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# A REVIEW OF VIDEO MODELING TO TEACH SOCIAL SKILLS TO PRESCHOOLERS WITH ASD

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A REVIEW OF VIDEO MODELING TO TEACH SOCIAL SKILLS TO  
PRESCHOOLERS WITH ASD

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THESIS

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A thesis submitted in partial fulfillment of the  
requirements for the degree of Master of Science in Education  
in the College of Education at the University of Kentucky

By

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Lexington, Kentucky

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2017

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## ABSTRACT OF THESIS

### A REVIEW OF VIDEO MODELING TO TEACH SOCIAL SKILLS TO PRESCHOOLERS WITH ASD

The purpose of this comprehensive literature review is to evaluate if existing research studies have produced substantial evidence to determine if the use of video modeling is as an evidence based instructional tool to teach social skills to preschool aged children with autism spectrum disorder. Literature was reviewed against standards suggested by What Works Clearinghouse for being an evidence-based practice. Based on the criteria set by What Works Clearinghouse for examining experimental rigor, evidence, and the requirements for practices being considered an evidence base, video modeling to teach this population of students social skills is not an evidence-based practice at this time.

**KEYWORDS:** Autism spectrum disorder, social communication skills, social skills, preschoolers, video modeling

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June 30, 2017

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## **Section 1: Introduction**

It is challenging for teachers to plan and implement effective teaching methods to successfully educate students with and without disabilities and teachers are faced with several obstacles when educating students with autism spectrum disorder (ASD). Autism spectrum disorder is defined as a group of complex disorders that impact the brain's development categorized by a variety of restricted, repetitive behaviors and delays in social communication skills under the Diagnostic and Statistical Manual of Mental Disorders, 5th Edition (DSM-5, American Psychiatric Association, 2013). Symptoms of ASD typically manifest within the first two years of a child's life, however symptoms can be noticed earlier if developmental delays are higher in severity or symptoms can go unnoticed longer if severity is more subtle (DSM-5, 2013).

One area that poses significant challenges for individuals with ASD is social skills. Individuals with ASD often face obstacles in social interactions and demonstrate delays in social reciprocity (American Psychiatric Association, 2001; Maione & Mirenda, 2006). Some individuals with ASD are only able to converse about specific areas of interest or are often uninterested in social interactions when these topics are not the focus of the conversation. Individuals with ASD struggle with understanding the natural back and forth of a conversation leading to one sided conversations. Individuals with ASD demonstrate deficiencies in verbal and nonverbal communication. This includes poorly integrated verbal and nonverbal language, maintaining eye contact, and understanding and using gestures and nonverbal cues such as body language and facial expressions (DMS-5, 2013).

In addition, individuals with ASD often lack skills necessary for forming and maintaining positive relationships. The capability and motivation to respond to or seek peer interactions differs across individuals with ASD. Although some individuals with ASD are able to demonstrate the capability to respond to peer interactions there is generally a deficit in the ability to initiate and maintain interactions, especially interactions that do not result in a desired item or activity opportunities (Maione & Miranda, 2006). Deficits in the area of social communication can hinder the person's ability to be accepted as social members of their communities. Early childhood is the optimal time for individuals to acquire the necessary social skills that will facilitate the development of socially competent behaviors later in life and therefore, support the need for social interventions to be implemented at an early age (Green et al., 2013).

A major social developmental milestone for preschool aged children is to be accepted by a group of peers and develop friendships (McLean, Wolery, & Bailey, 2004). However, children with disabilities often will not engage in the typical types of social behavior, play, and communication that leads to successful interactions with peers (McLean et al., 2004). Children with ASD are less likely to interact or play with their peers than their typically developing peers. Often times the play of children with ASD is categorized by repetitive behaviors (e.g., lining up toys, fixating on specific aspects of toys) and lacking symbolic or social quality (MacDonald, Sacramone, Mansfield, Wiltz, & Ahearn, 2009). The lack of social development and play skills may be due to deficits in spontaneous language, imitation skills, and quantity of social interactions. It is also probable that because social consequences are not as reinforcing to children with ASD as

they are to their typically developing peers, children with ASD may tend to avoid social interactions or prefer solitary activities (MacDonald et al., 2009).

Preschool aged children need to understand how to interact with peers by engaging in positive communication and behaviors that enrich play and increase the probability of positive peer interactions occurring in the future (Lemmon & Green, 2015). Most children learn important social skills naturally through daily social opportunities with peers, siblings, parents, caregivers, and teachers. However, some children, especially those with ASD, might not develop these skills naturally or as rapidly due to a multitude of individual and environmental factors including lack of knowledge, practice, feedback, reinforcement, and limited learning opportunities (Green et al., 2013). As a consequence, a significant amount of preschool aged children lack the skills required to be socially successful. When compared to their socially developed peers, young children with ASD who lack these social skills are often at risk for peer neglect, rejection, and bullying (Green et al., 2013).

Due to the prevalent nature of deficits in social interactions associated with ASD it is improbable that these children will experience the benefits of social relationships with peers independent of the implementation of interventions designed to target these specific behaviors. Effective social interventions should utilize evidence-based strategies that focus on the development of skills necessary to increase and sustain positive interactions with peers such as sharing, turn taking, conflict resolution, initiation, nonverbal and verbal communication, conversational skills, imaginative play, responding to peers, and the generalization and maintenance of social skills. In 2016, according to the Centers for Disease Control's Autism and Developmental Disabilities Monitoring, the

prevalence of ASD is 1 in 68 children in the United States, which is roughly a 30 percent increase than the estimate of 1 in 88 children reported in 2012 (Centers for Disease Control and Prevention [CDC], 2016). With the prevalence of ASD rapidly increasing, it is essential for teachers to utilize evidence-based practices specific to this population of students when teaching social skills to ensure student achievement and increase the likelihood of successful social acceptance.

