarios with dogs;

- The video started with Participant Two walking across the park and seeing a dog (small and jumpy) coming towards the camera on the lead. Participant Two stood tall like a tree and stays that way while the dog and owner approach, the dog sniffs him, jumps up, and then leaves.
- The video then showed the same jumpy dog being fed treats from an outstretched hand made to look like Participant Two's.
- Next Participant Two and his Mum walked across the park before spotting a large dog on the lead. Participant Two stopped and stood with his arms crossed while the dog and owner

passed by quite closely. He was seen standing with his arms crossed until the dog and owner walk away, he was then shown walking away happily with Mum.

- In the next clip Participant Two and his Mum walked across the park before spotting a (large) dog off the lead. Participant Two stopped and stood with his arms crossed while the dog passeed by quite closely. He was seen standing with his arms crossed until the dog walked away, he was then seen walking away happily with Mum.
- The next clip shows Participant Two in the car and the text "off to Auntie's house". It then cut to footage of his Aunts driveway and gate from the perspective of Participant Two. He was then shown standing with arms crossed while saying "stand tall like a tree while Reuben sniffs me". Footage of his Aunt's dog (Reuben) was then shown running out of her house and jumping at Participant Two. He says "Reuben will stop sniffing me soon" and the dog then stopped jumping and sniffing and sat down. Participant Two is seen relaxing and giving the thumbs up.

**Participant Three. Video One.** Participant Three's first video-model was a peer model (modelled by participant Four). His video started with footage of his peer model pointing to dogs displaying different behaviours (happy, playful, scared, upset) and identifying these behaviours e.g. "dog is happy". Then the video displays different dogs barking and showed the peer-model identifying why they are barking e.g. "dog is upset, leave the dog alone". Next the video showed the peer-model in different scenarios with dogs;

- The video started with the peer-model and his Mum walking towards the camera, then a dog on the lead with its owner was shown walking toward the camera. The peer-model and his Mum are shown stopping and he crossed his arms and was heard saying "dog on a lead, it's

okay". The dog is seen walking away with its owner and the peer-model and his Mum are shown walking away calmly.

- Next the peer-model and his Mum walked towards the camera, then a dog off the lead with its owner walked toward the camera. The peer-model and his Mum are shown stopping and he crossed his arms and was heard saying "stand like a tree". As the dog off the lead came very close the peer-models Mum stepped in and hugs the peer-model while comforting him. The dog and owner are seen walking away and the peer-model and his Mum are shown walking away calmly together.
- Next the peer-model and his Mum are shown standing in the park, then a dog off the lead far from its owner walked towards the camera. The peer-model was shown crossings his arms and heard saying "stand like a tree". As the dog off the lead got very close and began to sniff at the peer-model, the peer-models Mum stepped in and hugs the peer-model while comforting him. The dog and owner are seen walking away and the peer-model and his Mum are seen walking away calmly together.

**Participant Three. Video Two.** Participant Three's second video was a VSM. After seeing little improvement from the peer-model intervention Participant Three was given a VSM. His video started with footage of him pointing to dogs displaying different behaviours (happy, playful, scared, upset) and identifying these behaviours e.g. "dog is happy". Then the video displayed different dogs barking and showed him identifying why they are barking e.g. "dog is upset, lets walk away". Next the video showed Participant Three in the same three scenarios outlined above except it was himself and his Mum acting them out.

**Participant Four. Video One.** Participant Four's first video-model was a peer model (modelled by participant Three). His video started with footage of his peer model pointing to dogs displaying

different behaviours (happy, playful, scared, upset) and identifying these behaviours e.g. “dog is happy”. Then the video displayed different dogs barking and showed the peer-model identifying why they are barking e.g. “dog is upset, lets walk away”. Next the video showed the peer-model in different scenarios with dogs;

- First the peer-model and his Mum walked towards the camera, then a dog on the lead with its owner walked toward the camera. The peer-model and his Mum are shown stopping and he crossed his arms and is heard saying “dog on a lead, it’s okay”. The dog was seen walking away with its owner and the peer-model and his Mum were seen walking away calmly.
- Next the peer-model and his Mum walked towards the camera, then a dog off the lead with its owner walked toward the camera. The peer-model and his Mum are shown stopping and he crosses his arms and is heard saying “stand like a tree”. As the dog off the lead gets very close the peer-model is heard saying “help me please”, the peer-models Mum steps in and hugs the peer-model. The dog and owner were seen walking away and the peer-model and his Mum were seen walking away calmly together.
- Next the peer-model and his Mum are standing in the park, then a dog off the lead far from its owner comes towards the camera. The peer-model is shown crossings his arms, turning his face away, and is heard saying “stand like a tree”. As the dog of the lead gets very close and begins to sniff at the peer-model, the peer-models Mum steps in and hugs the peer-model while comforting him. The dog and owner are seen walking away and the peer-model and his Mum are seen walking away calmly together.

