INVESTIGATING THE FUNCTIONAL RELATIONSHIP BETWEEN VIDEO MODELING AND IMPROVED SOCIAL LANGUAGE SKILLS OF A CHILD WITH AUTISM

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Abstract

Identifying useful strategies for teaching children with autism to use social language with their peers is a challenge for professionals designing treatment programs. Previous research has documented that video modeling can be effective in teaching children with autism a variety of skills; however, the methods utilized have not demonstrated great success in teaching complex social language use with peers. The purpose of this study was to assess the effectiveness of video modeling for teaching a child with autism to use social language with a typical peer during play. Specifically, the study included the use of multiple response exemplars (i.e., multiple video vignettes as models) for promoting unscripted and generative social language with peers. The results provide suggestive evidence that experimental control was demonstrated using a multiple baseline design across three play activities. The video modeling intervention was effective in increasing social language in two of the three activities. Video feedback and prompting were required in the third activity in order for a stable rate of increased language to occur. The results are discussed with reference to previous research, future directions, and implications for practice.
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CHAPTER 1

Introduction

The importance of supporting the development of meaningful social relationships in all children is unquestionable. Promoting reciprocal social interaction in children with autism is an exceptional challenge, yet is essential to positive social development and outcomes. This chapter will provide an overview of autism, its features and characteristics, and what is known about its prevalence. It will examine the social impairments related to autism and highlight research designed to address the social deficits of children with autism. It will also outline interventions using videotape technology to teach individuals with autism and other developmental disabilities. Video interventions will be emphasized as a method of teaching skills to children with autism in hopes of alleviating some of their deficits related to social interactions. Limitations of the current research on video treatments will be discussed as they relate to teaching social skills to children with autism. Finally, I will propose an intervention using video modeling procedures as a technique to increase the social language skills of children with autism.

Autism

Autism is a disorder that significantly affects many of the essential characteristics of human behavior. Autism is a neurobiological disorder present from birth or very early in life [National Research Council (NRC), 2001]. The disorder is defined in terms of behavioral excesses and behavioral deficits. Behavioral excesses can be seen in terms of the child’s insistence in sameness, and repetitive, stereotyped behaviors. Behavioral deficits encompass the areas of socialization and language. Children with autism present core deficits in social
interaction, forming relationships with others, communication, and other areas of development.

Autism is most easily thought of in terms of a spectrum of disorders. This “spectrum” represents varying degrees of symptomatology. Autism, or “Autistic Disorder,” is included in the Diagnostic and Statistical Manual of Mental Disorders, version IV (text revision) (DSM-IV-TR) under “Pervasive Developmental Disorders (PDD)” [American Psychiatric Association (APA), 2000], which is an umbrella term for disorders that show similar impairments in basic social skills but vary in the severity or presence of communication deficits and other behaviors typically associated with classic autism (NRC, 2001). Autism spectrum disorder (ASD) is an increasingly popular term referring to this broader definition of autism (Dunlap & Bunton-Pierce, 1999). The broad class of autism spectrum disorders includes: (1) Autistic Disorder; (2) Pervasive Developmental Disorder-Not Otherwise Specified (PDD-NOS), “which refers to a collection of features that resemble autism but may not be as severe or extensive” (Dunlap & Bunton-Pierce, 1999, p. 2); (3) Asperger’s disorder, which generally refers to individuals who display the social criteria for autism, but have intact language and average IQ scores; (4) Rett’s Syndrome, a degenerative genetic condition with neurological signs that only affects girls; and (5) Childhood Disintegrative Disorder, which a regressive disorder. What has been described as “classic autism” is listed in the DSM-IV-TR as “autistic disorder.” Table 1 summarizes the symptoms of autism as defined in DSM-IV-TR.
<table>
<thead>
<tr>
<th>Category</th>
<th>Symptom</th>
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| 1. Qualitative impairment in social interaction (must have at least two) | • marked impairment in the use of multiple nonverbal behaviors, as eye-to-eye gaze, facial expression, body postures, and gestures to regulate social interaction  
• failure to develop peer relationships appropriate to developmental level  
• a lack of spontaneous seeking to share enjoyment, interests, or achievements with other people (e.g., by a lack of showing, bringing, or pointing out objects of interest)  
• lack of social or emotional reciprocity  
• delay in, or total lack of, the development of spoken language (not accompanied by an attempt to compensate through alternative modes of communication such as gesture or mime)  
• in individuals with adequate speech, marked impairment in the ability to initiate or sustain a conversation with others  
• stereotyped and repetitive use of language or idiosyncratic language  
• lack of varied, spontaneous make-believe play or social imitative play appropriate to developmental level  
• encompassing preoccupation with one or more stereotyped and restricted patterns of interest that is abnormal either in intensity or focus  
• apparently inflexible adherence to specific, nonfunctional routines or rituals  
• stereotyped and repetitive motor mannerisms (e.g., hand or finger flapping or twisting or complex whole-body movements)  
• persistent preoccupation with parts of objects |
| 2. Qualitative impairments in communication (must have at least one)         |                                                                                                                                               |
| 3. Restricted, repetitive, and stereotyped patterns of behavior, interests, and activities (must have at least one) |                                                                                                                                               |
In addition to these criteria, a child must show delays or abnormal functioning in at least one of the following areas, with onset prior to age 3 years: (1) social interaction, (2) language as used in social communication, or (3) symbolic or imaginative play. If the child does not meet the required number of criteria to warrant a diagnosis of autism, a diagnosis of PDD-NOS may be made. Hence, a child may be diagnosed with an autism spectrum disorder but may not meet full criteria for a diagnosis of autism.

The prevalence rates vary according to whether one is interested in the prevalence of PDD diagnoses in general or in autism diagnoses in particular. Prevalence rates for autism have been reported at approximately 7.5 per 10,000 individuals (Fombonne, 1999). When a broader definition is used and those with any of the PDDs are considered, the rate increases to about 20 cases per 10,000 (Fombonne, 1999). However, in a recent investigation of young children in the United Kingdom, Chakrabarti and Fombonne (2001) found prevalence rates for PDD to be 62.6 per 10,000. Specifically, they reported autism prevalence rates at 16.8 per 10,000, and other PDDs (i.e., PDD-NOS and Asperger's syndrome) at 45.8 per 10,000, suggesting that the rates of both autism and PDD in general are higher than previously reported.

In addition, previous autism studies have suggested that nearly 75% of children with autism have an associated diagnosis of mental retardation, ranging from very mild to profound (APA, 2001). This number is still commonly reported, despite recent suggestions that this number is too high. For example, Chakrabarti and Fombonne (2001) reported an average rate of mental retardation in children with PDD of 26%. In addition, it has been reported that there are three to four boys affected for every girl affected with autism, which has remained relatively stable (NRC, 2001). Clearly, there is much uncertainty regarding the
prevalence rates of autism and associated PDDs. There is some evidence that the rates are increasing, and that many children with PDD -- including those with autistic disorder itself -- may be less cognitively impaired than has previously been described (Chakrabarti & Fombonne, 2001).

Social Impairment in Autism

In Kanner's original report in 1943 in which he described several children with autism, he suggested that "the outstanding, 'pathognomonic,' fundamental disorder is the children's inability to relate themselves in the ordinary way to people and situations from the beginning of life" (p. 41). He also noted an "extreme autistic aloneness" (p. 41) in all the children that he observed. These social difficulties continue to be prevalent in our understanding of autism today. Clearly, what has been called a "difficulty relating socially to other people," (Ozonoff & Miller, 1995, p. 415) is a hallmark of autism. By definition, children with autism demonstrate impairments in social interactions, social reciprocity, relationships, social language, nonverbal communication, imitation, and play skills (APA, 2001). While these deficits can be discussed on a general level, it must be remembered that there are wide-ranging differences within the group of children with autism (NRC, 2001).

Joint attention is one aspect of typical development that is seriously deficient or non-existent in children with autism. Joint attention typically develops pre-linguistically and involves "the triadic coordination of attention between the infant, another person, and an objects or event" (Charman, 1997). In an interaction of joint attention, the primary focus is on the sharing of attention to the event/object, not on the interaction itself. Joint attention behaviors can be imperative, in which the child wants something (much like requesting), or declarative, in which the behavior serves to share awareness or the experience of an event or
object (Charman, 1997). While children with autism usually are not impaired in their ability to share attention for the purpose of requesting a preferred object or activity, they do display serious deficiencies in their production and comprehension of joint attention behaviors that serve the purpose of showing or pointing to an object or event to share the experience of it. Signs of this irregularity are present from very early in a child’s life. In addition, research has documented abnormal patterns of face and eye gaze with children with autism and others in their environments (Dawson, Hill, Spencer, Galpert, & Watson, 1990; Sparling, 1991, as cited in Kohler, Anthony, Steighner, & Hoyson, 2001). In much the same way, children with autism are impaired in sharing affective emotions (Yirmiya, Kasare, Sigman, & Mundy, 1989, as cited in Kohler et al., 2001).

Many children with autism also have very limited or no imitation skills. For example, they demonstrate less imitation of other people’s actions, movements, and vocalizations than chronological-age peers (DeMyer et al., 1972; Stone et al., 1997, as cited in NRC, 2001). Thus, their ability to learn via modeling is impaired. Many of the social skills that typical children learn through observation are simply out of reach for children with autism who have difficulty imitating.

In addition, social language, while encompassing the domain of communication deficits, plays a large role in the social impairments of children with autism. Half of children with autism have no speech or conventional gestures (National Research Council, 2001). Those who do speak often use speech to communicate wants and needs, not for social purposes such as sharing experiences or engaging in conversations. Alternatively, conversational speech may be idiosyncratic or perseverative, reflecting the children’s failure to attend to their listeners’ knowledge state or interest level. Hadwin, Baron-Cohen, Howlin,
and Hill (1997) noted that, "a primary language dysfunction in autism lies in the pragmatic domain, that is, in the functional use of language in social settings" (p. 520). Even nonverbal communication is markedly deficient; the use and interpretation of social gestures may be absent or limited, as is the children’s expressive and receptive understanding of emotions (NRC, 2001).

Other components of social language that are impaired include responsiveness and initiations to peers and others. The ability and motivation to respond to others varies widely; some children with autism have severe deficits in responsiveness to others, while others show some ability to respond to social overtures. However, even if children with autism do respond to others, deficits are almost always apparent in their ability to initiate or maintain interactions that do not result in preferred items or activities (Krantz & McClannahan, 1998). Verbal initiations are rare without instruction, as children with autism are not likely to comment spontaneously about what they are playing with or their interests, ask questions, or offer information (Taylor & Levin, 1998).

Other deficits consistently reported in children with autism are those involving play skills, especially pretend or symbolic play skills. Wide-ranging differences in play skills may be associated with language and IQ scores, as well as age (NRC, 2001). Sensorimotor play may be more consistently impaired in older children than in younger children. However, symbolic play seems to be markedly deficient in most children with autism. Because the core symptoms of autism reflect deficits in their social behavior and hence, their peer interactions, facilitating peer interaction for children with autism is undeniably a complex but essential task.
The Need for Intervention

Incorporating peers into the treatment of children with autism can be thought of as having two related purposes: (1) having peers act as tutors or teachers; and (2) including typical peers as playmates of children with autism to form reciprocal friendships. For both purposes, peers can be either the recipients or the initiators of social interaction (Taylor, 2001). Children with autism might be taught to initiate interactions with peers and/or respond to the social overtures of peers.

Peers can be included as participants in intervention programs, or can be used to measure the generalization of target skills. Hall and Smith (1996) suggested that "A potential factor in the successful generalization of social skills is the inclusion of preferred peers as participants in education and training programs" (p. 2). With regard to interventions designed to promote social interaction, Hall and Smith emphasized that "proximity alone is not sufficient to promote positive social interactions between children with autism and their peers; that is, most children with autism do not 'become socialized' merely by spending time with typical children" (p. 83) and that "in the absence of intervention, interactions are minimal" (p. 83). Thus, it is highly unlikely that children with autism will experience the benefits of social relationships in the absence of interventions designed specifically for this purpose.

Social relationships are especially important in the context of the increasing prevalence of educational practices that support the inclusion of students with autism in regular education classrooms. Schonert-Reichl and Hymel (1996) noted that "If one goal of inclusive education is to promote social acceptance and development among students, then direct interventions designed to facilitate positive social interactions between all students is
necessary, especially in an inclusive setting” (p. 154). Kamps and Kravits (1998) also discussed this notion specifically as it relates to children with autism:

Clearly, the true nature of social integration must be promoted and actively sought for all children. A key is that persons are not just physically integrated or included but that they are actually “interacting” with others. We suggest that this will only happen for students with autism with direct intervention as suggested by these data from social skills and peer network activities as well as other experimental studies. Though structured activities (e.g., social scripts, etc.) may not be quite as ‘natural’ as desired, it may be a necessary first step (p. 115).

The failure to teach social interaction skills may have significant consequences. Whitaker, Barratt, Joy, Potter, and Thomas (1998) emphasized that:

...without systematic intervention, youngsters with autistic spectrum disorders who are placed in mainstream schools are likely to encounter and present substantial difficulties arising from their problems with social interaction, however generous the level of additional staffing. Active avoidance of peer contact, compounded by high levels of well-intentioned adult support, may reduce the youngsters’ opportunities to learn from their peers and prevent the establishment of supportive peer relationships (p. 61).

Clearly, given the significant degree of social impairment experienced by most children with autism, research-based interventions are essential for promoting and enhancing social interactions with peers.
Overview of Interventions to Increase Social Interaction

Since 1943 when Kanner first described autism, numerous treatment approaches have been promoted to treat it, including holding therapy (Tinbergen & Tinbergen, 1983), the Option Method (Kaufman, 1976), DIR/floor time (Greenspan, 1992), vitamin/dietary interventions (Rimland, 1987), sensory integration therapy (Ayers, 1972), auditory integration therapy (Stehli, 1991), facilitated communication (Biklen, 1990; Crossley, 1992), and many others. There is no doubt that "the [current] state of the art in autism treatment remains confusing. Controversy surrounds many forms of interventions, resulting either from the obtrusiveness of the intervention or from the lack of research evidence in its support" (Buggey, Toombs, Gardener, & Cervetti, 1999, p. 205). However, many researchers and practitioners in the field agree that the most effective treatments used today are those based on principles of applied behavior analysis, including discrete trial teaching (Lovaas, 1987, 2002; Smith, 2001), positive behavioral supports (Buggey et al., 1999), and verbal analysis of behavior (Carbone, 2001).

Because even the most effective treatments have limitations, and because children with autism continue to present unique challenges to parents, teachers, and other treatment providers, researchers are continually exploring effective methods of teaching in order to validate existing methods and develop new strategies (Buggey et al., 1999). Various techniques have been demonstrated to be effective in addressing a number of the social impairments of children with autism. Research that is focused on promoting social development, specifically peer interaction, can be divided into four main areas: (a) teaching children with autism to interact with typical peers, (b) teaching typical peers to interact with children with autism, (c) teaching children with autism to interact with their peers with
autism, and (d) teaching children with autism and typical peers to engage in reciprocal interactions (Taylor, 2001). Interventions that have been empirically demonstrated to show some degree of effectiveness for teaching various social interaction skills to children with autism include: (a) the use of script fading procedures (Krantz & McClannahan, 1998), (b) the use of tactile prompts (Taylor & Levin, 1998), (c) naturalistic procedures (Kohler et al., 2001), (d) various peer mediated strategies (Strain & Schwartz, 2001; Strain, Shores, & Timm, 1977), (e) self-management procedures (Koegel, Koegel, Hurley, & Frea, 1992; Newman, Reinecke, & Meingberg, 2000; Stahmer & Schreibman, 1992; Strain & Kohler, 1994), and (f) various videotape intervention techniques (Buggey et al., 1999; Charlop-Christy, Loc, & Freeman, 2000; Charlop & Milstein, 1989; Sherer et. al., 2001; Wert & Neisworth, 2003). This latter body of research is directly relevant to the present study, and will be reviewed briefly in the section that follows.

**Overview of Videotape Intervention Techniques**

Over the past decade in particular, the use of videotape technology has emerged as a promising practice for teaching a wide variety of skills to individuals across a range of disabilities and ages. For example, video modeling has been found to be effective for teaching behaviors such as walking, swimming, and communicating to children with spina bifida, hyperactivity, mutism, and various developmental disabilities (Dowrick, 1999; Dowrick & Dove, 1980, Dowrick & Hood, 1981; Dowrick & Raeburn, 1977). Recently, there has also been an interest in the use of videotape treatments with children with autism, with some success. Such treatments include video modeling techniques, video priming, and video feedback. These three treatments will be introduced in the sections that follow.
Video Modeling

Video modeling "involves the child observing a videotape of a model engaging in a target behavior and subsequently imitating" (Charlop-Christy et al., 2000, p. 537). Two trends with regard to technique can be identified in the literature on video modeling. One technique involves using other people as models in the videos, the "other-as-model paradigm" (Sherer et al., 2001); and the other involves using the observer as his or her own model, the "self-as-model-paradigm" (Sherer et al., 2001), which is often referred to as self-modeling. Dowrick (1983) defined self-modeling as "a procedure in which people see themselves on videotapes showing only adaptive behavior" (p. 105). This technique utilizes videotape editing to achieve the desired modeling video.

Video modeling procedures have been shown to be successful for teaching children with autism a variety of adaptive behaviors including social skills, play skills, requesting skills, self-care skills, purchasing skills, and academic skills. With regard to social skills, research has demonstrated success in teaching children with autism conversation skills (Charlop & Milstein, 1989; Charlop-Christy et al., 2000; Sherer et al., 2001); play-related comments (Taylor, Levin, & Jasper, 1999); appropriate responding to questions during play (Buggey et al., 1999); greetings (Charlop-Christy et al., 2000); independent play skills (Charlop-Christy et al., 2000; D’Ateno, Mangiapanello, & Taylor, 2003); spontaneous requesting (Wert & Neisworth, 2003); perspective taking (Charlop-Christy & Daneshvar, 2003); and verbal statements, gestures, facial expressions, and intonations (Charlop-Christy, Carpenter, & Dennis, 2002).
Video Priming

In addition to video modeling, researchers have examined the use of videotapes for priming children with autism. Priming involves giving an individual information to prepare for the performance of a task or activity (Bainbridge & Myles, 1999). Priming can also be thought of as “a way to manipulate antecedent events, or set up establishing operations” (Schreibman, Whalen, & Stahmer, 2000, p. 3). In much the same way that visual schedules may help children with autism to understand and follow predictable activity sequences in school and home settings (Mirenda, 2001), videotapes may prepare a child for new experiences by portraying a sequence of upcoming events. Thus, rather than target an increase in specific skills as in video modeling, video priming serves the purpose of “previewing” an upcoming event for a child, with the hope of reducing or preventing problem behavior. Video priming has been shown to reduce disruptive behavior during transitions in children with autism (Schreibman et al., 2000) and has also been used to introduce toilet training to a child with autism (Bainbridge & Miles, 1999), although the weaknesses in the design used in the latter study do not allow for a clear interpretation of the results.

Video Feedback

Finally, there is limited research on the use of videotape feedback with individuals with autism. This approach involves videotaping the target individual performing specific behaviors and then co-reviewing the tape with an adult so that the person can evaluate his or her own behaviors. This method incorporates components of self-management into the treatment package as well. Video feedback techniques were demonstrated to be effective for teaching self-care skills to two adolescents; one with autism and one with William syndrome.
(Lasater & Brady (1995). While this is the only study examining a video feedback package with individuals with autism, the procedure shows considerable promise for use in teaching other skills.

Advantages of Video Techniques

One of the primary advantages of utilizing videotape technology to teach children with autism is the ability to reduce adult prompting. Other techniques (e.g., providing externally managed contingencies or supplemental prompts), while documented to be effective in facilitating social interaction skills, can be obtrusive in natural settings where natural interactions typically occur (Taylor & Levin, 1998). In their discussion on the use of a video feedback procedure to increase desirable social interactions and decrease undesirable interactions among peers with behavioral and emotional issues, Kern-Dunlap et al. (1992) suggested that, when externally managed contingencies are administered by adults, they “can be viewed as interfering with the ongoing flow of student-to-student interactions” (p. 356). Furthermore, children with autism can become readily dependent on prompts delivered by adults during social interactions in particular, and thus may be unable to display appropriate social behaviors in the absence of treatment providers. The use of videotape techniques to teach children with autism may provide an effective alternative to experimenter-implemented reinforcement contingencies or prompts and result in less prompt-dependent social behavior.

Limitations of Current Research

Videotape procedures have demonstrated that children with autism are able to exhibit social skills after watching a model perform specific target behaviors. However, there are several limitations of the research on using videotape techniques to teach social interaction skills to children with autism. The limitations will be reviewed briefly in this section.
Limited Number of Studies and Limited Scope of Research

Because videotape interventions are quite new for children with autism, there has not been an extensive range of studies documenting effectiveness across a wide range of children. In particular, fewer than a dozen studies have evaluated the outcomes of videotape modeling procedures for teaching social skills to children with autism, and several of these included only a single social skill among other behaviors that were targeted. To date, there has been only one study (Thiemann & Goldstein, 2001) that has examined the effectiveness of a videotape technique for teaching social language with peers to children with autism. However, this study was fairly limited in scope and included only one aspect of video feedback among an entire intervention package that incorporated peer training, social stories, written text cues, adult prompting, video feedback, self and group evaluation, and reinforcement.