Research has proven video modeling to be an effective teaching method to foster the abilities of individuals with ASD to acquire necessary adaptive behaviors including social, play, requesting, functional skills, and academic skills) through observational learning (Maione & Mirenda, 2006). Video modeling is a instructional tool that emerged as a alternative of in vivo modeling and can be defined as the presentation of another individual performing target behaviors through video based instruction (Wilson, 2013). Video models can be created using a variety of models such as peers, teachers, adults, or even the student (video self-modeling) demonstrating a desired behavior or task. Following the presentation of the VM, the child is then given the opportunity to perform the specific behavior or skill demonstrated by the model in the video.

Learning through the observation and imitation of other individuals can lead to the acquisition of new behaviors and often times, when a child witnesses another child receive reinforcement (vicarious reinforcement), increases the probability of that child performing the target behavior (Bandura, 1977; Hine & Wolery, 2006). The social learning theory suggests that individuals gain knowledge and acquire new skills by observing a target behavior correctly demonstrated by other individuals without

additional need for behavioral training or learning-by-doing approach (Boudreau & Harvey, 2013).

In addition to being an evidence-based practice, VM has become a popular tool used by teachers due to the many benefits and easy implementation. Video modeling is cost effective and can be used in a wide range of environments including home, school, community, and clinical settings. Video modeling is relatively unobtrusive and can be easily incorporated into almost any intervention plan (Maione & Mirenda, 2006). The use of VM can utilize strengths of children with ASD and help to control for potential learning obstacles associated with other forms of instruction. Many children with ASD find watching the videos rewarding and can in turn serve as a natural reinforcement for the child (Maione & Mirenda, 2006). Children with ASD also benefit from repeated practice and instruction. The use of VM allows for repeated viewing which can help to optimize instruction. Video modeling can help to control for stimulus overselectivity by zooming in on important cues to highlight specific behaviors necessary for acquiring a new behavior or skill. Video modeling can also help to eliminate obstacles for children who may have limited abilities to comprehend verbal instructions by incorporating visuals and highlight strengths in visual processing (Maione & Mirenda, 2006).

Charlop-Christy, Dennis, Carpenter, and Greenberg (2010) investigated the effectiveness of using VM to teach three boys ages 4 to 7 with ASD socially expressive behaviors. Video modeling demonstrated the appropriate use of verbal comments, intonation, gestures, and facial expressions for three scenarios: being shown a preferred toy, denying access to a preferred toy, and knocking down bowling pins (Charlop-Christy et al., 2010). Mastery for this study required participants to demonstrate all four-target

skills across activities. During baseline, very few target responses were made; however, after VM was introduced the participants were able to demonstrate all target behaviors 80% of the time (Charlop-Christy et al., 2010). The results of this study support the use of VM to teach social skills that are essential to increasing the frequency and appropriateness of social interactions to children with ASD.

Similar to Charlop-Christy et al. (2010), Boudreau and Harvey (2013) demonstrated the effectiveness of using VM to teach three young children ages 7 to 11 with ASD to increase the frequency of initiations of social interactions with peers during playtime. For this study, social interactions were defined as any verbal statement oriented toward a peer. The social skills taught using video self-modeling included commenting on a peer's toy and asking a peer to play a game. All three participants' frequency of initiations increased to above 50% of intervals following the implementation of VM, enabling the child to learn to utilize skills necessary in establishing friendships (Boudreau & Harvey). Video modeling allows children with ASD to grasp complex social skills that could potentially hinder their social interactions with peers. This study gives further support to the benefits of using VM to teach children with ASD social skills

Current education legislation and policy focus on the commitment to using best practice within the classrooms that emphasizes the need for the use of evidence-based practices (Wong et al., 2015). The use of interventions lacking in empirical support could result in the use of practices by teachers and clinicians that are not in the best interest for the child (Horner, Carr, McGee, Odom, & Wolery, 2005). With the increasing number of young children being diagnosed with ASD, it is important for early interventionists and preschool teachers to be using evidence-based practices when planning interventions for

their students (Wong et al., 2015). In order to remedy this problem it is essential to student success to identify evidence-based practices.

There are several methods to evaluating if an intervention has met the criteria for being an evidence-based practice. A practice is considered evidence-based when there is repeated and convincing evidence to support the demonstration of a functional relation between the independent variable and the change in the dependent variable (Horner & Kratochwill, 2012). Horner et al. (2005) developed criteria for evaluating single case design research for quality indicators to determine the evidence base of a practice. The quality indicators used determine if a study is considered an “acceptable” study. The quality indicators used include the description of participants and settings, dependent variable, independent variable, baseline condition, and internal, external, and social validity. Articles coded as “acceptable” should be compared collectively in order to determine if a practice has met the criteria set by Horner et al. (2005). To be considered evidence based, at least five different studies, collectively including at least 20 participants, need to be coded as “acceptable.” Three different research groups in different geographic locations must conduct the studies (Horner et al., 2005).

Similar to Horner et al. (2005), Reichow, Volkmar, and Cicchetti (2008) published a method for evaluating single subject case design research for evidence-based practices. When evaluating research, Reichow et al. (2008) suggest using a two levels of rubrics for evaluating the quality indicators of a study. The first rubric identifies quality indicators pertaining to the elements of the design to determine the validity of a study. The second rubric evaluates quality indicators that are important to evaluate however, are not necessary for determining a study’s validity. After evaluating the primary and

secondary indicators, studies are coded as “strong,” “adequate,” or “weak.” Based on Reinchow et al. (2008), in order for a practice to be considered evidence based there must be at least five studies coded as “strong,” conducted by three different groups of researchers in three different geographic locations. The studies need to include at least 15 participants in order to be considered evidence based. A practice can also be considered evidence based if there are 10 articles coded as “adequate,” conducted by three different groups of researchers in three different geographic locations. The studies need to collectively include at least 30 participants (Reinchow et al.).