**Participant Four. Video Two.** Participant Four’s second video was a VSM. After seeing little improvement from the peer-model intervention participant Four was given a VSM. His video

started with footage of him pointing to dogs displaying different behaviours (happy, playful, scared, upset) and identifying these behaviours e.g. “dog is happy”. Then the video displayed different dogs barking and shows him identifying why they are barking e.g. “dog is upset, lets walk away”. Next the video showed Participant Four in the same three scenarios outlined above except it is himself and his Mum acting them out not the peer-model.

## Appendix P – Participant Two Self-Reported Fear Levels Results

### Participant Two Dog Scenario Scale Rating of BAT Results

Table 10. Participant Two Dog Scenario Scale Rating of BAT Dog On A Lead

| | Hierarchy Step | Baseline 1 | Baseline 2 | Baseline 3 | Post-Intervention 1 | Post-Intervention 2 |
|---|---|---|---|---|---|---|
| 1 | 50m | 2 | 5 | 2 | 1 | 1 |
| 2 | 40m | 3 | 3 | 2 | 1 | 1 |
| 3 | 30m | 4 | 5 | 2 | 1 | 1 |
| 4 | 20m | 4 | 5 | 2 | 1 | 1 |
| 5 | 10m | 5 | 5 | 1 | 2 | 1 |
| 6 | Standing Beside | 3 | 5 | 2 | 2 | 1 |
| 7 | Patting Dog | 1 | 5 | 1 | 1 | 1 |
| 8 | Dog Barking | 3 | 5 | 5 | 1 | 1 |
| 9 | Feed Treat Ground | 1 | 5 | 5 | 1 | 1 |
| 10 | Feed Treat Hand | 2 | 5 | 5 | 1 | 1 |
| 11 | Sit Beside | 2 | 5 | 5 | 1 | 1 |

Table 10 displays the level of fear that Participant Two indicated on the Dog Scenario Scale at each hierarchy step during each BAT session with the dog on a lead. The dog scenario scale ranged from 1 ‘not scared at all’ through to 5 ‘extremely scared’. During baseline Participant Two’s responses varied greatly from session to session; most likely due to the different types of dog used in each session. After receiving his VSM intervention, Participant Two’s ratings were markedly reduced in both post intervention phase one and post intervention phase two from baseline.

Table 11 displays the level of fear that Participant Two indicated on the Dog Scenario Scale at each hierarchy step during each BAT session with the dog off a lead. During baseline session one Participant Two indicated that he was low on the dog scenario scale, however, the following two sessions he rated very high on the scale. After receiving his VSM intervention, Participant Two’s ratings were markedly reduced in both post intervention phase one and post intervention phase two

from the baseline sessions. These results suggest that the intervention had a significant positive impact on the fear levels of Participant Two when being exposed to dogs both on and off the lead.

Table 11. Participant Two Dog Scenario Scale Rating of BAT Dog Off A Lead

| | Hierarchy Step | Baseline 1 | Baseline 2 | Baseline 3 | Post-Intervention 1 | Post-Intervention 2 |
|---|---|---|---|---|---|---|
| 1 | 50m | 1 | 5 | 5 | 1 | 1 |
| 2 | 40m | 2 | 5 | 5 | 1 | 1 |
| 3 | 30m | 1 | 5 | 5 | 1 | 1 |
| 4 | 20m | 2 | 5 | 5 | 1 | 1 |
| 5 | 10m | 1 | 5 | 5 | 1 | 1 |
| 6 | Standing Beside | 2 | 5 | 5 | 1 | 1 |
| 7 | Patting Dog | 1 | 5 | 5 | 1 | 1 |

**Participant Two Dog Scenario Questionnaire Results**

Figure 8 displays Participant Two's Dog Scenario Questionnaire results. Participant Two was asked to fill out the Dog Scenario Questionnaire using the Dog Scenario Scale at each BAT session and after every viewing of his VSM. During baseline sessions Participant Two consistently rated the scenarios quite highly on the scale; he rated five or more of the nine scenarios at 'scared even more' or above. In his final session, post intervention phase two, Participant Two rated three of the nine scenarios at 'scared a little bit' and the remaining six as 'not scared at all'. These results suggest that the intervention had a significant positive impact on the fear levels of Participant Two when imagining the Dog Scenarios.