Narrow Range of Target Social Behaviors

The primary social skills targeted in past videotape intervention research have been either very basic or quite ritualized, including skills such as greetings (Charlop-Christy, et al., 2000), responding to specific questions (Buggey et al., 1999), or answering a question and then asking the same question back in a rote format (Sherer et al., 2001). Nikopoulos and Keenan (2003) attempted to teach adult-directed social initiations (i.e., either leading an adult by the hand or using verbal statements) but found only partial success with four out of seven children. Those four children learned to initiate primarily in a controlled setting with the presence of a specific toy.

Success has also been demonstrated in teaching some conversation skills; however, while good generalization has been reported, the conversations have all followed a highly
scripted format. For example, Charlop and Milstein (1989) and Charlop et al. (2000) taught children with autism to engage in conversations using videotape modeling procedures. The children learned to talk about different topics with different people, and even generalized from conversations about physical referents to abstract conversations. However, all of the conversations started with the experimenter asking a question. The next three turns consisted of the child with autism answering a question and then asking a question back. Thus, none of the children learned to initiate conversations or to interact outside of the scripted formula. Furthermore, neither of these two studies examined generalization to typical peers. Taylor et al. (1999) were successful in teaching two children with autism to initiate play statements to siblings, but no unscripted comments were made by one of the children, and generalization to peers other than siblings was not assessed. D'Ateno et al. (2003) taught complex solitary play skills and “self-talk” verbalizations to a preschooler with autism, but they did not assess generalization to peers. From these examples, it is clear that there is a need for research that examines the use of videotape interventions for teaching both scripted and unscripted language that is used during social interactions with peers.

**Failure to Use Specific Strategies to Promote Generalization**

Two types of generalization have been described in the literature on applied behavior analysis. The first, stimulus generalization, refers to the occurrence of trained skills in novel settings, with novel people, and/or with novel materials (Heward, 1987). The second, response generalization, refers to the occurrence of new skills that are in the same response class as trained skills but have not been taught directly (Heward, 1987). Following an intervention designed to increase social language in children with autism, the use of unscripted (i.e., un-taught) verbalizations would be indicative of response generalization.
Unfortunately, the occurrence of unscripted verbalizations following videotape interventions has not been documented to date. In fact, some researchers (e.g., Taylor et al., 1999) have speculated that videotape interventions may only be effective for teaching scripted social language skills to children with autism.

While several of the existing videotape studies have assessed stimulus generalization in children with autism, none have used specific strategies that are designed to promote response generalization. Such studies reflect the use of what Stokes and Baer (1977) referred to as a “train and hope” strategy with regard to response generalization – a strategy that, more often than not, fails to produce positive outcomes. As alternatives, Stokes and Baer described several preferred strategies in this regard, including (a) introducing natural maintaining contingencies, (b) training sufficient exemplars, (c) training loosely, (d) using indiscriminable contingencies, (e) programming common stimuli, (f) mediating generalization, and (g) training to generalize. Training a sufficient number of exemplars to elicit generalized responding (i.e., rather than only scripted responding) is particularly applicable to interventions designed to promote generative social language of children with autism. Stokes and Baer described the technique of training sufficient exemplars as “perhaps one of the most valuable areas of programming” (p. 355). Obviously, it is impossible to train all of the possible verbalizations that a child with autism may demonstrate with a peer. Rather, programming multiple exemplars of responses may promote the generalized responding that is often sought when teaching social language to children with autism.

Combining Other Treatments

Many videotape intervention studies have incorporated other features into the intervention package, making it difficult to ascertain which component is primarily effective.
For example, studies have included reinforcement; practice sessions with an adult following video viewing; or multi-component packages including discrimination training, role plays, debriefing, reinforcement, social stories, and prompting (Lasater & Brady, 1995; Thiemann & Goldstein, 2001). Research is needed to isolate the impact of a videotape intervention alone for teaching social skills and other behaviors.

Purpose of the Study

The goal of this study was to extend the current research by evaluating the effects of a video modeling intervention on the social interaction skills of a child with autism. The unique features of this study included (a) the use of a videotape modeling intervention with multiple vignettes (i.e., multiple exemplars) to teach social language to a child with autism during peer play activities; (b) the inclusion of complex social language skills as dependent measures, and (c) the use of videotape modeling alone, without additional contingencies or prompts. Previous researchers have documented the effectiveness of videotape modeling procedures for teaching simple, rote social language skills, yet the research has not shown much success for teaching unscripted, novel social language. This study will extend the current literature of video modeling by increasing the number of vignettes used to model play and language use, aiming to promote more generative, unscripted social language. Specifically, the study will address the following questions:

1. Is there a functional relationship between a video modeling intervention using multiple exemplars and an increase in total social language verbalizations in a child with autism?

2. Does a video modeling procedure with multiple exemplars lead to an increase in both scripted and unscripted language in a child with autism?
3. Does a video modeling procedure with multiple exemplars lead to an increase in both initiations and responses in a child with autism?
CHAPTER 2

Review of the Literature

This chapter will highlight the importance of teaching peer interaction skills to children with autism, examine interventions in which researchers that have attempted to teach social interaction skills, identify several areas that warrant extra attention, and illustrate why the proposed intervention holds promise for teaching children with autism to interact with peers. In addition to discussing general interventions designed to promote social skills, I will review the existing literature on using videotape interventions with individuals with autism. I will discuss various uses for videotapes in autism treatment and will also examine some of the pertinent issues in this area. I will suggest that using multiple exemplars as a video modeling intervention has much to offer in teaching peer interaction skills to children with autism. The chapter will conclude with a discussion and examination of some of the attractive features of video intervention, and the contributions that video modeling can provide in teaching children with autism peer interaction skills. I will examine some hypotheses as to why this may be an effective intervention for children with autism. Finally, I will explore the current state of the science in this area and suggest what we need to know to utilize video interventions with children with autism effectively.

The Importance of Social Relationships

Every day, we experience situations in which we are expected to be social. When many of us think of our happiest times, we think of other people with whom we shared those times. In fact, it is difficult to think of meaningful moments without thinking of ourselves interacting with another person. Aside from the expectations of our social world, social relationships provide benefits to an individual’s life and are central to the positive social
development of children. In addition, fostering positive social development in children is important for ensuring academic success as well as social competence among children (Schonert-Reichl & Hymel, 1996). We have a better understanding of why friendships and social relations are so vital for children when we examine research that examines peer acceptance, friendship participation among children, the nature of these friendships, and the consequences associated with peer relationship problems (Asher & Rose, 1997).

Research examining typical children's social and emotional development has provided us with an understanding of peer adjustment, benefits, and consequences. The importance of peer acceptance versus rejection by a peer group is recognized in a range of research. Asher and Rose (1997) discussed the stable nature of a child's level of acceptance, as well as some of the behavioral correlates of peer acceptance. Research shows that, in general, children who are well accepted display more prosocial characteristics such as friendliness, cooperativeness, helpfulness, and kindness. On the other hand, children who are poorly accepted show more aggressive, disruptive, and withdrawn behavior. Research on friendships highlights many relationship benefits, such as companionship, help and guidance, validation, support, and a place for intimate exchange or self-disclosure (Asher & Rose, 1997). Strain and Schwartz (2001) also discussed the "natural support function" (p. 120) that friendships provide. They noted that friends "have a ready, willing, and largely noncontingent source of support to accomplish tasks, gain entry into social groups, and establish yet other networks of social support" (p. 120). They also discussed the social learning function of friendships for providing children with information about social conventions and acceptable conduct as well as opportunities to acquire and practice new skills.
Asher and Rose (1997) also noted many ways that factors such as the quality of a friendship can uniquely contribute to peer adjustment. In examining loneliness, they demonstrated that even one high quality friendship can act as a buffer against some of the consequences of peer relationship problems. Some of the consequences of a low level of acceptance and/or a lack of friends include: lack of opportunities to experience benefits of friendship; lower self-esteem; increased social anxiety, depression, loneliness; and an increased likelihood of school avoidance, which can lead to academic problems or even school dropout. On the other hand, research has shown that having friends and/or familiar peers in kindergarten can lead to a more positive school adjustment, positive school attitudes, and, in some cases, a likelihood of higher academic achievement (Birch & Ladd, 1996; Ladd, 1990, as cited in Asher & Rose, 1997).

Clearly, examining the research on social development is a necessary first step in discussing any interventions that are designed to promote this development in children who experience difficulty in this area. Children with autism can not only experience many of the positive benefits of peer relationships, but also can likely experience many of the same consequences if they lack acceptance and friendships. As the core symptoms in autism reflect deficits in their social behavior, facilitating or promoting positive peer relationships for children with autism is a difficult but necessary endeavor.

Treatment providers, teachers, and parents face distinct challenges in developing social relationships among children with autism and their peers. As indicated in Chapter 1, children with autism have significant deficits in social skills. Thus, they often have great difficulty interacting appropriately with peers. Even when skill deficits are not present, a child with autism may fail to use the skills that he or she has developed in other settings, with
peers. For example, a child may have developed appropriate play and language skills in one setting or with adults, but may continue to play silently beside other children. Or, a child may be reliant on adult prompting to initiate or engage in social exchanges with peers. Of course, many children with autism are involved in intensive behavioral treatment programs and make significant improvements in their ability to follow directions, imitate adults, play with toys, and so forth (Taylor, 2001). As these skill repertoires increase, children with autism are likely to benefit from interventions to promote peer interaction. These interventions require individualization and careful planning to benefit children with autism (Taylor, 2001).

*The Importance of Spontaneous Language, Generalization, and Maintenance*

While many studies have documented success in teaching children with autism specific skills related to social interaction, they vary in their definitions of social interaction and their inclusion of specific behaviors related to social interaction. Studies in this area also vary with regard to the inclusion of measures related to generalization -- especially generalization to peers -- as well as measures related to the maintenance of treatment effects following treatment. When examining research on teaching children with autism social interaction skills, it is necessary to clearly describe target behaviors, include measures of generalization across a variety of dimensions, and ensure that behaviors learned will be maintained over time.

The specific social behaviors targeted for intervention have varied greatly across studies. Hence, "social interaction" may take on different meanings for different authors depending on the specific components targeted. In particular, social language can take many forms, ranging from requesting, to commenting, to initiating, to responding; and some forms of social language may be easier to teach than others. For example, for children with autism
in particular, the acquisition of a generalized commenting repertoire may be more difficult to acquire than a requesting repertoire, since commenting primarily benefits the listener whereas requesting primarily benefits the speaker directly (Skinner, 1957). Thus, if attention from a listener is not an established conditioned reinforcer, the motivation for commenting may be insufficient to sustain its generalized use (Halle, 1987). In addition, regardless of the skills taught, efforts to increase social interaction skills may be useless if newly-acquired behaviors do not generalize across people, settings, and stimuli. Some studies in this area have not included measures of generalization at all. Other studies have included generalization measures across certain dimensions but have omitted others, such as the generalization of skills to peers.

With these critical issues in mind, I will examine the research involving interventions designed to increase social interaction skills of children with autism. Taylor (2001) provided a useful system for organizing research in this area; she divided the research into four general areas: (a) teaching children with autism to interact with their peers with autism, (b) teaching typical peers to engage in social interactions with children with autism, (c) teaching both typical children and children with autism to engage in reciprocal interactions, and (d) teaching children with autism to interact with typical peers. This chapter will utilize this framework in its discussion of the literature.

*Teaching Children with Autism to Interact with Other Children with Autism*

The first area of research involves teaching children with autism to interact with their peers with autism. Only one research study has been done in this area. Hall and Smith (1996) discussed the necessity of identifying strategies that effectively promote social interaction between children with autism because of the fact that social skills are taught in both
integrated and segregated settings. Thus, social skills training may occur in segregated settings, at least initially, especially for children who receive 1:1 intensive intervention. Hall and Smith (1996) investigated whether it was possible for children with autism to identify mutually preferred playmates, using a sociometric measure consisting of photographs of peers who were other children with autism. They also evaluated a social skills program and its effects on the generalization of social interaction among children with autism to the playground. The social skills program consisted of 7 or 8 weekly, 15 minute sessions and involved pairs of mutually selected children. Sessions included activities that emphasized sharing and turn taking, such as ball games and blocks. Assistants encouraged children to focus on their peer partners while playing and talking, and also provided models and prompts for appropriate greetings and farewells. The results indicated that, out of 15 children with autism, over half could identify preferred peers. Of these, five children made reciprocal nominations and were thus included in the study, leading the authors to state that “children with autism do have preferred playmates and these relationships can be considered when social interaction programs are designed” (p. 317). The social skills intervention, which included the mutually preferred peers, resulted in some increases in sharing, verbal interaction, affection, and play initiation behaviors from playground observations (the generalization setting) for at 3 out of the 5 boys. While not all children benefited equally or showed consistent increases in target skills, all children demonstrated improved social skills in some form. However, the results of this study must be interpreted cautiously, given the fact that used an AB design that did not enable demonstration of experimental control. However, the study did introduce the idea of including preferred peers in treatment and provided suggestive evidence that “children with autism can generalize targeted social skills
to peers with autism” (p. 318). Clearly, the next step in a study such as this is to evaluate the intervention using a rigorous research design, and to include measures that measure generalization and maintenance more precisely.

*Teaching Typical Peers Skills to Interact with Children with Autism*

Another focus of research in the area of social development is on teaching typical peers to interact with children with autism (Taylor, 2001) or teaching peers to be intervention agents (Strain & Schwartz, 2001). In general, researchers investigating peer-mediated strategies have demonstrated significant increases in social interaction between children with autism and typical peers as a result of training typical peers to make various social initiations such as organizing play (e.g. suggesting a play idea, directing another child to a play activity), sharing, giving affection and praise, offering or requesting help, and so forth. Typically, peers are taught the strategies using role-plays with adults and then are prompted to use them with children with autism and reinforced for doing so. Several variables have been found to be important for successful generalization and maintenance; these include specific peer characteristics, prompting methods, reinforcement strategies, methods of fading, setting characteristics, and the use of multiple peers in training (NRC, 2001).

Research to date has shown that peer-mediated strategies can be very effective in promoting social development of children with autism; however, they are usually complex to deliver and require skilled peers, as well as carefully planned and implemented procedures (NRC, 2001). Phillip Strain and his colleagues have published a large body of research documenting the success of peer-mediated strategies for increasing the social skills of children with autism. While a thorough review of these studies is beyond the scope of this paper, I will review a few of the primary studies in this regard.
In one of the first studies of peer social initiations, Strain et al. (1977) taught specific behaviors to typical peers, so that they could engage children with autism in social play. The peers were taught to initiate play with children with autism, using phrases such as “come play” and “let’s play ball,” while engaging the children with autism in related activities. Baseline data showed rare interactions, with the typical peers only occasionally directing interactions toward their peers with autism. Following intervention, peer initiations increased and the responses of children with autism to these initiations immediately increased as well. In this case, training typical peers proved to be effective for increasing responding in children with autism, but the effects of the intervention were limited because the peers tended to rely on adults to prompt them to use their learned strategies consistently.

A series of subsequent studies further documented the effectiveness of teaching peers to initiate play with children with autism (e.g., Strain et al., 1977; Ragland, Kerr, & Strain, 1978; Strain, Kerr, & Ragland, 1979). Strain and Kohler (1998) noted that the results indicated that (a) generalization effects are often weak, (b) peer initiation training often leads to a brief increase in negative interactions when children with autism engage in problem behaviors following interruptions to self-stimulatory behavior, (c) there is often variability in children’s responsiveness to intervention, (d) there seems to be a relationship between the success of an intervention and the social functioning of target children prior to intervention, and (e) in order for peer-mediated interventions to be successful, high levels of teacher involvement are usually required.

In an attempt to overcome the finding that success with peer-mediated strategies can be limited to situations in which adults are available to prompt typical peers to use the strategies, Sainato, Goldstein, and Strain (1992) examined the use of self-evaluation
procedures to promote the use of learned strategies by typical peers. Following training in the use of facilitative strategies such as attention getters, play organizers (i.e., suggesting an activity), sharing, and responding, the researchers evaluated the effects of training on both typical preschoolers and the children with autism. They found that the peers did not significantly increase their use of strategies until they were taught to self-evaluate their use; and that teacher prompting decreased concurrently. The target children’s frequency of social interactions increased only after the self-evaluation intervention was implemented with the typical peers. Similarly, generalization effects were poor until the self-evaluation component was implemented in the generalization setting. Unfortunately, no follow-up measures were available to indicate whether the peers continued to use the facilitative strategies or whether the target children’s increases in social interaction persisted following intervention. Also, it is important to note that changes in the behavior of children with autism occurred mainly with regard to their responsiveness to peer initiations.

Strain and colleagues also have investigated other methods of reducing or minimizing adult prompting. In a review of peer-mediated interventions, Strain and Kohler (1998) evaluated the use of group-oriented contingencies for promoting social interaction skills among peers with autism and their typical peers. Group contingencies involve standardized, dependent and interdependent contingencies that are applied to the behavior of individuals or the group as a whole (Strain & Schwartz, 2001). Specifically, the group receives reinforcement based on the behavior of an individual or the number of social interactions in the group. These strategies have been shown to be effective in producing changes in children’s social behavior when they include explicit training of peers to engage in specific responses (Strain & Schwartz, 2001).
Pierce and Schreibman (1997) also examined the effects of using peer trainers to promote the use of multiple social skills in two children with autism. Intervention consisted of training peers in naturalistic pivotal response training (PRT) strategies such as getting the attention of the child with autism, giving him/her choices, modeling appropriate behavior, encouraging and extending conversations, and commenting. After learning the PRT strategies with adults, peers were instructed to use the strategies with target children with autism. Feedback was faded as the peers became successful at implementing the strategies. The researchers found that, after peers implemented the PRT strategies, the children with autism showed increased levels of language exchanges, initiations, varied toy play, and frequency and quality of language use. Both children with autism and peers generalized their conversation skills to peers not included in the study.

Recently, Laushey and Heflin (2000) examined the effects of a peer-initiated procedure taught to an entire kindergarten class, including a peer with autism. Two classrooms participated, both including one child with autism or PDD-NOS. The researchers used a reversal design to assess the effects of a “buddy system treatment” and the subsequent removal of the buddy system structure. During the buddy system, the children were first taught to “stay with, play with, and talk to a buddy” (p. 186). The specific social skills targeted consisted of asking for an object, responding, getting a peer’s attention, waiting for a turn, and looking at a peer when he or she was talking. Each day, every child had a different buddy. Data indicated that the buddy program was responsible for significant increases of appropriate social skills for the children with autism. Generalization and follow-up probes were taken for one child with autism at the beginning of his grade one year. These measures
indicated that the participant maintained his level of performance on the target skills and generalized them to a new environment without the implementation of a buddy system.

In a review of peer-mediated approaches, Strain and Kohler (1998) discussed the highly structured and proscribed procedures characteristic of early peer-mediated approaches and some of the limitations associated with these procedures. They also reviewed two studies (Kohler, Strain, & Goldstein, 1994; Kohler, Strain, Hoyson, & Jamieson, 1997) that examined a combination of naturalistic approaches and peer-mediated strategies, and suggested that combining peer-mediated tactics with naturalistic tactics appears to be an efficient way of promoting social interaction of children with autism. Finally, they also suggested that approaches such as self-monitoring may be effective for reducing adult prompts.

Teaching Children with Autism and Typical Peers Reciprocal Interactions

There is also a body of research that focuses on teaching children with autism and typical peers to engage in reciprocal interactions (Taylor, 2001). Gonzalez-Lopez and Kamps (1997) suggested that the ability of children with autism to develop reciprocal social interactions is "limited by lack of responsivity to others' initiations and the absence of social initiations on their part" (p. 13). In this area of social interaction, research has focused on both training peers to initiate and maintain interactions, and on teaching appropriate social behaviors to children with autism. For example, Gonzalez-Lopez and Kamps used direct instruction to teach skills such as greetings, imitating and following instructions, sharing, taking turns, asking for help, and requesting to four children with autism and 12 typical peers, in a small group format. Skills targeted were neither rote nor scripted; rather, they were skills that could be applied to various situations. The typical peers were also given
information about autism and some training in basic behavior management procedures. A reinforcement and feedback procedure that included stickers and star charts was also implemented in the final phase of intervention for all children. Results of this ABCAC design study indicated that social skills training and reinforcement, when used together, significantly increased the duration and frequency of interactions of children with autism. Also, target students used more social behaviors following social skills training and reinforcement, as shown by behavioral ratings. The results for the typical peers were considerably more variable and less consistent, although most peers increased their levels of interaction as well. The intervention also proved to be effective for teaching typical peers some basic behavior management techniques that better equipped them to deal with problem behaviors when they occurred. This study demonstrated that social skills training combined with a reinforcement system was effective in increasing interactions for both children with autism and for typical peers. While social skills training alone did result in some increases, greater increases were achieved when the reinforcement phase was added. No information on generalization or follow-up was gathered for these students.

In more recent investigations, Kamps et al. (2002) examined the role of peer training when embedded within interventions designed to increase participation of children with autism. The contexts of the first study were social skills and cooperative learning groups. The first study found that both cooperative learning and social skills groups combined with peer training increased the amount of time engaged in social interaction for the children with autism and their peers. In addition, two social behavior follow-up probes conducted in non-training settings showed that the effects generalized and were maintained following intervention, with the cooperative learning groups demonstrating better generalization. A
second study by the same investigators included a sample of 34 students with autism and examined the generalization effects of multiple peer social groups on social interaction skills. Peer groups included social skills groups, cooperative learning groups, and lunch and recess buddy programs. The groups involved trained peers, familiar peers (not trained), and stranger peers. Kamps et al. found that the duration of reciprocal social interactions increased over time for both students with autism and their trained peers (i.e., peers who participated in at least one peer mediation program). Students with autism who participated in multiple peer mediation programs showed greater generalization across peers, although social interaction was highest with trained peers. On the basis of these results, Kamps et al. (2002) noted that “peer mediation needs to incorporate the use of effective instructional strategies such as modeling and reinforcement (Gonzalez-Lopez & Kamps, 1997), visual cueing and scripts (Krantz & McClannahan, 1998), and self-management techniques (Koegel, Harrower, & Koegel, 1999) to enhance student acquisition of social skills” (p. 185) for both children with autism and their typical peers.