The current literature review followed the guidelines set by What Works Clearinghouse (WWC) by Kratochwill et al. (2013). What Works Clearinghouse was established in 2002 by the Institute for Education Sciences to provide a set of quality indicators use to determine the experimental rigor of single case research designs (Kratochwill et al.). These guidelines were chosen because unlike Horner et al. (2005) and Reichow et al. (2008), Kratochwill et al. (2013) requires the examination of both the design rigor and evidence in order to determine a practices evidence base. WWC examines both the design components and the evidence (Horner & Kratochwill, 2012). WWC classified articles as “meets design criteria,” “meets design criteria with reservations,” and “does not meet.”

According to Kratochwill et al., the first quality indicator is the systematic manipulation of the independent variable. This minimizes the threats to internal validity (e.g., maturation, history). The second quality indicator is determining if the independent variable was measured systematically over time by more than one person through interobserver agreement (IOA) data for at least 20% of sessions. In addition to reporting



interobserver agreement data (IOA) for 20% of the sessions, IOA data needs to be at or above 80%. IOA adds to the strength of the outcomes reported. The third quality indicator requires studies to show at least three attempted demonstrations of effect. This allows for a study to demonstrate experimental control. The final quality indicator is the number of data points per phase in order to for the phase. An increased number of data points allows for the evaluation of the trend (Kratochwill et al.).

Once each study has been coded as “meets design criteria,” “meets design criteria with reservations,” and “does not meet” the next step is to evaluate the evidence of a study using visual analysis. Only studies coded as “meets design standards” or “meets design standards with reservations” were retained for further evaluations. The outcome of each study is coded as “strong evidence,” “moderate evidence,” or “no evidence” based on the number of demonstrations of effect and non-effect. In order to be coded as having “strong evidence” there must be at least three demonstrations of effect with no non-effect. Studies coded as having “moderate evidence” the studies must show at least three demonstrations of effect with one non-effect. Studies coded as “no evidence” demonstrated less than three effects.

Due to the demands for accountability in education for using evidence-based practices to promote effective interventions for children with ASD, the purpose of this comprehensive literature review is to evaluate if existent research studies have produced enough information to determine if the use of VM to teach preschool aged children with social delays, including ASD. is an evidence-based practice, based on the standards suggested by What Works Clearinghouse (WWC).

## **Section 2: Research Question**

The purpose of this comprehensive literature review is: (a) are there existing studies on the use of VM to teach preschoolers with ASD social skills conducted with acceptable experimental rigor based on WWC standards?, (b) if so, for whom and under what conditions?, (c) is there substantial evidence to determine of the use of VM as an instructional tool to teach social skills to preschool aged students with ASD to meet the standards by WWC for being an evidence-based practice?.

### Section 3: Method

#### Search Procedures

The author evaluated previously published literature to determine if the use of VM to teach social skills to preschool aged students with ASD is an evidence-based practice. The author conducted an electronic search of the following online search engines: *PsychInfo, ERIC, Academic Search Complete, CINAHL with full text, Communication & Mass Media Complete, and Psychology and Behavioral Sciences Collection*. Combinations of the following search terms were used to locate articles: *preschool, preschoolers, social, social skills, social delays, social communication, video modeling, video self-modeling, Autism, and ASD*. Following the electronic search, the author then examined the reference lists for titles including the keywords: preschool, video modeling, and social skills for additional related articles.

**Inclusion criteria.** In order to be included in the review, articles had to meet the following inclusion criteria: (a) used a single case research design; (b) participants ages were between 2 and 5 years old; (c) at least one participant had a diagnosis of ASD, (d) reported effects of VM on a particular social skill dependent variable (e.g., sharing, play, conversational skills, initiations); and (e) published in an English peer-reviewed journal in the past two decades. Articles in the reference list with a single asterisk indicate studies that met the inclusion criteria.

**What Works Clearinghouse (2010) indicators.** When evaluating each article meeting the initial inclusion criteria, the author followed the guidelines set by Kratochwill et al. (2013) for determining the quality of an article (see Table 1). The author created a data sheet based on these quality indicators to determine the presence or

absence of each. The datasheet consisted of the following nine categories: (1) systematic manipulation of the independent variable, (2) interobserver agreement data collected for 20% of all sessions, (3) interobserver agreement was at least 80% for all sessions, (4) at least three demonstrations of effect were attempted, (5) at least five data points per condition, (6) at least three data points per condition, (7) the report of procedural fidelity, (8) evaluation of design standards, and (9) evaluation of evidence for effectiveness. Classification of design standards were categorized as “meets design standards,” “meets design standards with reservations,” or “does not meet design standards.”

If a study met all of the quality indicators required by WWC, not including procedural fidelity, and had five data points per phase the article was coded as “meets design standards.” Studies were scored as “meets design standards with reservations” if there were only three to four data points per phase or did not fully meet the design standard requirements. Studies received a rating of “does not meet” if the studies did not systematically manipulate the independent variable, report IOA data for at least 20% of sessions, report average IOA below 80%, have three attempted demonstrations of effect, or have at least three data points per phase. Although the author reported on procedural fidelity, the presence or absence did not impact the manner a study was coded.

According to Kratochwill et al. (2013), the first quality indicator is the systematic manipulation of the independent variable that they examine. When an independent variable is systemically applied to the intervention the researcher has decided how and when to apply intervention this minimizes the threats to internal validity (e.g., maturation, history). When an independent variable is not systematically manipulated, the study “does not meet” design standards. The second quality indicator is whether the

independent variable was measured systematically over time by more than one person through IOA data for at least 20% of sessions. In addition to reporting IOA for 20% of the sessions, IOA data needs to be at or above 80%. IOA adds to the strength of the outcomes reported. Studies not meeting this quality indicator were scored as “does not meet” design standards. The third quality indicator requires studies to show at least three attempted demonstrations of effect. Demonstrations of effect could be across three different participants, settings, behaviors, or activities. This allows for a study to demonstrate experimental control by demonstrating a functional relation between the independent variable and the change in the dependent variable at three different points in time (Kratochwill et al., 2013). If a study does not have at least three demonstrations of effect it is difficult to say with certainty that the dependent variable changed when, and only when intervention was applied. Studies without three attempted demonstrations of effect did not meet this quality indicator and therefore were coded as “does not meet” design standards. The final quality indicator is the number of data points per phase in order to for the phase to be considered as an attempt to demonstrate effect. Data points are used to determine the trend, level, and stability of an intervention, the more data points per phase increase the confidence in the pattern of responses (Kratochwill et al., 2013). Studies with less than three data points per phases were coded as “does not meet.” Studies with five data points per phase were coded as “meets design standards” and studies with three to four data points were coded as “meets design standards with reservations.”