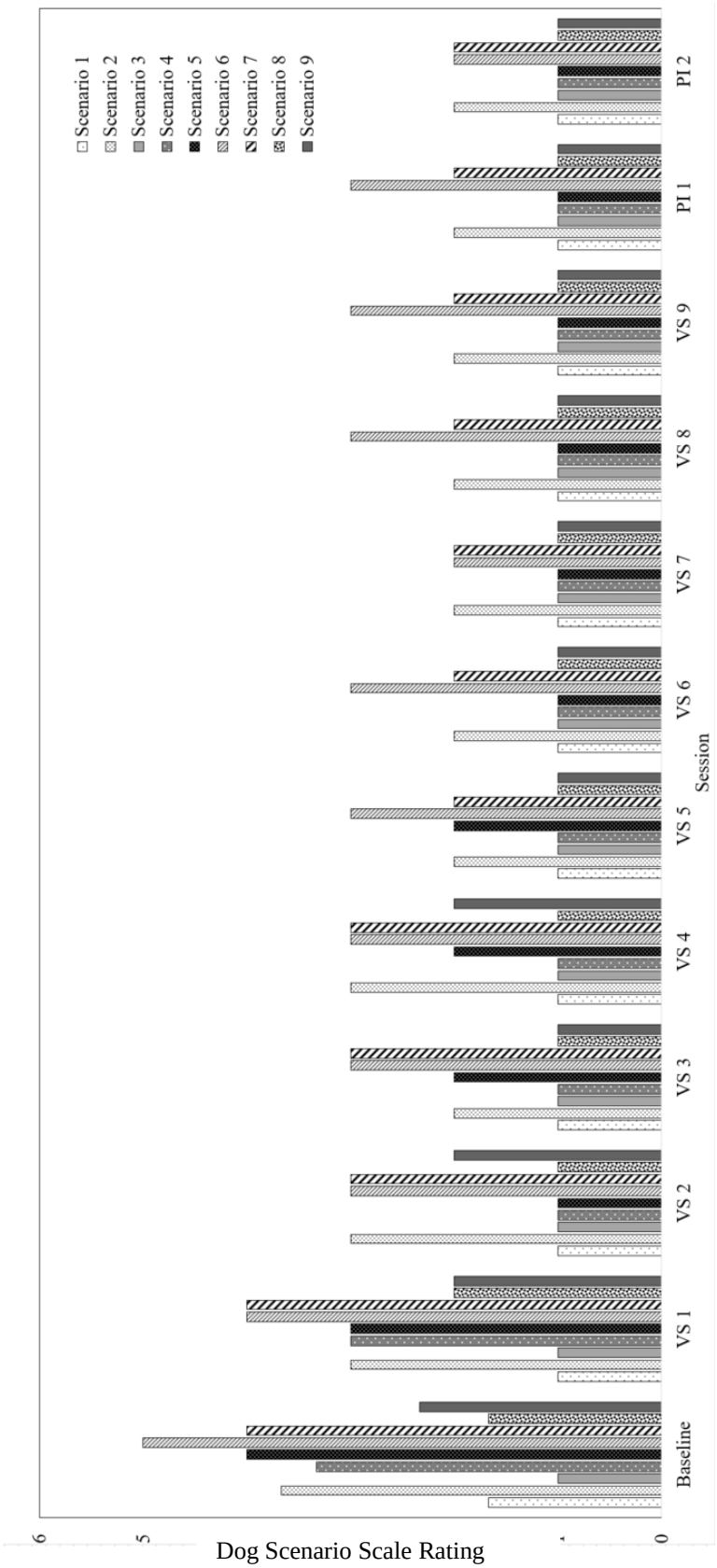



*Figure 8.* Participant Two Dog Scenario Questionnaire Results