Recently, McGrath, Bosch, Sullivan, and Fuqua (2003) examined the effectiveness of peer and individual social skills training for a 4-year-old child with autism and several of his peers in a local preschool. Training techniques included verbal instruction, modeling, prompting, shaping, and reinforcement. Social skills training involved teaching both the target child and the peers several childhood games and teaching the peers various strategies to get the target child’s attention, make initiations, and play with him. In addition, the researchers taught the target child several response strategies, including how to play with his peers independently. The investigators found that, after 18 sessions of social skills training with the peers and with the target child separately and then 8 sessions with the peers and
target child simultaneously, the number of initiations made by the peers towards the target child increased from 2 to 7 per 10-minute session, which was higher than rates on comparative measures taken with typical peers. In addition, the number of appropriate responses made by the target child increased from 1 to 24 per 10-minute session over the intervention. Measures of social validity also supported the positive changes. Clearly, this intervention was effective in increasing both peer initiations and the target child’s responses; however, no discussion of the target child’s ability to initiate with the typical peers was included and no mention was made of generalization or follow-up measures. Thus, it is difficult to establish the clinical significance of this intervention for children with autism and their peers.

_Teaching Children with Autism to Interact with Typical Peers_

Finally, there has been a wealth of research indicating various degrees of success for teaching social interaction skills to children with autism so that they can interact with typical peers. Although much of this research shows that interactions are often dependent on consistent adult prompting and attention (Strain & Kohler, 1994), there have been many attempts to find strategies that result in independent and spontaneous interactions by children with autism in the absence of adults. These will be reviewed briefly in this section.

_Tactile Prompts_

Taylor and Levin (1998) examined the utility of using a tactile prompt with a 9-year-old student with autism who was learning to initiate verbal interactions about his play activities. A battery-operated electronic device placed in the student’s pocket was set to vibrate at 1-minute intervals, which prompted the student to turn to another person and talk about the play activity in which he was involved at the time. Results indicated that verbal
initiations without verbal prompts from an adult only occurred during the tactile prompt condition, and generalization and follow-up probes with typically developing peers indicated that the tactile prompt was effective in producing initiations with peers during other cooperative learning activities as well. Once initiations were produced by the student with autism, his peers began to engage in more interactions as well and reciprocal interactions also increased. While the tactile prompt appears to be an effective way of eliminating often-obtrusive adult prompts in the midst of peer interactions, the limitations of this study include the difficulty experienced with fading the device and the limited long term follow-up data.

Written Scripts

Krantz and McClannahan (1998) investigated the use of a script fading procedure for teaching children with autism to initiate spontaneously with others. They embedded written scripts with cues to say simple phrases such as “Look” and “Watch me” into the children’s photographic activity schedules, and taught the children to approach another person, verbalize the scripted statement, and engage in an activity. All three of the children learned to say the scripted comments, and two of the three quickly began to elaborate and to make some unscripted statements in their interactions. The results also transferred to new people and new activities. While this study did not specifically examine peer interactions, it may be promising as an intervention targeted with peers.

Naturalistic Teaching Strategies

Kohler et al. (2001) evaluated naturalistic teaching strategies for teaching four children with autism social interaction skills in an integrated preschool. They provided teachers with training in naturalistic strategies such as using novel materials, joining an ongoing activity, having the child with autism make choices, using incidental teaching
strategies, using comments and questions, requiring expansions of talk, and inviting peer interactions. The authors found that, when teachers were provided with technical assistance and feedback on naturalistic strategies, all four children increased their social interactions, and these interactions remained at a similar level during a maintenance phase for two of the children. However, the increases were "both gradual and modest" (p. 102). For example, one child's interactions with peers increased from 1% during baseline to 17% during the technical assistance phase. While the results were not dramatic, this study shows that naturalistic strategies can have some impact on children's social interactions without the use of explicit instruction or adult prompts and directions. However, the intervention occurred in the environment in which the social behaviors were intended to be used, and measures of generalization were included.

Self-Management

Self-management techniques are also useful in teaching children with autism to interact with typical peers. Strain and Kohler (1994) examined the effects of a self-monitoring package on social interactions of three preschool boys with autism. They were interested in fading the adult-mediated components (i.e., the frequency of adult prompts and attention) of a social skills intervention that consisted of play organizer suggestions, offers and requests to share, and offers and requests for assistance. Language was targeted in a general format, with no scripted procedures involved. Visual supports in the form of posters displaying target skills were also displayed around the classroom. The self-monitoring procedure involved the children putting foam disks into a cylinder following each positive initiation, concurrent interaction, or response. After a criterion number of disks were accumulated in the cylinder, both the target children and their peers received a small edible
reward. Results showed that the self-monitoring package produced large and immediate increases in the social interactions of all three boys at school and at home. Adult prompts and edible rewards were successfully faded in both settings; however, generalization and follow-up data were not collected.

Taylor and Holberton (1998, as cited in Taylor, 2001) also described a procedure in which two boys with autism were taught to self-monitor their use of comments and questions during snack time by making check marks on an index card whenever they used these skills. At the end of the conversational interaction, the children were able to choose a preferred activity. Taylor and Holberton found that the boys engaged in significantly higher rates of questions and comments about a variety of topics when this system was introduced. The system was eventually faded out and both boys continued to ask each other questions and make comments.

Self-management procedures have also been successful for increasing the responsiveness of children with autism with typical peers (Koegel et al., 1992), increasing varied responding of children with autism (Newman et al., 2000), increasing appropriate play in unsupervised settings (Stahmer & Schreibman, 1992) and reducing disruptive behaviors (e.g. Mancina, Tankersley, Kamps, Kravits & Parrett, 2000; Newman, Tuntigian, Ryan & Reinecke, 1997). While these studies are not all directly related to social interactions, they demonstrate the utility of self-management procedures as an effective intervention across a wide range of skills.

**Videotape Interventions**

A final category of promising interventions for facilitating peer interaction involves the use of videotapes. Videotape treatments – in particular, video modeling interventions --
have many attractive features that make them ideal for implementation with children with autism. First, video modeling is relatively unobtrusive and can be readily incorporated into almost any treatment paradigm with children with autism (Buggey et al., 1999). Second, research has shown that it can be effective in a wide range of environments, including homes, treatment clinics, after-school programs, and classrooms. Third, video modeling can be combined with other techniques that may increase its effectiveness. Alcantara (1994) noted that "because instructors or teachers are the ones to implement a variety of training techniques in their classrooms, they may be more receptive to conducting replication studies when the techniques are as lifelike as possible, including allowing instructors to deliver assistance to students whenever it is necessary" (p. 51). Alcantara demonstrated that video modeling could be implemented in the classroom and that the new skills successfully transferred to other settings.

Fourth, videotape equipment is becoming increasingly available at decreasing cost, and most families and schools consider videotape playback machines to be standard equipment (Schreibman et al., 2000). Fifth, many children with autism find watching videotapes to be reinforcing, and may display high levels of motivation to watch them. For example, Lasater and Brady (1995) noted that the boys with autism in their study enjoyed participating right from the beginning and were eager to see the videotapes used as models. Sixth, some researchers have suggested that the use of videotapes may help to compensate for the stimulus overselectivity often exhibited by children with autism since, when filming, a video camera can readily zoom in on relevant cues in order to highlight specific target behaviors. This may enable the child to focus on the relevant information and thus promote more rapid acquisition (Charlop-Christy & Daneshvar, 2003).
Schreibman et al. (2000) described some additional advantages of videotape intervention. They noted the benefits of presenting information visually as opposed to auditorily for individuals with autism. Also, they noted that “video allows for the presentation of future events in a manner that allows for many of the cues associated with the primed situation (e.g., sight, sound, movement, ancillary features of the environment), which is not possible with verbal description or pictorial representation” (p. 9). They also suggested that, because of their visual nature, video techniques may be more effective for children who have limited ability to comprehend verbal descriptions. Sherer et al. (2001) proposed the idea that the acquisition of skills from video modeling may be related to the relatively intact “visual processing abilities” of children with autism, and noted that the children in their study who made remarkable gains were reported as having “extraordinary visual memories and a preference for compulsions with visual stimuli” (p. 146). Videotape interventions also offer a way to teach skills without externally managed contingencies or prompts, and without having to disturb ongoing peer interactions.

A final strength emerging from the video modeling research revolves around the finding that “using videos is a strategy that generalizes across individuals and settings and maintains over time” (Sherer et al., 2001, p. 146). This generalization may be attributed to several factors inherent in video interventions that provide more “facilitators of generalization” (Stokes & Baer, 1977) such as the use of multiple exemplars (Charlop & Milstein, 1989) and programming common stimuli such as everyday tasks, toys, and video viewing, which is strongly associated with most children’s natural environments (Charlop-Christy et al., 2000). Charlop-Christy et al. also suggested that, since children with autism commonly imitate what they see on television or videotapes, this form of intervention may
provide natural contingencies. The use of videotape also allows children to remain separate from the context of new behaviors, which may lead to better generalization.

Treatments utilizing videotapes include video priming techniques that are designed to prepare individuals for upcoming events; video feedback techniques, which include aspects of self-management procedures; and video modeling techniques that use either other people as models, or the self as a model. These will be reviewed in the next sections.

Video Priming

Only two video priming studies have been conducted with participants with autism. Schreibman et al. (2000) examined the effects of video priming for reducing disruptive behavior during transitions. Their subjects included three boys with autism who all displayed severe behavior problems during transitions. The researchers created videotapes by carrying a video camera through each transition setting from a position that simulated the child’s-eye view of each environment. The specific settings depended on the identified problem transitions for each child (e.g., getting ready and leaving the house). No human models were included in the videotapes, each of which was 1 to 4 minutes long. During intervention, each child was shown his transition video and then immediately engaged in the transition activity itself. Results indicated that video priming reduced problem behavior to near-zero levels in all three children. Two of the children showed reduced problem behavior immediately after treatment, and one child responded more gradually. In addition, after inappropriate behaviors decreased in the target settings, the effects generalized to untreated settings in all but one instance. This research shows the powerful effects that video priming can have in reducing or eliminating problem behaviors associated with transitions. Future research is necessary to
compare the effectiveness of video priming with other strategies, such as priming using picture schedules, to see which is superior.

Another study used video priming in a different way. Bainbridge and Myles (1999) used priming to introduce toilet training to a child with autism. The participant was a 3-year-old boy who was shown a toilet training video three times per day and then verbally prompted to go to the bathroom each time. While this was a case study and the results were not dramatic, there was a slight increase in the mean number of dry diapers per day. This study provides another example of a promising priming method for preparing children with autism to learn skills that may be difficult to teach.

**Video Feedback**

Research is also emerging on the use of video feedback (i.e., self-assessment and/or self-evaluation), although only two such studies have been conducted with participants with autism. This approach involves videotaping the target child performing specific behaviors and then reviewing the videotape with the child so that he or she can evaluate his or her own behaviors. Lasater and Brady (1995) examined the effectiveness of a videotape feedback approach to teach self-help skills to two adolescents with developmental disabilities and behavior disorders. One of the boys was diagnosed as having autism and the other boy was diagnosed with PDD and William syndrome. Two training tasks and two generalization tasks were chosen for each student. Tasks included skills such as shaving, hanging up clothes, making a sandwich, making the bed, and washing clothes. During intervention, each boy participated in a 20-minute self-assessment and self-modeling training package just before they engaged in their tasks. The training package included having the participant watch a series of videotaped vignettes of himself performing the tasks, followed by questions from
the trainer about the behaviors that were observed, discrimination training (i.e., the participant was asked to point out correct and incorrect behaviors), rehearsal (i.e., role-plays with props), and debriefing by the trainer (i.e., the participant was reminded what to work on and was provided with verbal praise for correct behavior). The results showed that video feedback, combined with the remainder of the training package, dramatically increased independent responding and task fluency and resulted in generalization to untreated tasks as well as a decrease in interfering behaviors.

Thiemann and Goldstein (2001) conducted the only study to date aimed at promoting social communication between children with autism and their typical peers, using video feedback as one component of a multielement intervention. The total intervention also included social stories, written text cues, adult prompting, visual supports, peer training, self and group evaluation, and reinforcement. While the results demonstrated a functional relationship between improved social communication and the intervention package, it was not clear whether this was the result of the combination of techniques or any one technique alone. Nonetheless, the inclusion of video feedback makes the study worth mentioning.

Video Modeling

Modeling in general involves observing another person exhibiting a behavior. Albert Bandura, a pioneer in modeling research, demonstrated that typical children act more aggressively toward a toy after observing an aggressive model (Bandura & Huston, 1961, as cited in Sherer et al., 2001). He also showed that observing a model receive reinforcement for a specific behavior increases the rate of that behavior in the observer as well (Bandura, Ross, & Ross, 1961, as cited in Sherer et al., 2001).
Many traditional teaching methods rely on modeling as a way of prompting children with autism to engage in correct responses or behaviors. There is also a body of research that supports the use of modeling for teaching children with autism skills such as appropriate voice volume and expressive labels (Coleman & Stedman, 1974, as cited in Charlop & Milstein, 1989); discrimination tasks (Egel, Richman, & Koegel, 1981, as cited in Charlop-Christy et al., 2000); and imitative, independent play skills (Tryon & Keane, 1986, as cited in Charlop-Christy et al., 2000). The general modeling literature, in combination with advances in technology, has led to the evolution of video modeling procedures to teach a wide range of skills.

**Video modeling to teach self-help skills.** Alcantara (1994) used a videotape instructional package to teach purchasing skills to three students with autism who were 8 to 9 years old and had significant cognitive and language impairments. One child had limited speech (single words and short phrases) and the other two had very limited manual signing skills. A videotape was created to depict a 32-step task analysis for purchasing skills, using an other-as-model paradigm. During baseline, the purchasing skills of the students were assessed prior to treatment. During the video instruction phase, which occurred at school, the students watched the videotape in which a model purchased a specific item at a target location. They were then taken to the store and were asked to go through the same steps as in the video to purchase the item, without assistance. During the third phase (video modeling plus in vivo training), verbal prompts, demonstrations, and physical assistance was used in the store to enable them to complete the target steps, as needed. The results indicated that video modeling alone increased their ability to complete all but 4 of the 32 steps. When in vivo training was added, they all learned the additional four steps as well. Generalization to a
third store occurred for all of the subjects after the purchasing sequence was acquired in two stores.

Shipley-Benamou, Lutzker, and Taubman (2002) examined the utility of a video modeling intervention for teaching daily living skills to three 5-year-old children with autism. Instead of presenting videotapes of models engaging in the target behaviors, the investigators were interested in determining whether videos of functional tasks filmed from the child’s perspective would lead to skill acquisition. Several functional, developmentally appropriate, daily living skills were identified for the participants, including making orange juice, preparing a letter to be mailed, feeding a pet, cleaning a fish bowl, and setting the table. Videotapes were made of each task being performed as the child would see it; only the hands of the model were visible in each video. The researchers utilized a ABAC multiple probe design across tasks and participants. They found that video modeling was effective in rapidly promoting skill acquisition across all three subjects and that newly acquired skills were maintained during the return-to-baseline phase as well as at follow-up one month later. Probes revealed that the children were able to generalize the new skills to their home environments throughout each phase of the study. The results of this study show promise for the use of video modeling to teach children with autism functional, daily living skills.

*Video modeling to teach social skills.* Charlop and Milstein (1989) published one of the first studies demonstrating success using a video modeling procedure with children with autism. The subjects were three high-functioning boys with autism who were 6 to 7 years old. The study used familiar adults as models on the videotapes and had the models engage in scripted conversations about toys. The conversations consisted of three scripted lines for each child and four lines for the adult, with each line consisting of both an answer and a question
During the intervention phase, each child viewed the videotape three times, and was then tested to determine if he could hold the conversation with the therapist. If a child did not meet the criterion of two out of three consecutive, successful repetitions of the conversation, the video was shown again and the child was retested. This process was continued until a child met criterion. All of the children acquired conversational speech after exposure to the video modeling procedure. One child reached criterion after 20 presentations of the video, another reached criterion after 3 presentations, and the third child reached criterion after 6 presentations. In addition, the conversation skills generalized across topics, persons, novel stimuli (toys), and to more abstract forms of conversation. However, the scripted format of the conversations remained the same, with the person without autism initiating all conversations. Also significant was the finding of an increase in unscripted responses by the children with autism during conversations with the therapist, as well as an increase in general question-asking after the video modeling intervention. All gains were maintained at a 15-month follow-up.

Buggey et al. (1999) used a video self-modeling procedure to teach appropriate responses to questions during play to three children with autism who ranged in age from 7 to 12 years of age. While recording baseline measurements of the level of the children’s responses, the researchers compiled intervention videotapes by editing the baseline tapes and compiling a few minutes of appropriate responses onto one intervention videotape for each of the subjects. Also included in the final videotapes were 3 to 5 reinforcing statements by an adult, distributed at variable intervals. The children watched the self-model videotapes three times per week just before each probe session with the experimenter for 2.5 to 4 weeks. After the introduction of video self-modeling, all three children showed an increase in responding.
behavior to double that of baseline. Moreover, two of three children's parents (all of whom were blind to the target skill and the intervention) reported changes in the children's ability to respond to questions.

Recently, Wert and Neisworth (2003) used video modeling to teach four young children with autism spontaneous requesting behaviors, which were defined as independent asking for an object or action without any assistance. Self-modeling tapes were created for each child by prompting the child to engage in the skill (in the home setting) and then editing the tape to show what appeared to be independent request behaviors. A multiple baseline design was employed across baseline, video self-modeling, and follow-up. The children watched individual 5-minute videotapes once per day at home within one hour of attending school. Data were collected in the school setting and revealed that video self-modeling caused significant increases in spontaneous requesting in the preschool setting (indicating positive generalization effects). These effects were also maintained over a 2 to 6 week maintenance phase. The investigators suggested that future research should examine the use of requesting with peers of children with autism as well.

D'Ateno et al. (2003) studied the use of video modeling for teaching complex, solitary play sequences to a preschool-age child with autism. The use of a multiple baseline design across three activities (tea party, shopping, and baking) was used to evaluate the efficacy of the video modeling procedure. Video vignettes were created using an adult model who read a script and spoke to a doll in each of the play activities. Dependent measures included scripted and unscripted verbalizations as well as modeled and not-modeled motor responses. During the intervention, the child viewed the video a minimum of 1 hour prior to scheduled play sessions with the play materials depicted in the video. No other external
reinforcement, prompting, or correction procedures were used. Following the introduction of video modeling, the experimenters found that video modeling alone led to a dramatic increase in the number of both verbal and motor play responses made by the child to the doll during solitary play activities. In addition, the child engaged in long sequences of play behavior without prompting, correction, or reinforcement from adults. However, the authors found very little unscripted responding in this study, and suggested that this finding might be due to the fact that they used only one video vignette for each play activity. They stated that “a sufficient number of exemplars may not have been included in the teaching procedure” (p. 10) and suggested that “the presentation for each play sequence of multiple video vignettes that depict several responses as well as different types of stimuli might have enhanced generalization” (p. 10). While the effectiveness of video modeling as a treatment procedure to increase play skills was undoubtedly demonstrated in this study, no measures were included to suggest that the play skills were maintained over time. In addition, the child learned to make verbalizations towards a doll in her play, but no peers were involved in this study.

Finally, Charlop-Christy and Daneshvar (2003) reported interesting results after examining the use of video modeling to teach perspective-taking to three young children with autism. The researchers used a multiple baseline design both across children and across tasks, to assess the effectiveness of videotapes for teaching the children to pass false belief tasks. Procedures included having the children watch several similar but different tasks related to false belief scenarios. Two of the three children passed the post-tests and demonstrated generalization across similar stimuli; the third child failed the post-test but showed some ability to generalize to new stimuli/tasks. Perhaps the most interesting finding was that
related to generalization across stimuli and responses (which other studies involving false belief/theory of mind tasks have not shown). The researchers attributed this to the use of multiple video vignettes and training across stimuli and tasks (i.e., multiple exemplars), noting that “multiple exemplar training in the present study utilized variations on one specific task in order to broaden the range of behaviors being taught” (p. 19). They proposed that their findings suggest the possibility of teaching other complex social skills to children with autism using video modeling and multiple exemplars.

Comparison of In Vivo Modeling and Video Modeling

While all of the studies in the previous section provide convincing evidence that video modeling can be effective for teaching a range of behaviors, they do not address the question of whether an in vivo (i.e., live) modeling procedure could have been equally or more effective, thereby eliminating the need for the use of videotapes. Charlop-Christy et al. (2000) attempted to answer this question by comparing the effectiveness of “in vivo and video modeling in increasing target behaviors of children with autism by assessing (a) the effects of in vivo and video modeling across different tasks; (b) generalization of the acquired skills across stimuli, children and settings, and time; and (c) cost efficiency of both modeling techniques” (p. 538). The subjects included five children with autism between the ages of 7 to 11, representing a range of abilities. At a minimum, all children had nonverbal imitation skills. Target behaviors were chosen according to each child’s individual needs and included behaviors such as labeling emotions, independent play, conversational greetings, conversational speech, and self-help skills. The skills chosen had not been acquired as part of the children’s regular behavioral treatment, and baseline phases included prompting and reinforcement to determine if the behaviors could be learned through traditional methods.
With task difficulty held constant, each task was randomly assigned to either the video modeling condition or the in vivo modeling condition. All models were familiar adults who modeled the target behaviors at an exaggeratedly slow pace. An essential aspect of this study was that “exactly the same procedures were used for both the video modeling and the in vivo modeling conditions, except for the difference in the medium of how the models were presented (video vs. in vivo)” (p. 539). Thus, the only difference between the two conditions was that the models either appeared on the television screen or appeared live.