When evaluating the design standards, studies using multiple baseline or multiple probe designs coded as “meets design standards,” included at minimum of six phases

with at least five data points in each phases. To be coded as “meets design standards with reservations,” multiple baseline and probe designs require a minimum of six phases with three or four data points in each phase (Kratochwill et al., 2013). If a study using a multiple probe or multiple baseline design did not included at least six phases with three or more data points it was coded as “does not meet.”

In order for an alternating treatment design to be coded as “meets design standards” the study needed to include at least five repetitions of the alternating treatment. If the design had four repetitions of the alternating treatment, the study was coded as “meets design standards with reservation.” Alternating treatment design studies were coded as “does not meet” if the design had fewer than four repetitions (Kratochwill et al., 2013).

A withdrawal design was coded as “meets design standards” if the study included a minimum of four phases (i.e., ABAB) with at least five data points in each. A study with a minimum of four phases but only three to four data points per phases was coded as “meets design standards with reservations.” Studies with fewer than four phases (i.e., ABC) and less than three data points were coded as “does not meet” because there are not enough data points to support the existence or lack of an effect (Kratochwill et al., 2013).

Classification of effectiveness of articles either meeting design standards or meeting design standards with reservations were categorized as: (a) strong evidence, showing at least three demonstrations of effect with no non-effects; (b) moderate evidence, showing at least three demonstrations of effect with one non-effect; or (c) no evidence, showing less than three demonstrations of effect (Kratochwill et al., 2013). All information was coded by a graduate student and represented in Table 1. Articles in the

reference list with two asterisks indicate studies that were coded as “meets design standards” or “meets design standards with reservations” and were used for further evaluation on the effects of VM on teaching social skills to preschool students with ASD.

**Descriptive analysis.** After determining the presence or absence of the quality indicators proposed by Kratochwill et al. (2013), the author reported descriptive information on each study categorized as “meets design standards” or “meets design standards with reservations.” The following descriptive information was included (see Table 2): (a) reference; (b) participant information (i.e., age, diagnostic label); (c) setting and activity; (d) target behavior, (e) dependent variable, (f) type of video model (video model, video self-model); (g) experimental design; and (h) findings. All information was coded by a graduate student and represented in Table 2.

**Determination of an evidence base for using video modeling.** Studies coded by the author as “meets design standards” and “meets design standards with reservations” were evaluated collectively against the requirements for evidence-based practices set by Kratochwill et al. (2013). The criteria were: (a) a minimum of five studies rated as “meets evidence standards” or “meets evidence standards with reservations”, (b) the practice be evaluated by at least three different research teams, (c) the total number of participants included in the studies was at least 20, and (d) the studies were conducted in at least three geographic regions.

## Section 4: Study Characteristics

### Quality of the Single Case Experimental Design

A total of 18 studies included in 14 separate articles met the initial inclusion criteria for further review. Out of the 18 studies, five studies were scored as “meets design standards” and five studies were scored “meet design standards with reservation.” Eight of the 18 studies were scored as “did not meet design standards and were not retained for further analysis.” received a rating of “does not meet evidence standards” due to failure to systematically apply the independent variable, lack of IOA, reported IOA being below an adequate level, less than three attempts of demonstrations of effect, and/or inadequate amount of data points in each phase. Most commonly, studies were not retained for further analysis due to lack of sufficient amounts of data points in each phase.

Ten studies from seven different articles, scored as either “meets design standards” or “meets design standards with reservations,” were further reviewed to evaluate the descriptive information and determine magnitude of the evidence reported. The analysis of each of the studies can be found in Table 2. (a) Participants’ information, (b) setting and activity, (c) target behavior, (d) dependent variable, (e) type of model used in the video, (f) experimental design, and (G) findings.

### Participants

Participants came from a total of 18 studies included from 14 separate articles. Some articles included multiple studies that were evaluated separately for evidence of using VM to teach social skills to preschool children with ASD. An article had multiple studies if multiple dependent variables were measured separately and a graph was



included for each dependent variable. The participants in these articles were only counted once. For example, Maione & Mirenda (2006) included three separate studies with the same participant therefore, the number of participants for these three studies was only one total. D'Ateno et al. (2003) included two studies with a total of one participant. A total of 15 children (2-5 years old) with ASD participated in the 10 studies retained for further analysis. Out of the 15 participants, nine participants were male and six participants were female. Several diagnostic tools were used to evaluate the presence of ASD of each participant. Two of the studies (Hine & Wolery, 2006; Sheer et al., 2001) referenced the DSM-IV diagnostic tool for ASD. One study (Gena et al., 2005) referenced the DSM-5. One study (Buggey & Ogle, 2012) referenced the Childhood Autism Rating Scales (CARS). The Autism Diagnostic Observation Schedule (ADOS) was used in one study (Buggey et al., 2011). The remaining five studies (D'Ateno et al., 2003; Maione & Mirenda, 2006) used a private diagnostic center to confirm the diagnosis of ASD among their participants. All participants were included in the studies due to deficits in the area of social skills including, sharing, initiations with peers, play, socially expressive language, and conversational skills.

### **Settings**

Participants in the studies received intervention in a varied of settings. In five studies, participants received intervention in their homes (Gena et al., 2005; Maione & Mirenda, 2006; Sherer et al., 2001). Two studies were conducted in a private Applied Behavior Analysis (ABA) clinic (D'Ateno et al., 2003). In one study, intervention was delivered within the participants' private inclusive preschool on the playground (Buggey et al., 2011). Early interventions cite was used for one study (Buggey & Ogle, 2012).

Intervention was also conducted at university based inclusive preschool for one study (Hine & Wolery, 2006). Half of the studies were conducted during play-based activities with peers (Buggey et al., 2011; Buggey & Ogle, 2012; Maione & Mirenda, 2006) Four studies collected data during play activities with an adult (D'Ateno et al., 2003; Gena et al. 2005; Sherer et al., 2001). Only one study collected data during and individual play activity (Hine & Wolery, 2006).

The behaviors targeted in these studies are behaviors frequently targeted by interventions for children with ASD who struggle with social skills. The behaviors targeted in these studies included: social initiations and responses with peers (Buggey et al., 2011; Buggy & Ogle, 2012; Maione & Mirenda 2006), verbalizations during play activities (D'Ateno et al., 2003; Maione & Mirenda, 2006), engaging in play (Buggey & Ogle 2012; Hine & Wolery 2006), social language and communication skills (Maione & Mirenda, 2006; Sherer et al., 2001), and appropriate affective behavior and facial expressions (Gena et al., 2005). All studies reported target behaviors in an observable and measureable fashion.

### **Dependent Variables**

Two of the studies evaluated for descriptive characteristics measured the frequency of social initiations with peers (Buggey et al., 2011; Maione & Mirenda, 2006). Three studies measured the number of verbalizations (D'Ateno et al., 2003; Maione & Mirenda, 2006). One study measured the frequency of verbalizations (Maione & Mirenda, 2006). Buggey & Ogle measured the number of interactions during playground time. The percent of engagement in conversations was measured in one study (Sherer et al., 2001). The percent of appropriate affective responding was measured in

one study (Gena et al., 2005). One study measured the number of play actions performed by the target student (Hine & Wolery, 2006).

### **Data Collection**

Ten studies recorded participant performance data using event recording. Five of the studies collected frequency data of the target behavior occurred during an interval (Buggey et al., 2011; Gena et al., 2005; Maione & Miranda, 2006; Sherer et al., 2001).

Five studies collected data on the rate of occurrence of a specific social behavior (Buggey & Ogle, 2012; D'Ateno et al., 2003; Hine & Wolery, 2006; Maione & Miranda, 2006).

### **Type of Video Modeling**

Three different types of VM were used among the 10 studies including video self-modeling, video modeling of the whole scene or 3<sup>rd</sup> person point of view, and point of view modeling. Video self-modeling is when the target child is video taped performing the desired behavior. The child is then able to watch him or herself demonstrating the target behavior (Maione & Miranda, 2006). Video modeling of other is a when a model other than the target child is recorded performing the behavior (i.e., peer, adult). The target child then watches the video of another person performing the behavior (Sherer et al., 2001). Point of view modeling is a type of VM where the viewpoint of the target child is portrayed in the video. Point of view modeling is often recorded from an aerial viewpoint looking down at what the child would see while performing the target behavior (Hine & Wolery, 2006). Two studies used video self modeling (Buggey et al., 2011; Buggey & Ogle, 2012). Six studies used video modeling with other as the model (D'Ateno et al., 2003; Gena et al. 2005, 2005; Maione & Miranda, 2006). One study used point of view modeling with adult hands demonstrating the play activities (Hine &

Wolery, 2006). One study used both video self-modeling and VM with other as the model (Sherer et al., 2001).

### **Single Subject Research Designs**

The studies involved in this comprehensive review evaluated their research question using a single case research designs. One study used an alternating treatment design (Akmanoglu et al. 2014). A withdrawal design was used in one study (Plavnick et al. 2014). Three studies used multiple probe designs (Green et al. 2013; Kleeberger & Mirinda, 2010). The remaining 13 studies used a multiple baseline design. All 10 of the studies retained for further analysis and coded as “meets design standards” and “meets design standards with reservations” used multiple baseline designs.

## Section 5: Results and Outcomes

### Student Outcomes

The author used visual analysis to determine the effects of video modeling on social skills in the studies included in this review. Out of the 18 studies from 14 different articles, 10 studies were rated as “meets design standards” or “meets design standards with reservations”, which indicated these studies had met the quality indicators set by WWC (2010) for having an acceptable level of experimental precision. Three studies coded as “meets design standards,” offered “no evidence” to support the use of VM to teach preschoolers with ASD social skills (Buggey et al., 2011; D’Ateno et al., 2003). Four studies coded as “meets design standards with reservations,” showed “no evidence” (Buggey & Ogle, 2012; Maione & Mirenda, 2006). , Hine and Wolery (2006) did not have three consecutive probe data points before beginning intervention in all tiers and was therefore coded as “meets design standards with reservations.” Green et al. (2013) did not have probe data points every eight sessions and therefore was coded as “does not meet.”

One study coded as “meets design standards “ demonstrated “strong evidence” to support the use of VM for teaching preschool children social skills. Two studies coded as “meets design standards” and “meets design standards with reservations” demonstrated “moderate evidence.” A study by D’Ateno et al. (2003) was coded as “meets design standards “ and showed “strong evidence” for using VM to increase preschool children with ASD scripted verbalizations during play sequences. The study was coded as having “strong evidence” because the study showed three demonstrations of effect with no non-effects for increasing scripted verbalizations using VM. Sherer et al. (2001) was rated as

“meets design standards” showing “moderate evidence” for using VM to increase the percent of engagement in conversation for two preschoolers with ASD. Although this study attempted four demonstrations of effect, it was coded as “moderate evidence” because of the one non-effect. Hine and Wolery (2006) was rated as “meets design standards with reservation” showed “moderate evidence” for increasing the number of appropriate play actions. This study showed three demonstrations of effect with one non-effect and therefore was coded as “moderate evidence.”