The intervention phase was similar to that used by Charlop and Milstein (1989): the children watched either the video or the live model perform the target behaviors and were then tested for acquisition until they reached criterion. Results demonstrated that video modeling led to faster acquisition of the tasks than in vivo modeling. Furthermore, all of the children’s new behaviors generalized after presentations of video modeling, but none generalized after in vivo modeling. The authors emphasized the significance of the generalization finding in relation to children with autism, who are known to have difficulty generalizing new skills after training with traditional prompting and reinforcement procedures. The authors suggested several hypotheses to explain why video modeling was more effective than in vivo modeling, including the suggestion that video modeling may compensate for children’s stimulus overselectivity, as noted previously. They also suggested that videotapes may be more motivating may remove any added pressures associated with social interaction. Results of this important study clearly lend support to the use of video modeling for a wide range of target behaviors and across a range of levels of functioning.
Comparison of Other-As-Model and Self-As-Model

In their research, Charlop-Christy et al. (2000) provided preliminary evidence that video modeling is superior to in vivo modeling for children with autism. The next question then becomes, Is it more effective to use the "other-as-model" paradigm or to use "self-modeling"?

Very recently, Sherer et al. (2001) examined this question. The participants in their study were five boys with autism from 4 to 11 years old, all of whom had the ability to speak in short sentences (mostly for requests), but were not able to maintain any sort of conversation. Target behaviors were simple questions to which the children were required to respond and then ask of the experimenter. Eight questions were randomly assigned to the "other-as-model" condition, eight were assigned to the "self-as-model" condition, and four were used as generalization probes. Two videotapes were made for each child -- an other-as-model tape, which consisted of a peer model talking with an adult; and a self-model tape, which was created by editing tapes in which the child was prompted to answer and ask questions of an adult (the prompts were removed during editing). During intervention, the children watched their tape three times before going to sleep every night, with the self and other tape watched on alternate days. The therapist visited each day and asked the child all of the questions corresponding to the videotape watched the night before. This continued until the child reached 100% correct responding or failed to increase responding over several weeks. Three of the five children reached criterion (100%) for the conversation; the other two children achieved 60%-68% and 25% correct conversation behavior, respectively. One child who reached criterion was more successful in the other-as-model condition, a second child was more successful in the self-as-model condition, and the third child acquired target
behaviors rapidly under both conditions. The three children who benefited from video modeling were also successful in generalization of their behavior to a peer. This study seems to support the notion that using other-as-model is equally effective to self-modeling.

**Conclusion**

Children with autism pose a distinct challenge to treatment providers in promoting social behaviors and relationships with others, especially peers. Research in the field of social-emotional development has provided us with information on the value of social relationships among children. As autism treatment providers, we must make it a priority to teach both children with autism and their peers the skills they need to reap the rewards that friendship can offer.

This chapter has explored critical issues regarding peer interactions between children with autism and their peers and various interventions designed to promote such interactions. The chapter examined a broad range of interventions, including peer-mediated interventions, interventions to teach children with autism to interact with peers, and interventions that utilize videotapes to teach social skills. Finally, it included a summary of the research on videotape procedures with children with autism, and suggested that this type of intervention has the potential to teach children with autism complex social interaction skills. In particular, video modeling holds promise in this regard; research to date has shown that video modeling seems to be superior to in vivo modeling, can be used to teach a wide variety of new skills and behaviors, and can result in good generalization and maintenance when implemented in ways that are known to promote these effects (Charlop-Christy et al., 2000). In addition, it appears that using an other-as-model paradigm may be equally effective to using self-modeling (Sherer et al., 2001).
Several issues remain to be addressed in video modeling research. One important question pertains to the applicability of video modeling for teaching subtle social behaviors that are difficult to contrive using traditional teaching methods. Research is also needed to examine its effectiveness for teaching interaction skills that involve spontaneous, unscripted social language with peers. Video modeling with multiple exemplars appears to be a promising practice in this regard, but this requires empirical evaluation. In the next Chapter, I describe a study that utilized video modeling intervention and multiple video vignettes for teaching social language with peers to a child with autism.
CHAPTER 3

Method

Ethics Approval

Approval for this study was obtained on August 14, 2003 from the Behavioural Research Ethics Board of the Office of Research Services and Administration at the University of British Columbia.

Participant and Confederate Recruitment

The participant with autism was recruited through the Early Autism Project, a program in Burnaby, BC that provides support for young children with autism spectrum disorders. The Early Autism Project mailed letters to parents of children with autism describing the general purpose of the study, the criteria for participation, and basic information about the procedures involved in the study (Appendix A). Parents who responded to the recruitment letter received additional information from the investigator about the purpose, procedures, and timeline of the study prior to signing a consent form. Subsequently, the child of the consenting family was screened to determine if he met the selection criteria.

Once the child was determined to be eligible for participation in the study, his parents identified two potential peers for involvement and forwarded a letter to the peers’ families describing the purpose of the study, the general procedures, and time involved (Appendix B). Further information was provided to the peers’ parents once they contacted the researcher to indicate that they were interested in having their children in the study. Both families signed consent forms for their child’s participation (Appendices C and D).
Participant and Confederates

One 5-year-old boy with autism, Ryan, and two peer confederates, Jay and Pamela, were selected for participation in the study. All names are pseudonyms.

Ryan

Ryan was 5 years 7 months old when the study began. He had been diagnosed with autism at the age of 2 years 7 months in a multidisciplinary assessment at a provincial diagnostic center. He is the youngest child in a middle class, Chinese-Canadian family, and has an older sister as well as an older brother. For the duration of the study, in addition to the 1.5 years prior to it, Ryan participated in a home-based behavioural treatment program based on applied behaviour analysis. He received an average of 15-20 hours of 1:1 structured teaching weekly during this time. In addition, he had participated in regular, structured peer play sessions for approximately 6 months prior to the beginning of the study. At the time of the study, Ryan also attended kindergarten five mornings per week.

Ryan had made significant gains through his in-home treatment program but continued to demonstrate significant difficulty interacting with peers, particularly with the use of social language during peer play. Ryan was able to engage in parallel play with other children and responded well to prompting from an adult to use his language and interact with peers. However, without this additional support, Ryan’s level of cooperative play interaction and spontaneous language use with peers decreased significantly, and he was usually very quiet. Without adult support, Ryan also engaged in occasional perseverative behaviour and played with toys in a restricted, repetitive fashion.

Ryan also met the following criteria set out at the beginning of the study: (a) he was able to imitate 10 gross motor actions and 10 actions involving objects with a minimum of
80% accuracy across two trials per action (see Appendix E for list of items); and (b) he could imitate 10 simple phrases and sentences that were at least three words long, with a minimum of 80% accuracy across two trials per item (see Appendix F).

Language assessment. Prior to the study, The Clinical Evaluation of Language Fundamentals-Preschool (CELF-P) (Wiig, Secord, & Semel, 1992) was administered to Ryan by a registered speech-language pathologist with experience testing children with autism spectrum disorders. Ryan’s age-equivalent score on the CELF-P was 3 years 1 month. In addition, his mean length of utterance in morphemes (MLU-M), based on a language sample elicited during play and conversational interactions, was calculated at 4.4. This was described as “significantly below that expected for his age” and placed him in the age equivalent range of 3.5 to 4 years with regard to language ability. In summary, the speech-language pathologists’ evaluation reported that “Ryan is a quiet 5.5 year old with autism who is talking in short phrases, but rarely initiates communication spontaneously. He has significant delay in his expressive and receptive language skills.”

Jay

Jay, the first confederate in the study, is a 5 year-old boy who lives near Ryan and attends the same kindergarten class. He is from a Chinese-Canadian family and, while he is identified as an ESL student in school, has no identified sensory, motor, language, communication, or social/emotional/behavior disabilities. He knew Ryan for approximately 2 months prior to beginning the study.

Pamela

Pamela, the second confederate, is a 7 year-old girl who regularly participated in peer play dates with Ryan for several months prior to the beginning of the study. She is Chinese-
Canadian and is the sister of one of Ryan’s tutors. She has no identified sensory, motor, language/communication, or social/emotional/behavior disabilities.

Setting and Interventionists

All activity sessions, video modeling sessions, and follow-up sessions occurred in Ryan’s home. Activity sessions took place in the living room and at the kitchen table, depending on the activity. These were locations that Ryan typically used for play activities. The video modeling sessions occurred in the living room or family room, both of which were equipped with a television and videotape player.

Activity sessions were run either by one of two tutors who were trained in the specific protocol for running an activity session (see Appendix G) or by the experimenter. The video modeling intervention was implemented by either the participant’s mother, one of the two tutors, or the experimenter. The experimenter provided training to all parties regarding how to conduct the activity and video modeling sessions, and also measured procedural reliability at regular intervals. All video feedback sessions and prompting sessions (described later) were implemented by the experimenter only. Because Ryan’s parents worked full time and because the two tutors worked different shifts, decisions regarding who implemented activity sessions or video modeling sessions were usually made on the basis of practicality.

Materials

Play Materials

Prior to beginning data collection, the experimenter interviewed Ryan’s parents, and together they identified both play materials that were appropriate for Ryan and social language skills that were of high priority. Three activities were selected that were suitable for interactive play and were thought to be preferred by Ryan. The three activities included: Play
Dough (using MacDonald's food and ice cream making sets), Chevron cars (popular toy cars with eyes and faces on them that are available at Chevron gas stations), and Caillou’s treehouse (a playground-type activity set including figurines).

**Videotapes**

A total of nine video clips were developed for the participant. There were three videotaped vignettes for each of the three target play activities (e.g., three vignettes showing models talking and playing with each of play dough, Chevron cars, and Caillou’s treehouse, for a total of nine vignettes). Each videotape consisted of two adult models talking to each other while playing together in the activities. The adults spoke in short phrases (e.g., 3 to 6 words), consistent with the expressive language abilities of the participant. In order to promote variety, flexibility, and unscripted verbalizations, the models used different language in each vignette. Modeled language skills included both skills already in Ryan’s repertoire and specific target skills that were displayed infrequently or not at all.

The videotapes were created from three different script templates that included a variety of comments, questions, acknowledgements, initiations, responses, and other language behaviors that occurred between the two adult models (see Appendix H). Each script template was used to create one videotape vignette for each activity. Thus, across the three vignettes for each activity, there were an identical number of each type of language behavior. For example, Script Template #1 was used to create three scripts specific to play dough, Chevron cars, and Caillou’s treehouse. Each script was slightly different to reflect the three activities, but contained an identical number of initiations, responses, questions, comments, and so forth. The three videotapes created from Script Template #1 ranged from 1 min 13 seconds to 1 min 17 seconds in length, depending on the activity. The videotapes
based on Script Template #2 ranged from 1 min 10 seconds to 1 min 14 seconds in length; and those based on Script Template #3 ranged from 1 min 23 seconds to 1 min 27 seconds.

**Measurement**

**Dependent Measures**

*Child target behaviors.* The primary dependent measures were (a) the total number of verbalizations made by the participant; (b) the frequency of both scripted and unscripted verbalizations by the participant, (c) the frequency of both initiations and responses by the participant, and (d) the frequency of prompts and both unprompted and prompted verbalizations by the participant.

*Scripted verbalizations* were defined as participant verbalizations that exactly matched (i.e., were identical to) the verbalization of a video model, with a few minor exceptions. Verbalizations were considered to be scripted if the form of a participant verb or adjective utterance was slightly different from that of the video model, but the verb or adjective itself was clearly identical. For example, “I’m going to eat,” and “I’m gonna eat” were considered identical; and “I am hungry,” and “I’m hungry” were considered identical. Utterances with very minor substitutions, additions, or omissions of an article (for example, “Do you want the milkshake?” and “Do you want a milkshake?”) were also considered to be identical and therefore scripted. However, if a verbalization was only one word in length, it had to match the video model exactly (e.g., “Look” and “Look it” were considered to be different). Many words typically used to respond to the confederate, such as “yes,” “no,” “OK,” “yeah,” and “sure,” were also coded as scripted, since these words were all used in the modeling tapes. Finally, if a participant verbalization substantively matched the *beginning* of a modeled verbalization but was shorter than the model, it was coded as scripted (e.g. “I like
to play” was coded as scripted because “I like to play cars” was modeled in the video). 

*Unscripted verbalizations* were defined as participant verbalizations that were different from a video model in any way other than those listed previously (e.g., Model: “Look at the car,” Participant: “Look at the house;” or Model: Caillou is tired,” Participant: “Caillou feels tired”).

Definitions and examples for initiations and responses were adapted from the taxonomy used by Thiemann and Goldstein (2001). *Initiations* were defined as comments or questions that were not contingent on a peer’s immediately prior utterance. Initiations could be used to (a) introduce a new idea or topic; (b) request an action, object, or information from the peer (e.g., “Can I have the car?”); (c) comment about observable objects or events within an ongoing activity, or make appropriate social comments unrelated to the activity; (d) compliment the peer or oneself (e.g., “That’s cool,” “Good for you”); (e) secure the peer’s attention (e.g., “Look at this”); or (f) express enjoyment or displeasure to the peer regarding the ongoing interaction together (e.g., “This is fun” or “This is boring”).

*Responses* were defined as verbalizations that were contingent on a peer’s immediately prior utterance. Examples of responses included: (a) acknowledgments (e.g., “oh”) or direct or partial repetitions of the utterance; (b) agreements (e.g., “yeah”); (c) answers to the peer’s questions; (d) comments about observable objects or events within the ongoing activity, as well as appropriate social comments unrelated to the activity; (e) questions related to peer’s comments; and (e) clarifications of questions asked by the peer (e.g., “What did you say?”).

Other codes included repeats, unintelligible utterances, adult prompted utterances, and self-stimulation. Verbalizations were scored as *repeats* if the participant repeated an
exact word or phrase within 5 seconds. In this case, only the first verbalization was counted in total verbalizations and scored as an initiation/response and as scripted/unscripted. A phrase or word was considered to be repeated if the participant used the exact wording and/or changed, added, or omitted the article, pluralized or depluralized a word, or changed the form of a word (but used the same root). Any other changes (e.g., adding a new word, changing a word, etc.) were considered to be new utterances rather than repeats. Verbalizations were scored as *unintelligible* if more than 50% of the utterance could not be understood, and were not counted in total verbalizations. Verbalizations were scored as *adult prompted* if they occurred within 5 seconds of an adult verbal cue. Verbalizations were scored as *self-stimulation* if they consisted primarily of perseverative, off-topic speech or sounds that were characterized by an odd tone of voice. They were not counted in total verbalizations.

*Design*

A multiple baseline design across three play activities was used to assess the effects of the intervention. The multiple baseline design consisted of three to six phases for each activity, depending on the activity. The first activity, play dough, included four phases: baseline (A), video modeling (B), video modeling + video feedback (C), and follow-up (D). Chevron cars, the second activity, included six phases: baseline (A), video modeling (B), video modeling + video feedback (C), video modeling + video feedback + prompting (D), video modeling + video feedback (C), and follow up (E). Finally, the third activity, Caillou’s treehouse, included three phases: baseline (A), video modeling (B), and follow up (C). The video modeling intervention was introduced to each activity in lagged fashion consistent with a multiple baseline design (Barlow & Hersen, 1984; Kazdin, 1982). Stability of baseline
measures was established for each activity prior to implementing the intervention phase of the study. Follow-up probes occurred 7, 16, and 18 days after the completion of intervention.

Procedure

Activity Sessions

The purpose of the activity sessions was to assess the occurrence of the target behaviors across phases. Throughout baseline and intervention phases, 15-minute activity sessions were held 2 to 3 times per week in Ryan's home. Either the experimenter or one of two tutors from his home program set up, supervised, and videotaped each session. During these sessions, the Ryan and one of the two peer confederates engaged in all three play activities. Typically, Jay served as the peer for two sessions per week and Pamela served as the peer for one, although this varied somewhat over the course of the study. No training was provided to either of the peers. The activities and related materials were only available to the participant and peers during activity sessions. Each activity took place in a different area of the home; play dough was situated at the kitchen table, Chevron cars were played on a large area rug on the living room floor, and Caillou's treehouse occurred on a coffee table in the living room. The order of activities was counterbalanced across sessions, to control for an order effect.

At the start of each activity session, the children were told, "Time to play (activity)" and directed to the first activity scheduled for that day. A timer was started as soon as the children began playing and was set for 5 minutes. When the timer rang, the supervisor prompted the children to stop the first activity and move to the next activity, and so on until the children played with all three activities. No prompts or reinforcement were provided to either of the children during the activity sessions (except during the prompting phase for
Chevron cars), except to direct them to begin play with the materials provided for each activity. If either Ryan or the confederate left the play area for more than 20 seconds before the timer went off, he/she was redirected back to the activity one time and instructed to “Play (activity) with (peer).” If the same child left the area again for longer than 20 seconds, the activity would have been terminated; however, this never occurred.

The activity sessions were supervised and videotaped by the supervisor from at least 3 meters away in order to simulate a natural setting in which an adult provides minimal supervision of children’s play and interaction. Activity sessions were later transcribed and coded from the videotapes by the experimenter. The video camera was located at one of two corners of the room, depending on the play activity, and was positioned there during three peer play sessions prior to the start of the study in order to reduce reactivity. The frequency of target behaviors for each activity was counted from the point when the timer was started (i.e., when the children were positioned by an activity and begin to play) to the point when the timer rang 5 min later.

**Baseline (A)**

During baseline, the participant and confederate were instructed to play with the target toys, as described previously. No videotape modeling occurred during baseline. All baseline activity sessions were videotaped. Each activity session lasted approximately 15 minutes (i.e., 5 minutes per activity). Once a stable baseline was established for the first activity, the intervention phase was initiated for that activity.

**Video Modeling Phase (B)**

During this phase, activity sessions were held 2 to 3 times per week, as described previously. In addition, daily video modeling sessions occurred, during which the participant
watched three, 1-min video vignettes for each target play activity for which intervention had been initiated, according to the multiple baseline design. The vignettes consisted of two adults playing with and talking about each set of play materials, as described previously. Each video modeling session ranged from approximately 3.5 to 10 minutes in duration, depending on the number of vignettes that were shown (i.e., for the first play activity, the three vignettes totaled 3.5 min; once the second activity was introduced, three more vignettes were added for an total of 7 min, and so forth). Once the vignettes for the second and third activities were introduced, the order of presentation was counterbalanced daily across activities, to control for an order effect. Video modeling sessions were held every evening throughout the study except on days when activity sessions also occurred, when the video modeling sessions occurred between 30 to 60 minutes prior to the session.

Video modeling sessions were supervised by Ryan’s mother, one of two tutors, or the experimenter, who ensured that Ryan sat and watched the entire videotape. Prior to the first video modeling session only, the experimenter cued the participant to watch the people in the videotape talking and playing and pointed out 3 to 4 occasions of “good talking” in the vignettes in order to highlight the behaviors of interest (see Appendix I for a script of this interaction). Following this initial brief explanation, no further explanations were provided to Ryan regarding the videotapes, and the supervisors did not talk to him about the tapes either during or after the video viewing.

*Video Modeling + Feedback (C)*

After five sessions of video modeling for the second activity (Chevron cars), there was no evidence of any change in the frequency of Ryan’s verbalizations with either of the confederates. This appeared to be related to his intense pre-occupation with the Chevron cars
themselves, since he asked to play with them frequently throughout the day and engaged in perseverative behaviours with them during activity sessions (e.g., watching the wheels at eye level, reading the names on the bottom of the cars, etc.). Hence, video feedback was added to video modeling, in an attempt to provide additional input to Ryan with regard to the target behaviours. The video feedback intervention was implemented for both the play dough and Chevron cars activities at the same time, since target verbalizations had already increased considerably during play dough, thus providing numerous examples of “good talking.” The experimenter implemented the video feedback sessions on the same days the activity sessions occurred.

During this phase, the experimenter showed Ryan the videotape of himself and the confederate engaging in the play activities during the immediately previous activity session, paused the tape occasionally, and helped him evaluate whether or not he was engaged in “good talking.” The experimenter drew a green happy face representing “good talking” and a red sad face representing “not good talking” on a piece of paper. Initially, the experimenter cued Ryan to recognize “good” and “not good” talking and to put a mark under the appropriate face. She also provided verbal reinforcement for instances of “great/good talking” and remained verbally neutral for instances of “not good talking.” Finally, she provided approximately three examples of what Ryan could have said at times when he was not talking; these examples varied and depended on what Ryan was doing when the tape was paused. Each video feedback session required 8 to 15 minutes, primarily emphasized the positive aspects of Ryan’s behaviour, and ended with examples of good talking.

By the end of the second feedback session, Ryan learned to recognize good and not good talking, to discriminate between the two independently, and to suggest things he could
say. Ryan appeared to enjoy these feedback sessions and, near the end of the study, began to make statements such as “Good talking’s going to be the winner!” (while counting the number of “marks” he got under the happy face and comparing them to the number of marks under the sad face), and “I’m going to do lots of good talking.”