D’Ateno et al. (2003), conducted two studies to determine the effectiveness of VM on unscripted and scripted verbalizations of one child with ASD and showed “strong evidence.” The dependent variable for the first study was the number unscripted verbalizations, defined as contextual verbal statements that did not match those of the video model. In order to be scored as unscripted, the verbalization had to be at least three words in length and differ from a scripted response by more than one word. The dependent variable for the second study was the number of scripted verbalizations, defined scripted verbalizations as verbal statements that matched the statement of the video model. The independent variable for these studies used VM with adult models demonstrating three different play sequences. The participant was shown the VM absent of the play materials. With a minimum delay of 1 hour, the participant was given access to the play materials that correspond with the VM (D’Ateno et al., 2003). The results of the study measuring unscripted verbalizations showed “no evidence.” One possible reason for this outcome could be the limited number of exemplars used in the videos. The use of multiple verbal exemplars across each play sequence could have increased the likelihood of the participant’s ability to generalize responses. Another possible

explanation for this outcome, was the strict definition used to define an unscripted response. The results of the scripted verbalizations showed “strong evidence” and the participant’s number of scripted verbalizations systematically increased in all three tiers (D’Ateno et al., 2003).

Sherer et al. (2001) analyzed the effects of using both video self-modeling and video modeling of a peer model on increasing the percentage of engagement in conversations of five male participants ages 3 to 11 with ASD and showed “moderate evidence.” Although not all participants in this study were between the ages of 2 and 5, this study was included because at least one of the participants was preschool age, which was an initial inclusion requirement. The independent variable for this study included the use of two videos per target child, one using video self-modeling and one using a peer as the model. In each video the model was seen asking and responding to questions in an alternating manner about the target child’s home and school life. Based on a viewing schedule, the child was shown the VM three times before going to bed by his parents and asked the questions corresponding to the VM the next day by a therapist (Sherer et al., 2001). The results of the intervention were scored as showing “moderate evidence” with four demonstrations of effect with one non-effect. Three out of the five participants were able to meet criteria while two participants did not meet criteria. The authors did not report behavioral challenges for the two participants who did not meet criteria and reported both participants’ cognitive abilities and language abilities did not contribute to the lack of progress with VM. One potential explanation could be the participants were not motivated by the questions or by the use of VM. Only one of the preschool aged participants responded positively to the intervention. Although the other preschool aged

participant was able to meet criteria, he acquired acquisition more slowly than the older participants. One possible explanation for the variability in the data across participants could be that the two participants with the highest levels of performance were reported, through parent interview, as having excellent visual memories and preferred participating in activities with visual stimulus (i.e., picture books). This study also contributed to the literature evaluating the preference of the model used in VM. The authors reported that video self-modeling and VM with a peer model were equally as effective across participants (Sherer et al., 2001).

Hine and Wolery (2006) evaluated the effects of using VM to teach two preschool children with ASD play skills and showed “moderate evidence.” The dependent variable for this study was the number of play actions performed in a sequence while using sensory bin activities. The independent variable used point of view modeling to demonstrate the viewpoint of the target child while performing each play skill. The authors embedded the child’s favorite cartoon, based on parent interviews, to the beginning of the video to engage the child in viewing the VM and at the end of the video as a reward for watching the video. Following the viewing of the video, the child was provided with the sensory bin activity and instructed to play with the toys. The authors hoped by increasing the number of play actions performed there would be an increase in symbolic play skills, decrease in repetitive behaviors which may promote opportunities for social exchanges with peers, and by increasing appropriate play behaviors the apparent differences between target children and their typical peers would decrease. The results of the study were scored as showing “moderate evidence” by showing three demonstrations of effect and one non-effect. The two participants were able to acquire



new play skills across sensory bins. In the tier that demonstrated a non-effect, VM alone was not effective in teaching the participant to acquire the target play sequence.

However, the child was able to learn the play sequence after the authors added a phase change to include additional reinforcement, on a fixed ratio of 1 reinforcement schedule, and prompting. The need for additional prompting to imitate the video may indicate the use of VM alone may not be effective in some instances. A possible implication for the future to promote faster acquisition in this study could include reducing the number of probe sessions to reduce the risk of over exposure to the same items. Future studies could measure the diversity of play and the effects of using toys appropriately on social exchanges with peers (Hine & Wolery, 2006).

Buggey et al. (2011) demonstrated four non-effects for teaching social initiations using VM and was coded as “meets design standards” with “no evidence.” One of the studies by D’Ateno et al. (2003) was coded as “meets design standards with reservations” did not offer evidence to support the use of VM to teach unscripted verbalizations and demonstrated three non-effects. Gena et al. (2005) was coded as “meets design standards” however, the study only had two demonstrations of effect with one non-effect and therefore did not offer sufficient evidence to using VM to teach appropriate affective behaviors.

Buggey and Ogle (2012) was coded as “meets design standards with reservations” with “no evidence” to support the use of VM to increase social interactions. This study demonstrated three non-effects. Three studies conducted by Maione and Mirenda (2006) to teach verbalizations, unscripted and scripted verbalizations, and peer initiations, and responses were coded as “meets design standards with reservations.” Two demonstrations

of effect and one non-effect were shown for total verbalizations, scripted verbalizations, unscripted verbalizations, and initiations. Three non-effects were shown for the use of VM to increase responses. Due to the number of non-effects, these studies were coded as having “no evidence.”

### **Determination of an Evidence-based Practice**

The three studies coded as showing “strong evidence” and “moderate evidence” for the use of VM to teach preschool children with ASD social skills were evaluated against the standards for being considered an evidence-base practice suggested by WWC (2010). The criteria according to WWC for being considered an evidence-based practice included: (a) a minimum of five studies categorized as “meets evidence standards” and “meets evidence standards with reservations”, (b) the practice be examined by at least three different research teams, (c) the total number of participants included in the studies was at least 20, and (d) the studies be conducted in at least three geographic regions.