**Video Modeling + Feedback + Prompting (D)**

While the addition of video feedback did result in an average increase in the frequency of target behaviour during the Chevron cars activity, there was considerable day-to-day variability in the data and no evidence of stabilization. Furthermore, Ryan continued to engage in perseverative behaviour with the cars during the activity sessions for this activity. Thus, a phase that included a more directive prompting procedure was added to the intervention during the Chevron cars activity only. During this phase, in addition to video modeling and feedback, the experimenter provided both a verbal prompt (i.e., “Remember to talk when you are playing”) and a visual prompt (i.e., a green happy face similar to that used during feedback sessions, with the word “Talk” printed under it) after every 10 seconds of the Chevron cars activity during which Ryan did not speak. Initially, both visual and verbal prompts were provided; all prompts were faded over five sessions. Over five sessions, Ryan required 4, 6, 11, 6, and 4 prompts, respectively, before all prompts were withdrawn and he was able to maintain a stable rate of verbalizations without them. No prompts were provided for the other two activities for the duration of the study.

**Follow-Up**

Follow-up data were collected in activity sessions that occurred 7, 16, and 18 days after the completion of intervention. During this phase, no video modeling or feedback occurred, and Ryan did not have access to the experimental materials except during the three
videotaped activity sessions. Activity sessions were conducted in the same manner as during baseline and intervention.

Data Collection

Training

The investigator trained a research assistant (RA) who was blind to the purpose of the study to record occurrences of the target behaviors (i.e., scripted and unscripted verbalizations, initiations and responses, repeats, etc.). The adult model videotape vignettes produced for the study and a pilot videotape of Ryan and one of the confederates prior to the beginning of the study were used during the training. In addition, the RA was provided with a scoring manual containing operational definitions, examples and non-examples of the target behaviors, and a scoring protocol (Appendix J). Initial training was provided over 2 to 3 hours until the RA achieved 90% accuracy (compared to experimenter codings) over three practice transcripts.

The investigator also trained two of Ryan’s tutors to conduct the activity sessions and videotape them for data collection, and trained a tutor and Ryan’s parents to conduct the video modeling sessions. Training protocols were developed for this purpose consisting of checklists of procedures, instructions, and role plays (see Appendices G and K).

Inter-rater Reliability

The experimenter transcribed and then scored each activity session from the videotapes using a data sheet (Appendix L). To ensure that data collection was performed accurately by the experimenter, a research assistant scored the transcripts for 35.7% of the activity sessions, across all phases. Reliability checks occurred randomly during baseline, intervention, and follow-up conditions. Inter-rater reliability was calculated by dividing the
total number of agreements by the total number of agreements plus disagreements and multiplying by 100%, for both initiations/responses and scripted/unscripted verbalizations. The mean inter-rater agreement for initiations and responses across all activities was 93.7% (Play dough: 95.6%, Chevron cars: 94%, Caillou’s treehouse: 91.1%). Across the three activities, reliabilities ranged from 80% to 100%. The mean inter-rater agreement for scripted/unscripted verbalizations was 92.4% (Play dough: 95.7%, Chevron cars: 93.3%, Caillou’s treehouse: 83.3%), ranging from 81.1% to 100%. Table 2 shows a summary of the reliability scores for all intelligible verbalizations.

Table 2

<table>
<thead>
<tr>
<th>Dependent variable</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Play Dough</td>
</tr>
<tr>
<td>Initiations/responses</td>
<td>M = 95.6% (87.5 – 100%)</td>
</tr>
<tr>
<td>Scripted/unscripted verbalizations</td>
<td>M = 95.71% (92 – 100%)</td>
</tr>
</tbody>
</table>

Treatment Fidelity

Videotape viewing. In order to ensure that the videotape viewing protocol (Appendix K) was followed accurately, a measure of treatment fidelity was included in the study. Parents and tutors were asked to complete a form that specified the steps required for
videotape viewing by the participant and to record the duration of time Ryan watched the videotape vignettes each day. Parents and tutors also recorded data on the number of times Ryan left the room and/or stopped watching the videotape and the number of prompts needed to encourage him to sit and watch (see Appendix M). The experimenter observed 10% of the video modeling sessions and independently coded the accuracy of each step of the protocol.

Treatment fidelity for videotape viewing was calculated by dividing the total number of steps completed accurately by the total number of accurate plus inaccurate steps and multiplying by 100. Treatment fidelity was 100% throughout the study. Ryan never left the video viewing area and always watched the complete videotape. In a few instances, the supervisor provided reminders to watch the video when Ryan became excited about the tapes and began talking to the supervisor about what he was watching.

Activity sessions. A second measure of treatment fidelity with regard to the activity sessions was also included in this study. The supervisor of each session was asked to indicate whether or not she followed each step of the activity session protocol (see Appendix G). The experimenter independently co-observed 39.3% of all activity sessions, approximately one per week. Fidelity was calculated by dividing the total number of steps completed accurately by the total number of accurate plus inaccurate steps and multiplying by 100. With the exception of the ninth session, procedural reliability for activity sessions was 100%. On the ninth session, the peer, Jay, raised his voice to Ryan, grabbed toys from him, and called him a name. In response, the supervisor ended this activity at approximately 4 min 30 seconds instead of the required 5 min, and prompted Jay to play nicely. Subsequently, rules were established for Jay about “playing nicely” and were reviewed prior to every activity session.
in which he was involved. After reminding Jay to "play nicely" on approximately three occasions, his behaviour improved and no further problems occurred during activity sessions.

*Data Analysis*

Visual inspection of the data was used to assess the impact of the intervention. The impact was assessed by examining changes in the mean frequencies of target behaviours across phases and by critically analyzing the level, trend, and variability of the data both between and within phases. A careful analysis of these basic properties of the data allowed for a reliable determination of experimental control.
CHAPFER 4
Results
Overview

The goals of the study were to determine whether the use of video modeling including multiple exemplars would result in an increase in (a) total social language verbalizations in a child with autism, (b) scripted and unscripted language in a child with autism; and (c) initiations and responses in a child with autism. Due to challenges encountered during the second target activity (Chevron cars), the additional components of video feedback and prompting were also introduced into the study for this activity.

The data were analyzed using visual graphs for each activity, as is typical in single-subject research designs. These analyses suggest that the video modeling intervention was responsible for a significant increase in social language. Specifically, the frequency of unscripted social language exceeded that of scripted social language and the frequency of initiations exceeded that of responses. During one activity (Chevron cars), video feedback + prompting were required to achieve a significant, stable change in the target behaviours above baseline. In the following sections, the results will be presented for each of the activities according to each phase of the study.
**Frequency of Total Verbalizations Across Play Activities**

Figure 1 displays the results across the three play activities. These data will be used to answer the first two questions posed for this study, those related to total verbalizations and scripted/unscripted verbalizations.
Figure 1. Frequency of total, scripted, and unscripted verbalizations across play activities.
Question #1: Is there a functional relationship between a video modeling intervention using multiple exemplars and an increase in total social language verbalizations in a child with autism?

From a visual inspection of Figure 1, it appears that a functional relationship was established between the video modeling intervention and an increase in the participant's social language use. Additional components of video feedback and prompting were needed to achieve a stable increase in level for the Chevron Cars activity. This occurred because the participant engaged in repetitive stereotypic behaviour toward the Chevron Cars themselves. The results related to this question will be presented for each activity separately in the sections below.

*Play Dough*

Table 3 summarizes the data for the play dough activity.
Table 3.

*Summary of Means and Ranges of Verbalizations for Activity #1: Play Dough*

<table>
<thead>
<tr>
<th>Phase</th>
<th>Verbalizations</th>
<th>Scripted Verbalizations</th>
<th>Unscripted Verbalizations</th>
<th>Initiations</th>
<th>Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Baseline</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>10.4</td>
<td>n/a</td>
<td>n/a</td>
<td>9.0</td>
<td>1.4</td>
</tr>
<tr>
<td>Range</td>
<td>5 – 16</td>
<td>n/a</td>
<td>n/a</td>
<td>4 – 14</td>
<td>1 – 2</td>
</tr>
<tr>
<td><strong>Video modeling</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>25.3</td>
<td>6.9</td>
<td>18.4</td>
<td>22.0</td>
<td>3.3</td>
</tr>
<tr>
<td>Range</td>
<td>7 – 37</td>
<td>2 – 11</td>
<td>5 – 27</td>
<td>7 – 33</td>
<td>0 – 6</td>
</tr>
<tr>
<td><strong>Video modeling + feedback</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>30.4</td>
<td>12.9</td>
<td>17.5</td>
<td>23.2</td>
<td>7.2</td>
</tr>
<tr>
<td><strong>Follow-up</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>40.7</td>
<td>13.3</td>
<td>27.3</td>
<td>30.3</td>
<td>10.3</td>
</tr>
<tr>
<td>Range</td>
<td>31 – 47</td>
<td>7 – 18</td>
<td>24 – 29</td>
<td>23 – 40</td>
<td>4 – 19</td>
</tr>
</tbody>
</table>

*Baseline.* During baseline, there was a decelerating trend and a mean frequency of 10.4 verbalizations per session. Stability in the data was achieved after five sessions.
Video modeling. Upon implementation of the video modeling intervention, there was an immediate change in both the level and trend with regard to frequency. The mean number of total verbalizations across seven sessions of video modeling was 25.3, a significant increase over baseline, with the number of verbalizations more than doubling. Data during video modeling showed some variability, but with the exception of one data point (session 10), a consistent level of change over baseline was evident.

Video modeling + feedback. Following the introduction of the video feedback component, no immediate change in level was demonstrated. However, there was a gradually accelerating trend throughout this phase. The mean total frequency rose from 25.3 during video modeling to 30.4 during video modeling + video feedback.

Follow-up. Follow-up data continued to show high frequencies of total verbalizations, with the final two data points reaching levels that were among the highest frequencies across all phases.

Chevron Cars

Table 4 summarizes the data for the Chevron cars activity.
Table 4.

**Summary of Means and Ranges of Verbalizations for Activity #2: Chevron Cars**

<table>
<thead>
<tr>
<th>Phase</th>
<th>Total Verbalizations</th>
<th>Scripted Verbalizations</th>
<th>Unscripted Verbalizations</th>
<th>Initiations</th>
<th>Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Baseline</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>12.3</td>
<td>n/a</td>
<td>n/a</td>
<td>8.9</td>
<td>3.9</td>
</tr>
<tr>
<td>Range</td>
<td>5 – 19</td>
<td>n/a</td>
<td>n/a</td>
<td>3 – 15</td>
<td>0 – 10</td>
</tr>
<tr>
<td><strong>Video modeling</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>13.4</td>
<td>5.8</td>
<td>7.6</td>
<td>9.4</td>
<td>4.0</td>
</tr>
<tr>
<td>Range</td>
<td>7 – 19</td>
<td>3 – 8</td>
<td>4 – 11</td>
<td>5 – 16</td>
<td>2 – 8</td>
</tr>
<tr>
<td><strong>Video modeling + feedback</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>23.7</td>
<td>11.2</td>
<td>12.5</td>
<td>17.7</td>
<td>6.0</td>
</tr>
<tr>
<td>Range</td>
<td>11 – 43</td>
<td>2 – 25</td>
<td>6 – 18</td>
<td>10 – 35</td>
<td>1 – 10</td>
</tr>
<tr>
<td><strong>Video modeling + feedback + prompting</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>38.2</td>
<td>9.2</td>
<td>29.0</td>
<td>28.4</td>
<td>9.8</td>
</tr>
<tr>
<td>Range</td>
<td>29 – 45</td>
<td>5 – 12</td>
<td>23 – 35</td>
<td>22 – 36</td>
<td>7 – 17</td>
</tr>
<tr>
<td><strong>Video modeling + feedback</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>32.5</td>
<td>8.5</td>
<td>24.0</td>
<td>24.5</td>
<td>8.0</td>
</tr>
<tr>
<td>Range</td>
<td>31 – 34</td>
<td>8 – 9</td>
<td>22 – 26</td>
<td>24 – 25</td>
<td>7 – 9</td>
</tr>
</tbody>
</table>

*(table continues)*
Table 4. (continued)

<table>
<thead>
<tr>
<th>Phase</th>
<th>Total Verbalizations</th>
<th>Scripted Verbalizations</th>
<th>Unscripted Verbalizations</th>
<th>Initiations</th>
<th>Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Follow-up</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>42.0</td>
<td>16.0</td>
<td>26.0</td>
<td>31.3</td>
<td>10.7</td>
</tr>
<tr>
<td>Range</td>
<td>29 – 53</td>
<td>7 – 21</td>
<td>22 – 32</td>
<td>23 – 40</td>
<td>6 – 13</td>
</tr>
</tbody>
</table>

Baseline. During baseline, there was considerable variability in the data for this activity. However, there was a gradually decelerating trend in the second half of baseline, beginning with session 5, with stability evident by session 7. The mean number of total verbalizations during baseline was 12.3.

Video modeling. Following the introduction of the video modeling intervention, there was a change between the last data point in baseline and the first data point following intervention. However, overall, there was no apparent change in level or trend over 5 sessions. The data showed some variability, with a mean of 13.4 verbalizations per session, almost the same as in baseline.

Video modeling + feedback. Because Ryan showed signs of perseveration with regard to the materials used in this activity and because the target behaviour was not changing, a video feedback component was introduced, as described previously. Following the introduction of video feedback, there was a gradual improvement in both level and trend; however, the data continued to be quite unstable. Although the mean number of total verbalizations per session during this phase rose from 12.3 in baseline to 23.7 across 6 sessions, this was largely due to the fact that, during session 17, Ryan produced a total of 43 verbalizations. Aside from this, the range varied from 11 to 25 total verbalizations per
session. Thus, a decision was made to introduce a third component to the intervention, in an attempt to achieve greater stability.

*Video modeling + feedback + prompting.* During this phase, the experimenter began prompting the participant to talk following every 10 seconds during which he was silent, as described previously. The mean number of total verbalizations rose to 38.2, a substantial increase over baseline as well as a significant increase over the previous phase. In addition, the range increased to 23 to 45 verbalizations per session and the data achieved greater stability than during the previous phase.

*Video modeling + feedback.* Across the last three sessions of the previous phase, prompts were faded gradually from verbal to visual and then discontinued entirely. Over two sessions involving video modeling + feedback only (sessions 24 and 25), the data were maintained at the previously acquired level of change with a mean of 32.5 total verbalizations per session, slightly lower than when prompts were used but still substantially increased over baseline.

*Follow-up.* Follow-up data indicated that the participant maintained the gains in total verbalizations for up to 18 days after treatment was discontinued. In fact, the mean rate of total verbalizations during the follow-up phase was 42 per session, slightly higher than during treatment. The accelerating trend during the follow-up phase indicates that the participant continued to use his social language during this activity, even without further intervention.

*Caillou’s Treehouse*

Table 5 summarizes the data for the Caillou’s treehouse activity.
Table 5.

*Summary of Means and Ranges for Activity #3: Caillou’s Treehouse*

<table>
<thead>
<tr>
<th>Phase</th>
<th>Total Verbalizations</th>
<th>Scripted Verbalizations</th>
<th>Unscripted Verbalizations</th>
<th>Initiations</th>
<th>Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Baseline</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>14.76</td>
<td>n/a</td>
<td>n/a</td>
<td>11.1</td>
<td>3.67</td>
</tr>
<tr>
<td>Range</td>
<td>5 – 25</td>
<td>n/a</td>
<td>n/a</td>
<td>4 – 19</td>
<td>0 – 8</td>
</tr>
<tr>
<td><strong>Video Modeling</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>48.75</td>
<td>16</td>
<td>32.75</td>
<td>35.25</td>
<td>10.75</td>
</tr>
<tr>
<td><strong>Follow-up</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>50</td>
<td>22</td>
<td>28</td>
<td>37.67</td>
<td>12.33</td>
</tr>
</tbody>
</table>

*Baseline.* Baseline data during Caillou’s treehouse reflected a stable trend and level, with some variability during the first half of baseline. However, this baseline occurred over approximately 2 months and the variability decreased approximately half way through (i.e., around session 13), demonstrating a stable level and trend as well as no experimental drift related to the initiation of intervention in either of the other two activities. The mean number of total verbalizations for the baseline phase was 14.8 per session.

*Video modeling.* Following the introduction of the video modeling intervention, there was an immediate and dramatic level change. The mean number of verbalizations increased
to 48.8 per session, more than tripling that of baseline. There was no overlap of the data between the phases, suggesting a very strong intervention effect.

*Follow-up.* Follow-up data continued to illustrate this strong increase in total verbalizations for this activity, with a mean of 50 per session and little variability in the data (range = 45 to 53).

**Scripted/Unscripted Verbalizations**

Question # 2: Does a video modeling procedure with multiple exemplars lead to an increase in both scripted and unscripted language in a child with autism?

As depicted in Figure 1, it is clear that, for both play dough and Caillou’s treehouse, an immediate increase in both scripted and unscripted verbalizations occurred following intervention. This was also the case for unscripted responses in particular for Chevron cars, once the video modeling + feedback + prompting phase was initiated. It was predicted that scripted verbalizations would predominate, since these would (presumably) require imitation skills only. However, this was not the case. While there were increases in both types of verbalizations, and overlap between scripted and unscripted verbalizations during the first two intervention phases of Chevron cars, there were significantly more unscripted verbalizations in all three activities, overall.

**Play Dough**

Table 3 shows that the mean number of unscripted verbalizations during the intervention phase for play dough exceeded those of scripted verbalizations by a factor of almost three (mean = 18.4 for unscripted and 6.9 for scripted verbalizations). This difference was not as great during the video modeling + feedback phase, in which the mean number of scripted verbalizations doubled while the number of unscripted verbalizations remained
virtually the same. However, during follow-up, unscripted verbalizations again increased, accounting for twice as many verbalizations as those that were scripted.

**Chevron Cars**

Both types of verbalizations increased in the Chevron cars activity when a change in total target behaviour was demonstrated in the first video modeling + feedback phase. Yet, Figure 1 illustrates that one type of verbalization did not predominate over the other until the prompting phase, when the level of unscripted verbalizations increased significantly. From Table 4, these differences can be seen by examining the mean levels during this phase; the mean number of scripted verbalizations was 9.2 per session, while the mean level of unscripted verbalizations was 29 per session, three times higher. This difference remained the same when prompts were withdrawn as well as during the follow-up phase.

**Caillou's Treehouse**

Figure 1 and Table 5 illustrate that, during the intervention phase for this activity, the average number of unscripted verbalizations (32.8 per session) was twice that of scripted (16 per session). While this difference was not as pronounced during the follow-up phase, unscripted verbalizations continued to show higher levels than scripted verbalizations.

**Initiations and Responses**

Question # 3: Does a video modeling procedure with multiple exemplars lead to an increase in both initiations and responses in a child with autism?

Figure 2 displays the frequency of both initiations and responses. Overall, initiations were higher than responses for all phases of the three activities. While responses increased following intervention, the most significant changes involved initiations. These results will be discussed separately according to each activity.
Figure 2. Frequency of initiations and responses across play activities.
**Play Dough**

*Baseline.* As displayed in Table 3, the number of responses during baseline was extremely low, with a mean of 1.4 per session. Initiations during baseline were somewhat higher, with a mean of 9 per session. However, the trend of initiations during baseline was decelerating.

*Video modeling.* Following the introduction of video modeling, there was a substantial and immediate change in both trend and level regarding initiations. The mean number of initiations during this phase was 22 per session. Responses also increased to a mean of 3 per session during video modeling; while this reflects a slight change in level, the change was not substantial.

*Video modeling + feedback.* The addition of video feedback resulted in an additional level change in responses, with the mean rate increasing to 7.2 per session. This intervention also appeared to result in a gradual acceleration in the trend for rate of initiation, although the mean number of initiations did not differ significantly from that of the previous phase (i.e., 22 per session compared to 23 per session).

*Follow-up.* The effects of intervention on both initiations and responses was maintained throughout the follow-up phase. In fact, the mean number of initiations, 30.3 per session, and the mean number of responses, 10.3 per session, were both at their highest during this phase.

**Chevron Cars**

*Baseline.* The mean number of initiations during baseline was 8.9 per session, and the mean number of responses was 3.9. However, there was a significant amount of variability
for both initiations and responses during this phase, with a gradually decelerating trend in initiations noted toward the end of the phase.

*Video modeling.* Following the introduction of video modeling, there was no significant change in either initiations or responses, other than during the first session following the initiation of intervention (session # 8).

*Video modeling + feedback.* The addition of video feedback resulted in a mean increase in initiations (from 9.4 per session during video modeling to 17.7 during video modeling + feedback). However, there was considerable variability in this measure, as indicated by the range of 10 to 35 initiations per session. The data were also quite unstable for responses, with a range of 1 to 10 responses and a mean of 6 per session.

*Video modeling + feedback + prompting.* During this phase, the mean number of initiations rose to 28.4 per session, a notable increase over the previous phase. While the data continued to reflect some variability in initiations, a clear change in level was demonstrated (see Figure 2). In addition, the range across sessions decreased, indicating that the data achieved greater stability than during the previous phase. With regard to responses, with the exception of one data point (session 20), the data became more stable and the mean increased from 6 per session during the previous phase to 9.8 per session during this phase.

*Video modeling + feedback.* Upon returning to the previous condition of video modeling + feedback, the data remained similar to the previous phase, indicating that the removal of prompts did not result in a decrease in the frequency of either initiations or responses. The data maintained the previously acquired level change with a mean of 24.5 per session for initiations and 8 per session for responses, both slightly lower than when prompts were provided, but still three and two times more than the baseline data, respectively.
**Follow-up.** Follow-up probes revealed that the participant maintained the gains in both initiations and responses. The means of both initiations and responses during the follow-up phase were the highest overall, with 31.3 per session for initiations and 10.7 per session for responses. As was the case with total verbalizations, the data for initiations and responses continued to show an accelerating trend during these final three data points.

**Caillou's Treehouse**

**Baseline.** As depicted in Figure 2, the data during the extended baseline for Caillou's treehouse showed some variability, ranging between 4 to 19 initiations and 0 to 8 responses per session. The mean number of initiations during this phase was 11.1 and the mean number of responses was 3.7. While there was some variability in level, the trend remained stable throughout the baseline, with no drift as intervention was introduced in the other two activities.

**Video modeling.** Following the introduction of video modeling, Figure 2 illustrates a dramatic change in level of initiations. The mean number of initiations rose from 11.1 in baseline to 35.3 during this phase. The effect of the intervention was again demonstrated by a clear and immediate increase in level, with no overlapping data points. The intervention's effect on responses is evident as well, with an increase in mean per session rising from 3.7 during baseline to 10.8 during this phase. However, the data for responses show greater variability, with less clear evidence of an overall change in level. While two of the data points reached 17 responses per session, the highest throughout this activity, the other two data points overlapped with baseline data.
Follow-up. Follow-up data indicated that the gains made in both initiations and responses maintained following intervention. In addition, responses during this phase stabilized at a consistent level above that of baseline.

Peer Responses

While not originally included as one of the research questions, peer responses were scored in an effort to try to capture the number of successful initiations made by Ryan towards a peer, after the experimenter noted what appeared to be a qualitative difference in the success of some initiations over others. Thus, the frequency of peer responses was recorded and the percentage of times the peer responded to Ryan’s initiations was calculated. Table 6 displays the proportions of participant initiations responded to by a peer.
Table 6

Percentage of Ryan's Initiations Followed by Peer Responses

<table>
<thead>
<tr>
<th>Phase</th>
<th>Play Dough</th>
<th>Chevron Cars</th>
<th>Caillou's Treehouse</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline</td>
<td>42.2</td>
<td>35.5</td>
<td>30.5</td>
</tr>
<tr>
<td>Video modeling</td>
<td>34.4</td>
<td>38.3</td>
<td>36.9</td>
</tr>
<tr>
<td>Video modeling + feedback</td>
<td>38.1</td>
<td>36.0</td>
<td>n/a</td>
</tr>
<tr>
<td>Video modeling + feedback +</td>
<td>n/a</td>
<td>38.7</td>
<td>n/a</td>
</tr>
<tr>
<td>prompting</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Video modeling + feedback</td>
<td>n/a</td>
<td>38.8</td>
<td>n/a</td>
</tr>
<tr>
<td>Follow-up</td>
<td>44.0</td>
<td>26.6</td>
<td>38.9</td>
</tr>
</tbody>
</table>

Evidently, the proportion of peer responses to participant initiations did not change across phases of the study. The peers responded to an average of 36.9% of Ryan's initiations across all phases of the study.

Summary of Results

Visual inspection of the data revealed that, for two of the three activities, there was an immediate and substantial increase in the total number of verbalizations when the video modeling intervention was implemented. For one of the activities, Chevron cars, this increase was demonstrated to some extent following an additional intervention component of video feedback, and even more so when prompting was added. Other findings that emerged from visual analysis included a considerably higher number of unscripted than scripted verbalizations, with unscripted verbalizations often at least doubling those that were scripted. In addition, visual analysis established that, although implementation of the intervention led
to increases in both initiations and responses, the greatest effect occurred with initiations. However, there was no substantial change in the number of initiations that were followed by peer responses across the phases of the study.

The first research question examined whether a video modeling intervention using multiple exemplars was effective in increasing the use of social language in a child with autism. For two of the activities, this increase was immediate and dramatic, following the introduction of the intervention. For the third activity, this change was demonstrated following the introduction of additional intervention components. These results provide compelling evidence that changes in the dependent variables occurred as a result of the video modeling intervention.

The second question this study examined was whether a video modeling procedure would lead to an increase in both scripted and unscripted language in a child with autism. It was anticipated that scripted verbalizations would prevail. However, the results indicated that unscripted verbalizations were higher than scripted verbalizations in nearly every condition. While this study did not isolate the specific role of multiple exemplars with regard to this finding, it is clear that the video modeling intervention with multiple exemplars led to significant increases in unscripted, generative language in addition to scripted language.

The third and final question addressed whether the intervention would lead to an increase in both initiations and responses in a child with autism. Data from all three activities and throughout all conditions revealed that the intervention increased both types of language. However, this change was demonstrated most dramatically for initiations.
CHAPTER 5

Discussion

This study utilized a multiple baseline design across three play activities to assess the impact of a video modeling intervention on the frequency of peer-directed total verbalizations, initiations and responses, and scripted/unscripted language in one child with autism. During the video modeling intervention, the participant viewed tapes daily in which adult models played with and talked about the toys in the videos. In addition, the participant participated in two to three peer play sessions per week, designed to assess the effects of watching the videotapes. For two of the three play activities, play dough and Caillou's treehouse, the video modeling intervention with multiple exemplars led to an immediate and dramatic increase in social language use, providing compelling evidence of a functional relationship between the intervention and the subsequent changes. For the third activity, Chevron cars, additional intervention was needed to achieve a significant and stable change in the target behaviours.

Role of Peers and Peer Training

Previous research with children with autism has demonstrated that video modeling can be effective in promoting a variety of basic language skills during play. For example, D'Ateno et al. (2003) used video modeling to increase the number of verbalizations of a child with autism while she was engaged in complex play activities such as tea party, pretend shopping, and baking. However, these were solitary play activities, her verbalizations were essentially “self-talk,” with no social language use. The few studies in which video modeling was used to teach social language with peers did not attempt to isolate the effects of video modeling in this regard. For example, while Taylor et al. (1999) examined the effectiveness...
of video modeling for increasing the play comments of two children with autism towards their siblings, sibling training and reinforcement were included in the multielement intervention. Furthermore, the sibling of one of the participants read a script while playing, and both participants required practice with an adult before reaching criterion performance in probe sessions with their sibling.

In contrast, the present study examined the use of video modeling alone to promote social language between a child with autism and his peers. For two of the activities in the study, video modeling alone was sufficient to produce a dramatic increase in social language. This suggests that, at least in some circumstances and with some children, additional intervention components may be unnecessary. For example, a considerable body of literature has focused on training peers to promote the social interaction skills of children with autism, or on teaching both peers and children with autism skills related to social interaction. The present study focused only on Ryan and did not include a peer training component. In addition, the study utilized ordinary peer play interactions, without specific play "scripts" or additional instructions regarding how to play. Thus, the play activities provided a natural context within which the participant’s language use could be evaluated. Within this context, it was clear that Ryan’s social language increased dramatically.

The lack of peer training or scripting could be seen as a limitation in the present study, since there was considerable variability in the peers’ social interaction behaviour across activity sessions. Both peers were quieter, made fewer initiations, and responded to Ryan less consistently in some sessions than others. However, this variability also contributed to the natural play context during activity sessions, and may have contributed to the relatively larger proportion of unscripted verbalizations by Ryan as well. Some support
for this claim was provided by Taylor et al. (1999), in a study that involved two children with autism in play interactions with siblings. One participant’s sibling was taught to follow a commenting script while playing with her brother, while the second participant’s sibling played and commented naturally (i.e., without a script). Because the participant whose sibling was not trained to follow a script was the only one to use unscripted language, the investigators speculated that the wide variety of play comments made by this sibling might have facilitated more variable participant interactions. Thus, the natural play context may have facilitated the use of unscripted language for the participant in Taylor et al. (1999), as it may have for Ryan in the current study.

Originally, the experimenter planned to include only one peer in this study; however, two peers were included to increase the number of activity sessions that could be staged each week. Thus, Jay participated in two activity sessions per week and Pamela participated in one. The decision to use two peers may also have influenced the use of unscripted language by Ryan. If variability in peer language facilitated variability in Ryan’s language, it is likely that the inclusion of two peers enhanced this effect. Visual inspection of the data did not reveal any pattern with regard to more language occurring between any one of the peers over the other. However, it is important to note that both the peers’ familiarity with Ryan and their generally good play skills may have been contributing factors to the success of the intervention in the absence of peer training. Jay had been in Ryan’s kindergarten class for approximately 2 months prior to the study, although he had never participated in play dates in Ryan’s home. Pamela had participated in home play dates with Ryan for approximately 6 months prior to beginning the study. Although at one point early in the study, Jay demonstrated some difficulty playing nicely and became somewhat bossy toward Ryan,
briefly reviewing some basic “rules” about how to play nicely quickly alleviated this problem. Aside from this, both peers were generally cooperative and had good play skills themselves.

*Scripted/Unscripted Verbalizations*

The participant in this study demonstrated a dramatic increase in both scripted and unscripted verbalizations. However, unscripted verbalizations predominated across almost all phases of the study, and in several phases accounted for two to three times the frequency of scripted verbalizations. This finding is significant in light of previous video modeling research in which little or no novel responding was documented (e.g., D’Ateno et al., 2003; Taylor et al., 1999). Taylor et al. (1999) found that one participant made unscripted comments towards his sibling while the other did not. D’Ateno et al. (2003), who used only one video vignette for each of three play sequences, also found very little unscripted responding during solitary play activities, and suggested that this lack may have been due to a failure to include sufficient exemplars in the video modeling tapes. Based on this suggestion, three vignettes for each play activity were included in the present study, for a total of nine vignettes across three activities. While it is not possible to say with certainty that the inclusion of multiple exemplars in the present study was responsible for the increase in unscripted, generative verbalizations, this study was the first to both use multiple video vignettes across activities and to show subsequent increases in unscripted language.

This finding is also significant in light of the definitions used in the present study. D’Ateno et al. (2003) suggested that one explanation for the lack of unscripted responding in their study could be related to the “rather stringent” (p. 10) definitions they employed for unscripted verbalizations. In order to be scored as unscripted, a verbalization in that study
had to be at least three words in length and had to differ from a modeled response by more than one word. However, the present study also used a definition for unscripted responses that was also quite conservative. In order for a response to be scored as unscripted, it had to differ from a modeled verbalization by at least one word. Slight changes in modeled verbalizations such as using the same word in a different form were not considered to be unscripted, nor were utterances with minor substitutions, additions, or omissions of an article (for example, “Do you want the milkshake?” and “Do you want a milkshake?” were considered to be identical). In addition, all single word responses such as “yes,” “yeah,” “sure,” “OK,” “no,” and so forth were considered to be scripted because they were used by the models in the videotapes. Finally, if a participant verbalization matched the beginning of a modeled verbalization but was shorter than the model, it was coded as scripted (e.g., “I like to play” was coded as scripted because “I like to play cars” was modeled in the video). Thus, because the definitions used in the present study were quite conservative, it is unlikely that differences between these definitions and those used by D’Ateno et al. can account for the different results.

In this study, quantitative data were recorded to evaluate the relative frequency of scripted and unscripted verbalizations across phases. However, it is important to note that Ryan demonstrated unscripted verbalizations that ranged from those that differed only slightly from a modeled response to those that were completely novel. The following examples illustrate verbalizations that differed only slightly from their models:

Model: “I’m going to make a milkshake.”
Ryan: “I’m going to make ice cream” or “I’m going to make vanilla ice cream.”
Model: “I’ll be Caillou.”
Ryan: “I’ll be Gilbert.”
The following examples show more variability in Ryan's verbalizations:

Model: "Can I have the white cup?"
Ryan: "Can I have the yellow play dough?"

Model: "Can you help build the road?"
Ryan: "Pamela, are you going to build a road?"

Model: "I'm right behind you."
Ryan: "I'm behind Sally school bus"

Model: "Here's the red box."
Ryan: "I need the French fry box."

The inclusion of multiple exemplars may have also assisted Ryan to combine different verbalizations to create his own novel responses. In addition, some of his verbalizations seemed to be elicited by the inclusion of an idea in the script. For example, the idea of cooking a hot dog can be found in the following lines from one of the scripts used for Caillou's treehouse:

Model A: "What do you want to eat?" (while pretending to cook on a barbeque)
Model B: "I want a hot dog."
Model A: "OK. Here's your hot dog."

Ryan appeared to take this idea and use it to demonstrate related but novel verbalizations such as "I like hot dog," "Yummy hot dog," and "Do you like hot dog?" He also demonstrated many completely novel verbalizations that were not apparently based on models in any of the scripts. Examples of such verbalizations included:

"Awww, I dropped my chicken."
"Let's put sprinkles on chocolate ice cream."
"I'm going to cook you dinner."
"Did you drop your cool car?"
"Stop it, don't knock it."
"Let's switch."
"I wanna be Caillou and you be Rosie, Jay."
"Oh oh, don't want to fell off."
"We both win!"
"No, I don’t like dark brown."
"My favourite Chevron cars is Nando."
"It broke."
"Have to fix it."
"No, not by hair on my chinny chin chin" (after the peer said “Let me in, let me in,” while loading a car up a truck ramp).

In addition, although analyzing the mean length of Ryan’s utterances was beyond the scope of this study, the experimenter noted informally that both the quality and length of verbalizations appeared to increase following intervention. For example, Ryan frequently produced 1 to 2 word utterances during baseline sessions, compared to longer utterances following intervention (e.g., “Chevron cars” during baseline and “I like to play Chevron cars” following intervention).

Clearly, this study demonstrated high levels of response generalization in Ryan’s use of unscripted language, a phenomenon that has not been demonstrated in previous video modeling research. Unfortunately, due to time constraints, stimulus generalization across novel environments or people was not evaluated. However, there was some anecdotal evidence of stimulus generalization outside of the activity sessions. For example, midway through the study, Ryan had a conversation with a peer other than Jay or Pamela that very closely resembled several lines of the play dough script. This occurred while Ryan and the novel peer were working on an arts and crafts activity and waiting for pizza that was being prepared for lunch by Ryan’s father. When the peer asked Ryan if he liked pizza, he responded, “Yeah, I can taste it. I love pizza!” which was taken directly from two lines of a play dough script, substituting the word “pizza” for “ice cream.” Ryan then proceeded to say to the peer, “Pizza tastes good,” and “Mmmm, yummy!,” two additional lines from a play dough script except that that “chicken nuggets” was replaced by “pizza.” Ryan used the same
tone of voice and voice inflection as modeled in the tapes during these interactions as well.

Future research is needed to examine the impact of video modeling with multiple exemplars on stimulus generalization, in the context of an experimental design.

**Initiations/Responses**

Another interesting finding in the present study was the finding that Ryan produced more initiations than responses following the video modeling intervention. In light of the difficulties that children with autism have with regard to social initiation, this finding was somewhat surprising. This result is even more interesting when one compares the ratio of initiations to responses in the video modeling vignettes with the ratio of initiations to responses produced by Ryan during activity sessions. The ratio of initiations to responses averaged 66:34 -- almost 2:1 -- across the three videotape vignettes for each activity. However, on average, Ryan's initiation to response ratio was 3:1 following the video modeling intervention for both Chevron cars and Caillou's treehouse, and almost 7:1 for play dough. Thus, although Ryan observed an initiation-to-response ratio of 2:1 on the video modeling tapes, he produced an even higher proportion of initiations than was modeled. Perhaps the use of multiple exemplars provided Ryan with so many initiation examples that he was able to initiate at a higher rate than expected. An alternative explanation is that, because mimicking the video models appeared to be quite enjoyable for Ryan, he exaggerated the already-high proportion of initiations to responses in the videotapes, especially in sessions where the peer confederate initiated very little. Future research should endeavor to measure the frequency of peer initiations as well, to further examine the dyadic relationship between initiations and responses.
Peer Responses

As noted in Chapter 4, the frequency or proportion of peer responses was not one of the original dependent variables included in the study. However, peer responses were scored in an attempt to examine the extent to which Ryan’s initiations were successful, under the supposition that successful initiations would typically be followed by peer responses. While the absolute frequency of peer responses did increase somewhat following intervention (as the frequency of Ryan’s initiations increased), the proportion of Ryan’s initiations followed by peer responses did not. As is evident from Table 6, the mean proportion of peer responses to his initiations during baseline ranged from 30.5% in Caillou’s tree house to 42.2% in play dough, with a mean of 36%. Following intervention, the mean proportion changed very little to 37.9%; it also remained stable during the follow-up phase, with a mean of 36.5%. Overall, the two peers responded to an average of 36.9% of Ryan’s initiations throughout the study.

There are at least two possible explanations for this low and stable peer response rate. The first is that almost two-thirds of Ryan’s initiations were not followed by peer responses because they were somehow inadequate (i.e., unsuccessful) at eliciting peer responses. For example, Ryan may have had difficulty “putting together” all of the subtle nonverbal social skills (e.g., eye contact, getting a peer’s attention, etc.) that were needed to cue the peer that a response was expected. The second possibility is that the low proportion of peer responses to participant initiations reflects the difference between “high constraint” and “low constraint” utterances that has been documented in previous research (Rydell & Mirenda, 1991, 1994). Rydell and Mirenda (1991) described these two types of utterances as differing in the “degree of obligation placed on a listener by the form of a speaker’s utterance” (p. 132). High constraint utterances such as wh- questions, yes/no questions, and directives are more
demanding of a response than low constraint utterances such as indirect questions (e.g., “Maybe we can make ice cream?”) or comments. In this study, Ryan made many initiations that functioned as comments about the ongoing play activity rather than as requests or direct questions that demanded a peer response. For example, a low constraint initiation such as “Chicken nuggets are yummy” did not obligate the peer to answer; while a high constraint initiation such as “What do you want to eat?” did imply such an obligation. Even a high constraint initiation such as “Can you pass the red box?” did not require a verbal peer response; the only response it obligated was for the peer to give the requested item to Ryan.

Unfortunately, it was beyond the scope of this study to analyze the participant’s initiations in terms of the degree of constraint they placed on the peers, although it is at least somewhat likely that a large proportion were of the low constraint type that carried less response obligation. For example, the experimenter observed that, at times, Ryan appeared to be talking out loud about what he was doing rather than talking directly to the peer. Clear differences in body language were also noted between some types of verbalizations; for example, eye contact with a peer seemed to occur more often when Ryan asked a direct question and appeared to expect a peer response than when he simply initiated a comment. Future research is needed to examine the types of initiations influenced by video modeling and to examine the high vs. low constraint dynamic specifically. For example, video modeling scripts could be manipulated with regard to the proportion of high vs. low constraint models they offer, to determine the extent to which the scripts themselves have an impact on the nature of the utterances produced.
Video Modeling + Video Feedback

Prior to this, only one study has examined the use of video feedback as part of a multielement intervention aimed at increasing social language with peers in children with autism (Thiemann & Goldstein, 2001). Other studies have examined the use of video feedback for teaching self-care skills to an adolescent with autism (Lasater & Brady, 1995) and social skills to children with behavior disorders (Kern-Dunlap et al., 1992). In the present study, video feedback was included after it became clear that Ryan was perseverating on the physical characteristics of the Chevron cars. He repeatedly asked to play with them and showed excitement whenever it was time for the activity sessions that included them. However, as the study progressed, this perseveration appeared to be distracting for Ryan; he frequently stared at the undersides of the vehicles and watched the wheels and car "eyes" (i.e., headlights) move back and forth, without interacting at all with the peer. Interestingly, in one of the activity session transcripts, the experimenter noted that one of Ryan’s comments ("It says Chevron cars") occurred while he was staring at the bottom of the car, when he appeared to be "reading" the words printed there. Because of this perseverative behaviour, Ryan’s rate of verbalizations was quite low, even after the introduction of video modeling.

Video feedback was added to the intervention because the researcher speculated that Ryan’s perseverative behaviours might decrease if, prior to each activity session, he could view himself on videotape engaged in "good talking" and "not good talking" (e.g., staring at the car), and earned reinforcement (i.e., praise) for the former. Ryan appeared to enjoy the video feedback sessions thoroughly. He was fascinated with seeing himself on videotape, showed considerable interest in accumulating "points" (as he labeled them) for good talking,
and frequently made comments such as “Good talking’s going to be the winner!” Because the purpose of this study was to assess the affects of video modeling alone, his parents and tutors were specifically instructed not to discuss the videotape vignettes with Ryan, even when he attempted to initiate such a discussion. Perhaps as a result, he appeared thrilled to be able to talk about the play activities used in the study during the feedback sessions.

While the addition of video feedback did lead to a mean increase in the target behaviours over several sessions, the session-by-session data still reflected considerable variability over several feedback sessions. Apparently, Ryan found looking at the underside of the cars and at their moving “eyes” to be more reinforcing than participating in the video feedback sessions and receiving positive feedback for “good talking.” Further, it is important to note that video feedback was added to the play dough activity at the same time as the Chevron cars activity, and did not result in a significant increase in verbalizations in that activity either. Thus, this study did not provide strong empirical evidence for the efficacy of video feedback for increasing social language behaviours in one participant with autism. However, anecdotal reports from Ryan’s parents and tutors suggest that the video feedback may have functioned to make Ryan more aware of his language when playing with peers in general. Four months following the end of intervention, Ryan still refers to “good talking” when he interacts with peers, and often makes comments such as “I’m going to do lots of good talking” when he is told that a peer is coming to his home for a play date. His parents and tutors also report that his spontaneous social language has continued to develop rapidly. Future research is needed to assess both the short- and long-term impact of video modeling and video feedback when used both separately and together as part of a package.
Video Modeling + Video Feedback + Prompting

Because of the minimal impact of the addition of video feedback as an intervention component, adult prompts at 10 sec intervals were added and then gradually faded over five sessions. The prompts were provided only during the Chevron cars activity, and only when 10 sec had passed with no speech from Ryan. The prompts were faded gradually both in terms of frequency and level (i.e., from verbal + visual prompts to visual prompts only to no prompts). A total of 31 prompts were delivered over the five sessions (mean = 6.2 per session). As is evident from Figure 1, 29 of these were immediately followed by a verbalization by Ryan. The majority of his verbalizations during the five prompted sessions (mean = 84.8%) continued to be unprompted. The result of the addition of prompting was a clear, stable increase in Ryan’s verbalizations, even after the prompts were eliminated.