The first requirement states that a minimum of five studies coded as “meets design standards” and “meets design standards with reservations” must show “strong” or “moderate” evidence to support the use of the intervention tool. The results of this review show that only three studies met this standard. The second requirement of being determined as evidence-based is the studies must be conducted by at least three different research teams. The studies coded as “meets design standards” and “meets design standards with reservations” were conducted by three different research teams (D’Ateno et al., 2003; Hine & Wolery, 2006; Sherer et al., 2001) and, therefore, met this standard. The third requirement is the number of participants included in all the studies was at least 20. However, in this review, only 15 participants were included in studies coded as

“meets design standards” or “meets design standards with reservations”. The fourth requirement is the studies must be conducted in at least three different geographic regions. The three studies did not report the geographic regions. Based on the results of this review, the use of VM to teach preschool aged children with ASD social skills does not meet the criteria for being considered an evidence-based practice.

## **Section 6: Discussion**

The purpose of this comprehensive literature review was to examine the findings on currently published, peer reviewed studies examining the use of VM to teach social skills to preschool aged children with ASD. Eighteen studies from 14 articles were evaluated for quality indicators suggested by Kratochwill et al. (2013) to determine the validity of each study. Ten studies were identified as “meets design standards” or “meets design standards with reservations.” Seven out of the 10 studies showed “no evidence.” Two studies showed “moderate evidence.” Only one study demonstrated “strong evidence” to support the use of VM to teach preschool children with ASD social skills. The results of this literature review indicated that VM is not evidence-based for young children with ASD social skills. One possible reason for the outcome of this study included the level of rigor conducted during each study investigated.

### **Methodological Rigor**

Forty-four percent of the studies examined could not be retained for further analysis due to insufficient experimental rigor and were coded as “does not meet” design standards. Eleven percent of the studies not retained did not report IOA for 20% of session. Five percent coded as “does not meet” did not report IOA data at or above 80% and could not be retained for further analysis. Sixty-one percent of the studies did not include five data points per phase and a confident trend could not be established. One of these studies failed to report at least three data points and could not be retained for further analysis. All of the studies in in this review systematically manipulated the intervention.

Due to the lack of rigor, 10 out of 18 studies were coded as “meets design standards” or “meets design standard with reservations” and retained for further analysis

of outcomes using visual analysis to determine the level of evidence. However, out of these 10 studies, only three studies revealed evidence (D'Ateno et al, 2003; Hine & Wolery, 2006; Sherer et al., 2001). With minimal studies providing evidence to analyze and based on the criteria for evidence based practices by WWC, the use of VM to teach preschool aged children with ASD appropriate social skills did not meet the standards to be considered evidence based. The conclusion was made due to the lack of acceptable studies using this intervention to teach this population, less than 20 participants were included in these three studies, and the studies were not conducted in three different demographic regions. If more of the studies included in this review had followed the standards set by WWC, more evidence could have been evaluated to support the evidence base for this practice to teach social skills to this specific population of students.

In addition to following the standards for quality research by WWC, future research should report on the procedural fidelity of their studies. Barnett et al. (2013) broadly define procedural fidelity as the degree to which intervention is implemented in the manner it was planned. Procedural fidelity ensures that an intervention is implemented consistently every time. This helps to establish a functional relation between the intervention and the change in behavior by building confidence in the change being due to the introduction intervention. Out of the 10 studies included in this review, four studies (40%) did not report procedural fidelity. Two of these four studies were coded as “strong evidence” or “moderate evidence, however without the report of procedural fidelity it is difficult to say with certainty that the increase of social skills in the participants in studies were directly linked to the use of VM because of the possible inconsistency in applying

intervention. Future studies on this topic should ensure consistent implementation of interventions and increase confidence in the outcomes by reporting procedural fidelity.

### **Implications and Future Research**

Although the results of this review have determined VM to teach preschool aged children with ASD social skills is not evidence-based; teachers, clinicians, and parents should be aware of the implications and the focus for future research when using this instructional tool.

Buggey et al., (2011) was coded as “no evidence” due to four demonstrations of non-effects. However, two of the participants in this study did show a slight increase in making social initiations. During the videos, a typically developing peer was seen making an initiation with the target student and then being rewarded by playing with the child outside on the playground. and One participant was a four year old, female, diagnosed with ASD according to the Childhood Autism Rating Scale. During intervention this participant was able to show an increase in the mean of the number of social interactions from baseline and increase the mean again during maintenance. This participant’s mean rose from 23% in baseline to 42% in initiation. Her mean rose again to 48% during maintenance. The other participant was a four year old, male, diagnosed with ASD by the Childhood Autism Rating Scale. This participant did not show as much of an increase in his mean of the number of initiations, however, there was still an increase (Buggey et al, 2011).

The participants’ teachers were instructed to take notes regarding any changes in the participants’ behavior following the implementation of VM. The teachers reported that the female participant had increased her frequency of vocalizations, including calling two of her peers by name on the playground. The teacher reported the male student had

“stepped out of his comfort” and started approaching peers and began participating in activities with peers. Although, neither of these participants were able to meet criteria, the use of VM still had a positive effect on these two children’s number of social initiations with peers on the playground (Buggey et al, 2011).

Buggey and Ogle (2012) demonstrated three non-effects for using VM to teach social interactions including initiations, parallel play, and engaged play to two children with ASD. The intervention used in the study included video self-models of the target child playing with a typically developing peer in the classroom and on the playground. The results of this study found no change in the target children’s behaviors following the introduction of video modeling (Buggey & Ogle, 2012).

One possible reason for the lack of success could be related to the age of the participants. Children usually develop self-recognition typically before age two. However, there is evidence that shows self-awareness and the ability to recognize that play is not always real develops between the ages of two and three (Buggey & Ogle, 2012). These and other developmental skills might be prerequisites for successful video modeling. Due to the developmental delays associated with ASD, it is possible that the participants of this study have not yet acquired the skills necessary to benefit from the use of video modeling (Buggey & Ogle, 2012). This is an area that requires further research to determine the benefits of using VM to teach this age of students and teachers, clinicians, and parents should be cautious of this when using VM.