The direct prompting appeared to function to interrupt Ryan’s perseverative behaviour at the time it occurred. Following a prompt (e.g., “Remember to talk when playing”) Ryan frequently said “Okay,” removed his focus solely from the Chevron car or truck, and immediately began talking to his peer. Given the immediate impact of the prompting component, it is possible that video feedback was not required in the intervention at all – perhaps, prompting alone would have been sufficient for Ryan to increase his social language use during the Chevron cars activity. Because this was a short-term intervention component that was used in only one of the three activities in this study, additional research is needed to examine the impact of prompting for teaching social language to children with autism in the context of video modeling.
Modeling Tapes

It is noteworthy that, based on evidence of efficacy from previous research, this study utilized an “other-as-model” technique in the videotapes that were created. Not only did the tapes include other people as models (as opposed to “self” models), the models were unfamiliar adults. Thus, the positive results suggest that it may not be necessary to “match” participant and model characteristics in creating videotapes for modeling, and that this type of intervention might be able to be utilized in ways that are less cost-and time-intensive than when self-modeling tapes are involved.

Of course, given the empirical nature of this project, these modeling videotapes were created under carefully controlled conditions. Filming of the nine, 1-minute videotapes required approximately 4 hours. Word-by-word scripts were created for the models to follow during filming, and the three script templates ensured that an identical number of initiations, responses, and verbalization subtypes (e.g., questions, comments, greetings, clarifications, etc.) would occur across the three activities. The adult models were instructed to speak very clearly and enthusiastically during the vignettes to suggest that they enjoyed playing with the target toys, although their speech was presented more rapidly than might be typical so that each script could be completed within approximately one minute. Because these measures were taken to control for the number and type of verbalizations across activities and increase the internal validity of the study, they would not be necessary in order to create videotapes for practical applications, when internal validity is not a concern.
**Limitations**

*External Validity*

This study included only one participant whose language abilities, while delayed, were quite well developed. Ryan had the ability to make requests, respond to questions, make comments, and utilize his language to describe and explain concepts in short phrases/sentences; and, while he rarely used social language spontaneously with his peers, he was able to do so with prompting. It is not clear how effective this video modeling intervention would have been with children who were more significantly impaired in receptive and expressive language. Future research is needed to evaluate the effects of video modeling on social language with children with more limited language abilities.

In addition, Ryan had received many hours per week (over approximately 1.5 years) of home-based behavioural treatment utilizing methods based on the principles of applied behaviour analysis (ABA) including, but not limited to, discrete trial teaching. Part of his programming included learning basic skills such as sitting quietly, attending, cooperating, and imitating, as well as more advanced skills in the domains of abstract concepts and both receptive and expressive language. Thus, Ryan had already developed many skills that may have allowed him to benefit from video modeling. In general, he is a very cooperative child who rarely displays problem behaviours. For children who may not have developed these types of skills, the impact of such an intervention remains to be determined.

*Follow-Up and Generalization*

While the study showed impressive follow-up data up to 18 days following intervention, long term follow-up data were not collected due to time constraints. In addition, no measures of stimulus generalization were collected. Additional research is needed to
assess both long-term maintenance and generalization across people (e.g., siblings, unfamiliar peers), environments (e.g., school, playground), and stimuli (e.g. novel play materials).

Dependent Measures

Verbalizations. The current study did not analyze verbalizations in detail, other than classifying them as initiations and responses and as scripted/unscripted. Coding verbalizations into dichotomous categories did not permit assessment of the effects of video modeling on specific functional types of verbalizations, such as requests, comments, questions, greetings, acknowledgements, and so forth. Future research is needed to examine these effects as well as to evaluate the effects on high versus low constraint utterances, as discussed previously.

Motor behaviours. In addition to verbal behaviours, previous research using video modeling techniques has demonstrated an intervention effect with regard to motor behaviours during play. For example, D’Ateno et al. (2003) provided evidence that, during solitary play activities, their participant imitated many of the play routines observed on the model videotapes (e.g., pouring tea from a teapot into a cup). However, motor behaviours were not measured as a dependent variable in the present study, although Ryan was observed informally to incorporate many of the play actions modeled on the videotapes during play routines. Imitation of modeled motor play responses occurred at especially high levels in the Chevron cars activity, which was also the one in which Ryan needed the most support to use social language. Future research is needed to examine the impact of video modeling on the acquisition of motor as well as social language skills during play, as it is likely that this type of intervention could result in an increase in these skills as well.
Educational Implications

Reduced Adult Prompts

In the current study, no prompts were needed for Ryan to engage in increased social language in two of the three activities. For the third activity, only a few adult prompts were needed for five sessions, after which he was able to maintain high levels of social language with his peers without any further prompting for the duration of the study. This is significant in light of the fact that, previous to this study, Ryan had participated in regular, structured peer play sessions facilitated by one of his tutors for at least 6 months. Despite continuous attempts to fade prompting during these sessions, he continued to require them and his social language deteriorated when prompts were withheld. It appeared that Ryan had become dependent on adult prompts for appropriate social language with peers. Given this history, his dramatically increased use of spontaneous social language in this study was especially surprising and impressive. These results suggest that video modeling may eliminate the need for adult prompting in social situations in which continuous prompting from an adult can be obtrusive and disrupt the natural flow of play with peers.

Flexibility, Ease of Use, and Reinforcement Value

As the current study demonstrates, video modeling can be combined with many other techniques or components when necessary. The current study utilized the addition of video feedback and prompting to enhance the effectiveness of video modeling in the Chevron cars activity, which appeared to be resistant to change. In addition, while video modeling does require some technical expertise, analog and/or digital video camera equipment is becoming increasingly more available at a reasonable cost. Many families own or know someone who owns a video camera, television, and/or video playback machine, all of which are also
becoming standard equipment in Canadian schools. In addition, the finding that significant results were demonstrated with unfamiliar adult models makes the process of creating the modeling tapes relatively easy for families and school personnel, and the minimal time requirements outside of the context of a research study make it appealing as well.

Finally, many children with autism find watching videotapes to be reinforcing. This was certainly the case for Ryan, who was interested in and motivated to watch the videotapes from the outset. He was always attentive when they were shown, and memorized at least portions of the tapes long before the study was over (he was frequently observed to talk along with the models in the tapes). Additionally, Ryan enjoyed the video feedback sessions in which he was able to talk about the videotapes with the experimenter. His smiling and cheering for “good talking” indicated that this was clearly a positive experience.

**Conclusion**

This study examined three questions: (a) Is there a functional relationship between a video modeling intervention using multiple exemplars and an increase in total social language verbalizations in a child with autism? (b) Does a video modeling procedure with multiple exemplars lead to an increase in both scripted and unscripted language in a child with autism? and (c) Does a video modeling procedure with multiple exemplars lead to an increase in both initiations and responses in a child with autism? The results indicated that video modeling led to immediate and substantial increases in the participant’s social language for two of the three activities. For the third activity, the additional components of video feedback and prompting were needed to achieve a significant and stable increase in his social language. Results also indicated that the video modeling procedure with multiple exemplars led to increases in both scripted and unscripted language, with unscripted
language unexpectedly predominating. In addition, the intervention affected an increase in both responses and initiations, with initiations increasing most notably. Finally, results indicated that, when social language was resistant to change using video modeling alone, the additional components of video feedback and prompting led to the desired change.

The findings of this investigation make several unique contributions to the literature on both video modeling and teaching social language to children with autism. First, this research is the first study to document the effects of video modeling for teaching language use with peers during typical play activities. Second, the participant not only increased his social language use with a peer by modeling scripted language from the tapes, he also increased his use of unscripted social language. The increase in unscripted language, a unique and robust finding in this study, may have been a result of the inclusion of multiple exemplars in the videotape vignettes, as suggested by previous research. Third, the current study adds to the intervention research focused on teaching children with autism to initiate towards their peers. While the results indicated positive changes for both responses and initiations, the latter increased considerably more than the former, suggesting that video modeling may be an effective intervention for teaching children with autism to initiate. Fourth, this study illustrates the strength of video modeling alone without the additional use of peer training, reinforcement, prompting, or other experimenter-controlled contingencies. While additional contingencies were included for Chevron cars, immediate and robust increases in language use for the other two activities were clearly documented following video modeling alone. Finally, the unobtrusiveness of this intervention may make it ideal for use for busy families and as a part of already existing programs. This study demonstrated that, for two of the three activities, having the participant simply watch a short (i.e., 3
minute) model videotape once per day was enough to result in significant increases in social language. Practically speaking, this is good news for parents, interventionists, and others who might be in positions to implement video modeling interventions in home and school settings.
References


Appendix E

Gross Motor Actions

(from “Nonverbal Imitation,” Lovaas, 2002)

Tap knees
Tap table next to you
Raise Arms
Touch tummy
Stand up
Jump
Wave
Touch head
Stomp feet
Cover eyes with hands

Actions Involving Objects

Block in bucket
Push car
Tap a drum
Pretend to drink from a cup
Pretend to eat toy food
Put doll in a crib/bed
Put on a hat
Gallop a toy horse across the table
Bang a toy hammer
Brush hair
Appendix F

*Verbal Imitation Items*

I want play.

Make a house?

Want play baby.

I like car.

You want cookie?

Do you like?

All done now.

Look at me!

Big blue truck.

Can I have?

Want some more?
Appendix G

Activity Session Protocol

Date: ______________________________

Today, Activity #1 is (check one):  p Caillou  p play doh  p Chevron cars
Activity #2 is (check one):  p Caillou  p play doh  p Chevron cars
Activity #3 is (check one):  p Caillou  p play doh  p Chevron cars

Preparation:

☐ Check date and top of sheet to determine order of play activities for the day.

☐ Set up video camera on tripod. Put the video camera on the duct tape marked for the specific activity (approximately 6 feet from the first play activity). Put the tape in. Focus the video camera on the area of the first activity.

☐ Set up play materials – 3 sets of materials in 3 different locations. Put Caillou’s Tree House on the coffee table in the living room. Make sure to take the figurines out of the bag and next to the tree house on the coffee table.

☐ Take the Chevron Cars out of the box and put them on the area rug on the living room floor – put all cars at one end of the rug (closest to the fireplace). Turn the rug slightly so it is on a slight angle (pull the end near the coffee table out towards the couch).

☐ Take the play dough out of the box and put it on the kitchen table. Make sure there are two chairs at the kitchen table - one chair at end of table, one at side by the window. Pull away all other chairs.

☐ Get the timer ready. Set it for 5 minutes.

☐ Double check the schedule to make sure that the order of activities for the day is correct on this sheet.

☐ Check the video camera. Make sure it is focused on the first activity.

☐ Make sure to have both children use the bathroom before beginning.

☐ Make sure the external microphone is plugged into the camera. Turn it on. Attach the other end to Ryan (big part in pocket and microphone attached to shirt about 6 inches under chin) and make sure this end is also turned on (both pieces should be turned “on” and the red light should be on.

☐ Go back to the camera. Begin recording.
Appendix G (Continued)

**Activity 1:**

- Tell children, “Today we are going to play (first activity), then (second activity), and last (last activity).”

- Then tell them, “Time to play (first activity)” and direct them over to the activity using gesture prompts and possibly 1-2 verbal prompts (e.g. “sit down here” or “play (activity) on the floor”).

- When children begin manipulating toys (e.g. taking them out of the box, touching them on the table) press start on the timer (which is set for 5 minutes).

- Check that the video camera is focused on the children and that it is recording. Stand/sit by the video camera to ensure it continues to be focused on the children’s play. Look through the lens and focus the camera as needed during play.

- Double check that the microphone is on. The end attached to the camera should be set to “on” and the other end should have a red light on indicating it is “on.”

- **Do not give any additional prompts during play.**

- If either the participant or the peer leaves the play area for more than 20 seconds before the timer goes off, redirect him/her back to the activity and say “Play (activity) with (peer).” If the same child leaves the area again for longer than 20 seconds, consider the activity over and instruct the children to play the next activity.

- If a child leaves the play area, stop the timer. Restart the timer when the child returns or is prompted to return.

- If either child attempts to interact with you during the session, say, “Time to play with (peer).” If the child persists (e.g. needs help with something), provide help without saying anything.

**Activity 2:**

- When the timer rings, prompt the children to stop the current activity and move to the second activity. Say, “(activity) is all done. Time to play (activity).” Do not ask the children to put the toys away from the first activity.

- Move the video camera to the duct tape mark for the second activity. Make sure it is still on and recording, and focus it on the second activity.
Appendix G (Continued)

☐ When children begin manipulating the toys for the second activity, press start on the timer (which is set for 5 minutes).

☐ Check that the video camera is focused on the children and that it is recording. Stand/sit by the video camera to ensure it continues to be focused on the children’s play. Look through the lens and focus the camera continuously during the play.

☐ Double check that the microphone is on. The end attached to the camera should be set to “on” and the other end should have a red light on indicating it is “on.”

☐ Do not give any additional prompts during play.

☐ If either the participant or the peer leaves the play area for more than 20 seconds before the timer goes off, redirect him/her back to the activity and say “Play (activity) with (peer).” If the same child leaves the area again for longer than 20 seconds, consider the activity over and instruct the children to play the next activity.

☐ If a child leaves the play area, stop the timer. Restart the timer when the child returns or is prompted to return.

☐ If either child attempts to interact with you during the session, say, “Time to play with (peer).” If the child persists (e.g. needs help with something), provide help without saying anything.

Activity 3:

☐ When the timer rings, prompt the children to stop the current activity and move to the last activity. Say, “(activity) is all done. Time to play (activity).” Do not ask the children to put the toys away from the first activity.

☐ Move the video camera to the duct tape mark for the third activity. Make sure it is still on and recording, and focus it on the third activity.

☐ When children begin manipulating the toys for the last activity, press start on the timer (which is set for 5 minutes).

☐ Check that the video camera is focused on the children and that it is still recording. Stand/sit by the video camera to ensure it continues to be focused on the children’s play. Look through the lens and focus the camera continuously during the play.

☐ Double check that the microphone is on. The end attached to the camera should be set to “on” and the other end should have a red light on indicating it is “on.”
Appendix G (Continued)

☐ Do not give any additional prompts during play.

☐ If either the participant or the peer leaves the play area for more than 20 seconds before the timer goes off, redirect him/her back to the activity and say “Play (activity) with (peer).” If the same child leaves the area again for longer than 20 seconds, consider the activity over tell the children that they are “all done playing.”

☐ If a child leaves the play area, stop the timer. Restart the timer when the child returns or is prompted to return.

☐ If either child attempts to interact with you during the session, say, “Time to play with (peer).” If the child persists (e.g. needs help with something), provide help without saying anything.

☐ When the timer rings, prompt the children to stop the current activity and let them know they are finished playing. Say, “(activity) is all done. All done playing today.”

☐ If the peer is staying, tell both children to take a break so that you can finish organizing the materials and complete the steps in the protocol.

Final Steps:

☐ Stop recording. Rewind the tape in the video camera.

☐ Remove the tape and write the date, time started, and time ended on the tape label.

☐ Turn off the video camera.

☐ Hook up the power cord to the video camera, and plug it in so that the battery charges for the next session.

☐ Put the tape in the “TO LIANA” bin in the cupboard above the fridge.

☐ Clean up the play activities. Put all materials as they were (in all containers) and put boxes away. Make sure toys are clean (remove excess play doh, etc.) and ready for next session. Store the boxes in the cupboard above the fridge so the children do not have access to the materials between activity sessions.
### APPENDIX H: Script Template #1

<table>
<thead>
<tr>
<th>Caillou's Tree House</th>
<th>Play Dough</th>
<th>Chevron Cars</th>
</tr>
</thead>
<tbody>
<tr>
<td>R I want to be Caillou.</td>
<td>R I want to make French fries.</td>
<td>R I want to be Hank Hot Rod.</td>
</tr>
<tr>
<td>P I want to be Rosie</td>
<td>P I want to make chicken nuggets</td>
<td>P I want to be Danni Driver.</td>
</tr>
<tr>
<td>R Hi Rosie</td>
<td>R Hi chicken nuggets maker!</td>
<td>R Hi Danni.</td>
</tr>
<tr>
<td>P Hello Caillou. What do you want to do?</td>
<td>P Hi Fry maker! What do you want to do?</td>
<td>P Hi Hank. What do you want to do?</td>
</tr>
<tr>
<td>R Let's go in the tree house</td>
<td>R Let's make some food</td>
<td>R Let's have a race.</td>
</tr>
<tr>
<td>P OK</td>
<td>P OK</td>
<td>P OK.</td>
</tr>
<tr>
<td>R I'm gonna go up the magic spinner. Do you want to come?</td>
<td>R I'm going to put yellow in. Do you want to help?</td>
<td>R I'm going to go to the start line. Are you coming?</td>
</tr>
<tr>
<td>P Yeah. Wait for me.</td>
<td>P Yeah. Give me some yellow too please.</td>
<td>P Yes. (balanced below)*</td>
</tr>
<tr>
<td>R Here we go up.</td>
<td>R We need to push.</td>
<td>R We need to line up.</td>
</tr>
<tr>
<td>P This is fun.</td>
<td>P I like the fries.</td>
<td>P I like these cars.</td>
</tr>
<tr>
<td>P I want to get off.</td>
<td>P I want to take them off.</td>
<td>P I want to race.</td>
</tr>
<tr>
<td>R Sure. Here we are.</td>
<td>R Sure. Here you go.</td>
<td>R OK. Get ready.</td>
</tr>
<tr>
<td>R Look! I see Gilbert!</td>
<td>R Look! There's the fry box.</td>
<td>R Look! Ready. Set. Go.</td>
</tr>
<tr>
<td>R Meow</td>
<td>R mmm, tastes good!</td>
<td>R Beep beep</td>
</tr>
<tr>
<td>R I'm going down the slide.</td>
<td>R I'm eating fries.</td>
<td>R I went fast.</td>
</tr>
<tr>
<td>P I'm going up the ladder</td>
<td>P I want to make chicken nuggets.</td>
<td>P I went really fast.</td>
</tr>
<tr>
<td>R Wheeeee</td>
<td>R Yum</td>
<td>R mmmm</td>
</tr>
<tr>
<td>R Do you want to go down the slide?</td>
<td>R Do you want to use brown?</td>
<td>R Do you want to race again?</td>
</tr>
<tr>
<td>P OK. Here I come.</td>
<td>P OK. I'll put it in.</td>
<td>P Yeah. I'll get ready.</td>
</tr>
<tr>
<td>P Let's ride the bike.</td>
<td>P Let's push down.</td>
<td>P Let's line up.</td>
</tr>
<tr>
<td>R OK</td>
<td>R OK</td>
<td>R OK</td>
</tr>
<tr>
<td>R Go Rosie</td>
<td>R Open it.</td>
<td>R Drive your Danni car.</td>
</tr>
<tr>
<td>R Put it here and push. Do you want me to show you?</td>
<td>R Take it out. Do you want me to help?</td>
<td>R Line up at the start line. Are you ready?</td>
</tr>
<tr>
<td>P OK</td>
<td>P OK</td>
<td>P Yes. Go! (balanced above)*</td>
</tr>
<tr>
<td>R It goes fast</td>
<td>R I did it!</td>
<td>R I won!</td>
</tr>
<tr>
<td>P I like that.</td>
<td>P Chicken nuggets taste good</td>
<td>P That was fun!</td>
</tr>
<tr>
<td>R Can I have a turn?</td>
<td>R Can I have a turn?</td>
<td>R Do you want to trade cars?</td>
</tr>
<tr>
<td>R Let's watch Caillou!</td>
<td>R Let's make more food.</td>
<td>R Let's play again!</td>
</tr>
<tr>
<td>Caillou’s Tree House</td>
<td>Play Doh</td>
<td>Chevron cars</td>
</tr>
<tr>
<td>----------------------</td>
<td>----------</td>
<td>--------------</td>
</tr>
<tr>
<td>R Come on. Let's play Tree House!</td>
<td>R Come on. Let's play playdoh!</td>
<td>R Come with me. Let's play cars!</td>
</tr>
<tr>
<td>P OK</td>
<td>P Alright</td>
<td>P Yay!</td>
</tr>
<tr>
<td>R Do you want Rosie or Caillou?</td>
<td>R Do you want to make sundaes or McDonald's food?</td>
<td>R Do you want the orange car or the blue car?</td>
</tr>
<tr>
<td>P I'll have Rosie.</td>
<td>P I want to make sundaes.</td>
<td>P I want the orange car.</td>
</tr>
<tr>
<td>R I’ll be Caillou.</td>
<td>R I want to make some ice cream.</td>
<td>R I’ll be blue.</td>
</tr>
<tr>
<td>P Gilbert can play in the sand box.</td>
<td>P We can do it together</td>
<td>P We can put them in Cary Carrier.</td>
</tr>
<tr>
<td>R Caillou is tired. He needs to sleep in the tent.</td>
<td>R I’m going to use brown. It’s chocolate.</td>
<td>R I’m going to drive blue car up. Blue is first.</td>
</tr>
<tr>
<td>P Can Rosie sleep too?</td>
<td>P Can I have chocolate too?</td>
<td>P Can my orange car come on?</td>
</tr>
<tr>
<td>R Sure, put her in the tent.</td>
<td>R Yeah, put it inside.</td>
<td>R Yeah. Drive it up the ramp.</td>
</tr>
<tr>
<td>P (snore noise)</td>
<td>P num num num</td>
<td>P rrrrrrrrr</td>
</tr>
<tr>
<td>R Time to wake up.</td>
<td>R Put the cone under.</td>
<td>R Put the ramp up.</td>
</tr>
<tr>
<td>R What do you want to do?</td>
<td>R What shape do you want?</td>
<td>R Where should we go?</td>
</tr>
<tr>
<td>P Let’s go on the swing.</td>
<td>P Let’s do the star.</td>
<td>P Let’s drive on a road.</td>
</tr>
<tr>
<td>R Yeah. Good Idea!</td>
<td>R OK. I like that one!</td>
<td>R Yes. That’s cool!</td>
</tr>
<tr>
<td>P Here, put Caillou on the swing.</td>
<td>P Here, push it down.</td>
<td>P Here, push Cary Carrier.</td>
</tr>
<tr>
<td>R Can you help me?</td>
<td>R Can you help push?</td>
<td>R Can you help build the road?</td>
</tr>
<tr>
<td>P Yes....There!</td>
<td>P Sure....There you go!</td>
<td>P OK....There’s the road.</td>
</tr>
<tr>
<td>P I’ll make it go down.</td>
<td>P I’ll eat the ice cream.</td>
<td>P I’ll make it longer.</td>
</tr>
<tr>
<td>R I’ll push it.</td>
<td>R I’ll put sprinkles on.</td>
<td>R I’ll help build it.</td>
</tr>
<tr>
<td>R Wheeee</td>
<td>R “ch ch ch” (shaking)</td>
<td>R “ch ch ch” (hammering)</td>
</tr>
<tr>
<td>P Can Rosie have a turn?</td>
<td>P Do you want some?</td>
<td>P Do you want to drive?</td>
</tr>
<tr>
<td>R Yes, Rosie your turn.</td>
<td>R Yeah, I can taste it.</td>
<td>R OK, I can push Cary.</td>
</tr>
<tr>
<td>P I like swinging!</td>
<td>R I love ice cream!</td>
<td>R I like playing cars!</td>
</tr>
<tr>
<td>R Caillou is playing in sand box with Gilbert.</td>
<td>P I like making ice cream cones.</td>
<td>P I like building a road.</td>
</tr>
<tr>
<td>R This is fun!</td>
<td>R This is great!</td>
<td>R This is exciting!</td>
</tr>
<tr>
<td>P Yeah. I like Caillou's Tree House!</td>
<td>P Yeah. I like playing playdoh!</td>
<td>P Yeah. I like Chevron cars!</td>
</tr>
</tbody>
</table>
## Script Template #3

<table>
<thead>
<tr>
<th>Caillou's Tree House</th>
<th>Play Doh</th>
<th>Chevron Cars</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>R</strong> Yes! I love to play Caillou's Tree House.</td>
<td><strong>R</strong> Yay! I love to play play doh.</td>
<td><strong>R</strong> Cool! I love to play Chevron Cars.</td>
</tr>
<tr>
<td><strong>P</strong> Me too. It's fun!</td>
<td><strong>P</strong> Me too. It's so fun!</td>
<td><strong>P</strong> Yeah I do too. They are fun!</td>
</tr>
<tr>
<td><strong>R</strong> Can I have Gilbert?</td>
<td><strong>R</strong> Can I have the white cup?</td>
<td><strong>R</strong> Can I be the school bus?</td>
</tr>
<tr>
<td><strong>P</strong> Yea. Here.</td>
<td><strong>P</strong> Yes. Here.</td>
<td><strong>P</strong> Sure. Here is Sally school bus.</td>
</tr>
<tr>
<td><strong>R</strong> Thank you.</td>
<td><strong>R</strong> Thank you.</td>
<td><strong>R</strong> Thank you.</td>
</tr>
<tr>
<td><strong>P</strong> I'm checking the mail. No mail.</td>
<td><strong>P</strong> I'm making chicken nuggets. They are brown.</td>
<td><strong>P</strong> I'm driving under the table. I have baby car.</td>
</tr>
<tr>
<td><strong>R</strong> I'm putting the swing up. Look (name)!</td>
<td><strong>R</strong> I'm going to make a milkshake. Look (name)!</td>
<td><strong>R</strong> I'm driving the school bus. Look (name)!</td>
</tr>
<tr>
<td><strong>P</strong> Oh. It's up high.</td>
<td><strong>P</strong> I see. It looks good.</td>
<td><strong>P</strong> Wow! It's a gas can.</td>
</tr>
<tr>
<td><strong>R</strong> Yeah. Do you want it down?</td>
<td><strong>R</strong> Yeah. Do you want a milkshake?</td>
<td><strong>R</strong> Yeah. Do you need gas?</td>
</tr>
<tr>
<td><strong>P</strong> No. I'm gonna ride the magic spinner. Watch me</td>
<td><strong>P</strong> No. I'm gonna make a hamburger. Look at mine</td>
<td><strong>P</strong> Yes. I'm coming to get gas. Look at me. (doing wheely)</td>
</tr>
<tr>
<td><strong>R</strong> That's cool!</td>
<td><strong>R</strong> That looks good!</td>
<td><strong>R</strong> Cool!</td>
</tr>
<tr>
<td><strong>R</strong> Gilbert wants a turn. Can you put it up?</td>
<td><strong>R</strong> I want to make some fries. Can you give me yellow play doh?</td>
<td><strong>R</strong> I need gas. Can you give me gas?</td>
</tr>
<tr>
<td><strong>P</strong> Sure. Get on Gilbert.</td>
<td><strong>P</strong> Yes. Get the fries box.</td>
<td><strong>P</strong> OK. Stop right here.</td>
</tr>
<tr>
<td><strong>R</strong> OK. Gilbert is ready. Let go.</td>
<td><strong>R</strong> OK. Here's the red box. You can put the fries in.</td>
<td><strong>R</strong> OK. Sally school bus is ready. Put the gas in.</td>
</tr>
<tr>
<td><strong>P</strong> Oh oh. Are you OK, Gilbert?</td>
<td><strong>P</strong> OK. Do you like to eat fries?</td>
<td><strong>P</strong> OK. Do you want to go to school?</td>
</tr>
<tr>
<td><strong>R</strong> Yes. He's good. He needs to take a nap.</td>
<td><strong>R</strong> Yes. They are yummy. I need to put ketchup on.</td>
<td><strong>R</strong> Yes. I'm the bus driver. I'm driving to school.</td>
</tr>
<tr>
<td><strong>P</strong> Rosie is hungry. She's going to cook. What do you want to eat?</td>
<td><strong>P</strong> I want the milkshake now. I'm going to eat it all up! What do you want?</td>
<td><strong>P</strong> I'm coming to school too. I'm right behind you. What do you like to do at school?</td>
</tr>
<tr>
<td><strong>R</strong> I want a hot dog.</td>
<td><strong>R</strong> I want the green spoon please.</td>
<td><strong>R</strong> I like to play at the sand table.</td>
</tr>
<tr>
<td><strong>P</strong> OK. Here's your hotdog.</td>
<td><strong>P</strong> OK. Here's the spoon.</td>
<td><strong>P</strong> Oh. Here's the school.</td>
</tr>
<tr>
<td><strong>R</strong> Mmmmm, yummy! Could you give me a drink?</td>
<td><strong>R</strong> Mmmmm, yummy! Could you give me a chicken nugget?</td>
<td><strong>R</strong> rrrrrrr, there! Could you share the baby car now?</td>
</tr>
<tr>
<td><strong>P</strong> Here you go.</td>
<td><strong>P</strong> Here you go.</td>
<td><strong>P</strong> Here it is.</td>
</tr>
</tbody>
</table>
**Appendix I**

*Initial Video Viewing Session Script/Data Sheet*

<table>
<thead>
<tr>
<th>Date</th>
<th>Time</th>
<th>Supervised by</th>
<th>Explanation of target behaviours</th>
<th>Duration of Video</th>
<th>Number of times child left area</th>
<th>Number/type of prompts needed to watch</th>
<th>Additional Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Have child sit in comfortable location (chair in front of T.V.)</td>
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<td></td>
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<td></td>
<td>Say, “Time to watch a video. We are going to watch people playing and doing good talking with their friends.”</td>
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<td></td>
<td></td>
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<td>Said this: Y or N</td>
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<td></td>
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<td></td>
<td>Say, “Let’s watch the people playing and talking.”</td>
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<td></td>
<td></td>
<td></td>
<td><strong>Said this: Y or N</strong></td>
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<td></td>
<td></td>
<td></td>
<td>Turn on video.</td>
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<td></td>
<td>Point out people playing. Say, “Look they are playing (activity).”</td>
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<td></td>
<td><strong>Said this: Y or N</strong></td>
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<td></td>
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<td></td>
<td>Point out people talking. Say, “That was great talking. He/she said (repeat what person said). That’s good talking to friends.”</td>
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<td></td>
<td></td>
<td></td>
<td><strong>Said this: Y or N</strong></td>
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</tbody>
</table>
|      |      |               | Point out two more occasions of playing and talking.  
1. Y or N  
2. Y or N |                   |                               |                                         |                     |
|      |      |               | When video is finished, say “We can talk to our friends when we play.” |                   |                               |                                         |                     |
|      |      |               | **Said this: Y or N** |                   |                               |                                         |                     |
Appendix J

Scoring Procedures

**STEPS IN SCORING:**

1. Put video in VCR – make sure it is at the beginning of the tape.
2. Get out the transcription and a pen.
3. Have definitions and list of scripted verbalizations available.
4. Write the current date where indicated on the scoring sheet.
5. Write the date on the video tape where indicated on the scoring sheet.
6. Begin to play the videotape.
7. After each verbalization of the target child, score whether the verbalization was scripted or unscripted and whether it was an initiation or a response. Refer to the definitions regularly.
8. Pause/rewind/rewatch the video as needed.
9. Total the number of scripted, unscripted, initiations, responses and peer responses.
Appendix J (continued)

SCORING DEFINITIONS

Scripted verbalization:

- A verbalization that exactly matches any of the verbalizations on the list provided. Consider it a scripted verbalization if the form of the verb is different, but it is the same verb e.g. “I'm going to...” or “I'm gonna...” and “I am...” and “I'm...” would be considered the same. Also, consider it scripted for small substitutions in the article in a sentence e.g. “Do you want the milkshake?” and “Do you want a milkshake?” would be considered scripted.

- Consider the verbalization scripted if an article is added or omitted to a verbalization unless that verbalization is only one word.

Examples:
If “I want to make French fries” is the scripted verbalization,
then “I wanna make the French fries” would also be considered scripted.

If “I'm going to be a blue car” is the scripted verbalization,
Then “I'm going to be blue car” is also scripted.

If “Look” is scripted,
Then “Look it” is unscripted (because an article was added to just one word)

- Also, if a verbalization matches the beginning of a scripted verbalization then this will be coded as scripted.

Examples:
If “I'm making ice cream” is the scripted verbalization,
Then “I'm making” is also scored as scripted

If “Sally School bus is ready” is the scripted verbalization,
Then “Sally” is also scored as scripted.

If “Ready. Set. Go.” is the scripted verbalization,
Then “Ready” or “Ready. Set.” are both scored as scripted.

- This rule does not hold the same for the end of verbalizations.

  e.g. If “I want to make chicken nuggets” is the scripted verbalization,
  Then “Make chicken nuggets” is not scored as scripted; it is scored as unscripted.

- If part of the verbalization is unintelligible, but then there is a scripted verbalization, this will be scored as such

  e.g. “XXX tastes good” would still be scored as scripted because “Tastes good” is listed on the scripted verbalizations list
Appendix J (continued)

Unscripted verbalization:

- A verbalization that is not listed on the list provided, or that is different in any way from any of the verbalizations listed. (e.g. on list: "Look at the car"; Participant: "Look at the house" or on list: Caillou is tired”; Participant: “Caillou feels tired”).
- If a word (other than an article) is left out or added this will be scored as unscripted.

Initiations:

Comments or questions that are not contingent on a peer’s immediately prior utterance.

Initiations may be used to
(a) introduce a new idea or topic;
(b) request an action, object, or information from the peer (e.g., “Can I have the car?”);
(c) comment about observable objects or events within an ongoing activity, or make appropriate social comments unrelated to the activity (if the comment occurs within 5 seconds of the peer’s prior utterance and is contingent on that utterance, it will be scored as a response, not an initiation. If the comment occurs within 5 seconds of the peer’s prior utterance and is not contingent on that utterance then it will be scored as an initiation);
(d) compliment the peer or oneself (e.g., “That’s cool,” “Good for you”);
(e) secure the peer’s attention (e.g., “Look at this”); or
(f) express enjoyment or displeasure to the peer regarding the ongoing interaction together (e.g., “This is fun” or “This is boring”).

Responses:

Verbalizations that are contingent on a peer’s immediately prior utterance and that occur within 5 sec of the utterance.

Examples of responses include:
(a) acknowledgments (e.g., “oh”) or direct or partial repetitions of the utterance;
(b) agreements (e.g., “yeah”);
(c) answers to the peer’s questions;
(d) comments about observable objects or events within the ongoing activity, as well as appropriate social comments unrelated to the activity; (e) questions related to peer’s comments; and (e) clarifications of questions asked by the peer (e.g., “What did you say?”).

Other Codes/Rules:

Repeats:

If child repeats exact word or phrase within 5 seconds, then only the first verbalization will be scored.

The phrase is considered the same if the child says uses the exact wording and/or changes the article (or adds or leaves out the article), or pluralizes or depluralizes a word, or changes a the form of a word (but same root is used).
Appendix J (continued)

If the child makes a verbalization, then says something in between the second repeated verbalization, this will still be scored as a repeat as long as it was within 5 seconds of the first verbalization.

Other changes will be considered different verbalizations and will be scored accordingly (adding a new word, changing a word, etc).

If the same word/phrase is repeated after 5 seconds have passed, the verbalization will be scored as a new verbalization.

<table>
<thead>
<tr>
<th>e.g.</th>
<th>Verbalizations</th>
<th>Scored As</th>
</tr>
</thead>
<tbody>
<tr>
<td>I want a cookie</td>
<td>“+”</td>
<td></td>
</tr>
<tr>
<td>I want more cookie.</td>
<td>“+” (different word added)</td>
<td></td>
</tr>
<tr>
<td>I want the cookie.</td>
<td>“Repeat” (of first verbalization “I want a cookie” – occurred within 5 seconds)</td>
<td></td>
</tr>
</tbody>
</table>

If a verbalization includes an unintelligible word and then the next verbalization is identical (but you can understand the word), this will be scored as a repeat.

e.g. I am eating (XXX)
I am eating vanilla. (second verbalization would be scored as repeat).

Or
Yellow cars.
(XX) yellow cars. (scored as repeat)

If a verbalization is repeated but not completed, this will also be scored as a repeat.

e.g. Do you want chips?
Do you want... (scored as repeat)

If one child makes an initiation and the other child makes the same statement, the second will not be scored as “repeat.” One will be an initiation and the other will be a response.

e.g. A: Yummy ice cream (“+” Initiation)
B: Yummy ice cream (“+” Response)

Peer Prompts

- If the peer directly prompts Ryan with what to say, then the peer’s verbalization will be scored as an initiation and if Ryan repeats what the peer prompted him to say, this will be scored as “peer prompted” (PP). If the Ryan changes the utterance, score it as a response.

E.g. Peer: “Gilbert, come on say it Ryan”
Ryan: “Gilbert” (PP)

Peer: “Ryan tell me to stop it”
Ryan: “You stop it” (PP)

Peer: “say Rosie, Ryan say it”
Ryan: “Rosie, there you are.” (response – he changed it)
Appendix J (continued)

**Prompted (by adult)**

Occasionally, an adult may be providing prompting to Ryan. If you hear an adult prompt Ryan by reminding him to talk, and if a verbalization occurs within 5 seconds of that prompt then that verbalization will be scored as **PROMPTED (+)** and written in the appropriate column. Only the first verbalization following a prompt will be scored as prompted. Subsequent verbalizations will be scored regularly.

**Unintelligible:**

A verbalization will be scored as unintelligible if you cannot understand **more than 50%** of the verbalization. So, if there are only two words spoken e.g. (XXX) cars, then you must be able to understand more than one word to score this as an intelligible verbalization.

**Examples:**

(XXX) baby cars  
(XXX) I'm going to make (XX)  
(XXX) Go (XXX)  
(XXX) XX cookie  
(XXX) XX cookie good  
(XXX) go XXX XXX home

**Verbal Self-Stim:**

Code as "SS" when child engages in perseverative speech. Identify verbalizations as verbal self-stim when child uses odd tone of voice (will be different from other speech), and repetitively makes same sounds/words. Child will typically use a combination of sounds, unintelligible speech, and intelligible speech when perseverating. Statements will be difficult to understand, and off topic.

**SCORING KEY:**

P = peer  
R = Ryan  
(XXX) = unintelligible  
(round brackets around word) = approximation of what was said  
/ = started to say something then started again (only scored as one/last utterance)

**CODES:**

+ = for Ryan's verbalizations - put in correct column  
repeat = write this in column if verbalization is a repeat of previous verbalization  
peer = write this in appropriate column (to distinguish the verbalization from Ryan's which will be coded with a "+")  
U = unintelligible – write in appropriate column  
PP = peer prompted  
SS = self-stim = perseverative speech. Tone of voice will be different from other speech, child will appear to be completely unfocused. Statements will be difficult to understand.  
Prompt = prompted by adult to talk
<table>
<thead>
<tr>
<th>Activity</th>
<th>All Intelligible Verbalizations</th>
<th>Intelligible Initiations of Ryan</th>
<th>Intelligible Responses of Ryan</th>
<th>Intelligible Responses of Peer</th>
<th>Scripted Verbalizations</th>
<th>Unscripted Verbalizations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Caillou's Treehouse:</td>
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<td>Chevron Cars:</td>
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<tr>
<td>Play Dough:</td>
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</tbody>
</table>
Appendix K

Video Viewing Protocol

Date: ______________________________

Vignettes to be shown:  ρ Caillou  ρ Play doh  ρ Chevron cars

☐ Show the tape within an hour of the Activity Session, if there is one planned for the day.

☐ Check date and vignettes to be shown today to ensure you have the correct tape.

☐ Put chair in front of T.V. in living room (approximately 4-5 feet from the T.V.)

☐ Put the video in the VCR. Make sure it is cued up at the beginning.

☐ Call Ryan. Tell him to sit in the chair. Tell him, “Time to watch the play video.”

☐ Play the tape.

☐ Do not say anything about the tapes to Ryan during the viewing.

☐ If Ryan attempts to interact during the viewing, point to the T.V., and tell him “Time to watch the video.”

☐ If Ryan gets up from the chair, verbally prompt him to sit down and watch the video.

☐ If Ryan leaves the area, pause the tape, tell Ryan to return, then begin tape where it left off.

☐ When the tape is finished, tell Ryan, “All done watching videos.”

☐ Rewind the tape, and take it out.

☐ Put the tape in the Tape Box up in the cupboard above the fridge so it is ready for the next viewing.
Appendix L

Transcription Data Sheet

Activity #: ___________________________   Date on Video: ___________________________

Peer: ___________________________   Supervisor: ___________________________

<table>
<thead>
<tr>
<th>Verbalizations</th>
<th>Scripted</th>
<th>UNscripted</th>
<th>Initiation</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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Rater: ___________________________
Appendix L (continued)

<table>
<thead>
<tr>
<th>Date on Video:</th>
<th>Activity:</th>
</tr>
</thead>
</table>

Total Intelligible Verbalizations of Ryan (NOT counting repeats, SS, or U): 

Total Intelligible Initiations of Ryan (NOT counting repeats, SS, or U): 

Total Intelligible Responses of Ryan (NOT counting repeats, SS, or U): 

Total Intelligible Responses of Peer (NOT counting repeats, SS, or U): 

Total Scripted (not counting repeats, SS, or U): 

Total Unscripted (not counting repeats, SS or U): 

**KEY:**

- P = peer
- R = Ryan
- (XXX) = unintelligible
- / = started to say something then started again (only scored as one)

**CODES:**

- + = for Ryan’s verbalizations - put in correct column
- R = repeat = write this in middle column if verbalization is a repeat of previous verbalization
- U = unintelligible – write in middle column
- peer = write this in appropriate column (to distinguish the verbalization from Ryan’s which will be coded with a “+” (If peers verbalization is repeat or unintelligible write “R” or “U” in middle column as you do for Ryan’s)

- SS = self-stim = perseverative speech. Tone of voice will be different from other speech, child will appear to be completely unfocused. Statements will be difficult to understand.

- PP = peer prompted

- Prompt (+) = Verbalization within 5 seconds of adult prompt
## Appendix M
### Video Viewing Data Sheet

<table>
<thead>
<tr>
<th>Date</th>
<th>Time</th>
<th>Supervised by</th>
<th>Vignettes Watched (Write activity, and circle number of vignettes watched per activity)</th>
<th>Duration of Video</th>
<th>Number of times child left area</th>
<th>Number/type of prompts needed to watch</th>
<th>Additional Comments</th>
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<td>Activity:__________________________________________________________________________</td>
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<td>Vignettes: 1 2 3</td>
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