## **Conclusion**

Interventions that have been evaluated for experimental rigor and level of evidence allow for practitioners and professionals to select the best practice for planning

interventions. Teachers have a legal obligation to using evidence-based practices when making education decisions. However, even though, based on the results of this comprehensive literature review, it does not meet the criteria for being an evidence-based practice, it is not harmful to use VM for teachers, therapist, and caregivers to use as an intervention tool when teaching preschoolers social skills unless used for extended periods of time with no change in behavior without progress monitoring. The use of video modeling to teach these skills could potentially be beneficial for some students in this population. Future research on this topic should be conducted using the quality indicators set by WWC in order to increase the evidence to support the use of VM to teach social skills to preschoolers with ASD as an evidence based practice.



Table 1: Evaluation of Studies using What Works Clearinghouse Guideline

Authors (Design)	Systematic Manipulation of IV	IOA for 20% of sessions	IOA at or above 80%	At least 3 Demonstr. Of Effect	5 Data Points per Condition	3 Data Points per Condition	Procedural Fidelity	Classification of Design Standards	Classification of Evidence of Effectiveness
<b>Demonstration Studies</b>									
Akmanoglu et al. 2014 (Alternating treatment)	Y	N	N	Y	N	Y	Y	--	--
Apple et al. 2005 (Multiple baseline)	Y	Y	Y	Y	N	Y	Y	--	--
Bellini et al. 2007 (Multiple baseline)	Y	N	Y	N	N	N	N	--	--
Buggey et al. 2011 (Multiple baseline)	Y	Y	Y	Y	Y	Y	Y	MDS	None
Buggey & Ogle, 2012 (Multiple baseline)	Y	Y	Y	Y	N	Y	N	MDS-R	None
D'Ateno et al. 2003 (Multiple baseline) 1	Y	Y	Y	Y	Y	Y	N	MDS	Strong
D'Ateno et al. 2003 (Multiple baseline) 2	Y	Y	Y	Y	Y	Y	N	MDS	None
Gena et al. 2005 (Multiple baseline)	Y	Y	Y	Y	Y	Y	Y	MDS	None
Green et al. 2013 (Multiple probe) 1	Y	Y	Y	Y	N	Y	Y	--	--
Green et al. 2013 (Multiple probe) 2	Y	Y	Y	Y	N	Y	Y	--	--
Hine & Wolery, 2006 (Multiple baseline)	Y	Y	Y	Y	Y	Y	Y	MDS-R	Moderate
Jones et al. 2014 (Multiple baseline)	Y	Y	Y	Y	N	N	Y	--	--
Kleeberger & Mirenda, 2010 (Multiple probe)	Y	Y	Y	Y	N	N	Y	--	--
Maione & Mirenda, 2006 (Multiple baseline) 1	Y	Y	Y	Y	N	Y	Y	MDS-R	None
Maione & Mirenda, 2006 (Multiple baseline) 2	Y	Y	Y	Y	N	Y	Y	MDS-R	None
Maione & Mirenda, 2006 (Multiple baseline) 3	Y	Y	Y	Y	N	Y	Y	MDS-R	None
Plavnick et al. 2014 (Withdrawal)	Y	Y	Y	Y	N	N	Y	--	--
Sherer et al. 2001 (Multiple baseline)	Y	Y	Y	Y	Y	Y	N	MDS	Strong

Notes: MSD= meets design standards, MSD= meets design standards with reservations,

“--“= does not meet design standards

Table 2: Descriptive Information from Studies Rated as MDS and MD-R

	Participants	Setting (Activities)	Target Behavior	Dependent Variable	Type of VM	Experimental Design	Findings
Buggey et al. (2011)	4 years, 2 months PDD-NOS 4 years, 2 months PDD-NOS 3 years, 10 months PDD-NOS 4 years, 2 months-PDD-NOS	Private inclusive preschool (playground time)	Social initiations	Frequency of interval	Self	Multiple baseline	No Evidence
Buggey & Ogle (2012)	2 years, 8 months ASD 2 years, 6 months ASD	Early intervention cite (playing with peers)	Play skills	# of interactions	Self	Multiple baseline	No evidence
D'Ateno et al. (2003) 1	3 years 8 months ASD	Private ABA clinic (pretend play)	Scripted verbal statements	# of scripted verbal statements	Adult	Multiple baseline	Strong evidence
D'Ateno et al. (2003) 2	3 years 8 months ASD	Private ABA clinic (pretend play)	Unscripted verbal statements	# of unscripted verbal statements	Adult	Multiple baseline	No evidence
Gena et al. (2005)	5 years, 7 months ASD 4 years, 4 months ASD 3 years, 11 months ASD	Participants' homes (pretend play)	Affective behaviors (verbal and facial responses)	% of appropriate affective responding	Peer	Multiple baseline	No evidence
Hine & Wolery	2 years, 6 months ASD 3 years, 7 months ASD	Inclusive university based program (Sensory activity)	Pretend play	# of types of play actions	Adult (point-of-view)	Multiple baseline	Moderate evidence
Maione & Mirenda (2006) 1	5 years, 7 months ASD	Participant's home (playtime with peer)	Social language verbalizations	# of verbalizations	Adult	Multiple baseline	No evidence
Maione & Mirenda (2006) 2	5 years, 7 months ASD	Participant's home (playtime with peer)	Scripted/ Unscripted verbalizations	Frequency of scripted/unscripted verbalizations	Adult	Multiple baseline	No evidence
Maione & Mirenda (2006) 3	5 years, 7 months ASD	Participant's home (playtime with peer)	Peer initiations and responses	Frequency of initiations and responses	Adult	Multiple baseline	No evidence
Sherer et al. 2001	5 years, 7 months ASD	Participants' home (playtime with peer)	Conversation skills	% of engagement in conversation	Peer/Self	Multiple baseline	Moderate evidence

Notes: CARS= Childhood Autism Rating Scale

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\*Indicates articles included in review.

\*\*Indicates articles retained for further analysis.

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