

THE EFFICACY OF VIDEO SELF-MODELING IN AMELIORATING AGGRESSIVE  
BEHAVIOR AMONG STUDENTS IDENTIFIED AS AT-RISK WITHIN A  
RESPONSE TO INTERVENTION PARADIGM

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I am submitting herewith a dissertation written by Michelle La Spata entitled "The Efficacy of Video Self-Modeling in Ameliorating Aggressive Behavior among Students Identified as At-Risk within a Response to Intervention Paradigm." I have examined this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of PhD with a major in School Psychology.

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## ABSTRACT

MICHELLE G. LA SPATA

### THE EFFICACY OF VIDEO SELF-MODELING IN AMELIORATING AGGRESSIVE BEHAVIOR AMONG STUDENTS IDENTIFIED AS AT-RISK WITHIN A RESPONSE TO INTERVENTION PARADIGM

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The purpose of this study was to investigate the efficacy of video self-modeling (VSM) with early elementary-aged children who have not been evaluated as having a disability entitling them to special education services, but who have been identified by their teachers as exhibiting aggressive behavior within the school setting and who are “at-risk” for experiencing educational difficulties due to behavior. Eight students from two elementary schools received the VSM intervention and their data were analyzed as part of this study. Teachers and parents completed the BRIEF and SSIS, and students were observed at baseline and after the intervention. Half of all observations were conducted with two raters in order to assess inter-rater reliability. Primary analyses of observational data included visual analysis of level, variability, and trend, as well as statistical analysis using two nonparametric techniques (i.e., NAP and Tau-U) and one parametric technique (i.e., Allison-MT regression). Analysis of clinical and nominally significant changes on the BRIEF and the SSIS were conducted by obtaining the reliable change index (RCI).

The findings of this study indicated that VSM is a viable intervention for addressing aggressive behavior among at-risk elementary-aged students. Improvements

in behavior were observed for seven out of eight participants, particularly among participants who displayed more aggression at baseline. Teachers also reported clinically significant changes in behavior for some participants on the BRIEF and the Problem Behaviors scale on the SSIS; however, the VSM intervention did not affect parent ratings on those same scales nor did it affect the Social Skills scale on the SSIS, which may reflect the items comprising those scales. These findings demonstrate that school psychologists can use VSM as a secondary prevention tool in working with students who display aggressive behaviors; however, it is recommended that school psychologists are cognizant of the methods used to evaluate the effectiveness of VSM among at-risk students, who may not display significant behavioral deficits.

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## CHAPTER I

### INTRODUCTION

Children may struggle within the school setting for a myriad of reasons. Some children may struggle because they have more difficulty learning academic concepts than other children in their grade. Other children may experience educational difficulties because they have a health impairment or a physical disability that may impede their ability to get an education without assistance. Yet other children may struggle because they present with significant behavioral or emotional difficulties. Kauffman, Mock, and Simpson (2007) estimated that approximately 5% of children and adolescents in the general population experienced some type of behavior or emotional problem; of that group, only 20% (i.e., 1% of the overall population) received mental health support in the form of eligibility for special education services as a student with an emotional disability (ED). The remaining students either attempted to hide their emotional problems during the school day so they might have been overlooked, or they may have been declared ineligible for special education services because their behavioral difficulties represented social maladjustment (SM) rather than an ED.

The federal definition of an emotional disability (or emotional disturbance) indicates that a student has one or more of the following: (a) an inability to learn which cannot be explained by intellectual, sensory, or health factors; (b) an inability to build or maintain satisfactory interpersonal relationships with peers and teachers; (c) inappropriate types of behavior or feelings under normal conditions; (d) a general,

pervasive mood of unhappiness or depression; and (e) a tendency to develop physical symptoms, pains, or fears, associated with personal or school problems (Bower, 1981, p. 115-116; IDEIA, 2004). Furthermore, the federal criterion includes an exclusionary clause for social maladjustment, which states that “the term [emotional disturbance] does not apply to children who are socially maladjusted, unless it is determined that they have an emotional disturbance” (IDEIA, 2004); however, the federal criterion does not include a formal definition of social maladjustment (Cloth, Evans, Becker, & Paternite, 2014).

Some scholars have attempted to conceptualize social maladjustment as representative of a subcultural delinquent group who exhibited socialized aggression (Quay, 1987), or externalizing behavior disorders such as oppositional defiant disorder and conduct disorder (Miller, Williams, & McCoy, 2004). Some scholars argue that children with social maladjustment do not truly have a disability because they make intentional, deliberate choices to engage in rule-breaking behavior and would be less likely to benefit from special education support (Cloth et al., 2014; Merrell & Walker, 2004). Furthermore, children who are socially maladjusted act accordingly because they assign hostile attributions to others’ behavior (Miller et al., 2004). Besides these psychological considerations, there are also potential financial and political considerations to keeping children who are deemed socially maladjusted from accessing special education services. For instance, school districts across the country spent an average of \$7,700 (\$10,600 in 2015 dollars) to educate one student with an emotional disability in 2000, which is almost two times the cost of educating a child without a disability (Bureau of Labor Statistics, n.d.). Therefore, if children deemed socially

maladjusted were also entitled to special education services, then the district would incur additional financial burden (Nelson, 1992). Furthermore, their participation in high-stakes testing could affect the amount of money a school or district received from the government (Cloth et al., 2014). Lastly, students deemed to be socially maladjusted yet entitled to special education services would be less likely to be suspended or expelled for their infractions (Nelson, 1992). As is the case with other students who are in special education, the infraction committed by a child with social maladjustment would likely be subject to a manifestation determination hearing in which one possible outcome would entail revising his or her individualized education program (IEP), including a behavior intervention plan.

In order to address some of these concerns, Heathfield and Clark (2004) suggest that the financial burden of a school or district could be alleviated by providing preventative services or early intervention to address behavioral and emotional problems. These authors also argue that suspending or expelling students does not necessarily address their problems and in some cases may reinforce their behavior (Heathfield & Clark, 2004; Olympia et al., 2004). In addition, children who do not receive services in a timely manner to address their behavioral and emotional needs may not benefit as much as those who participated in prevention and early intervention programs (Olympia et al., 2004). The prognosis for children whose behavioral and emotional problems are not addressed early can be grim, as they are at higher risk for becoming criminals, developing adult psychiatric disorders, experiencing unemployment, or engaging in substance abuse upon reaching adulthood (Olympia et al., 2004).

The federal government also expressed a vested interest in meeting the early needs of children when President Bush signed the No Child Left Behind (NCLB) act into law in 2002. The intent of NCLB was to ensure that institutions set high standards and established measurable goals in order to improve individual outcomes in education. NCLB contains language pertaining to prevention and intervention programs for children and youth who are neglected, delinquent, or at-risk (Part D; NCLB, 2001). Therefore, the burden was on educators to reach out to children and adolescents with a variety of needs, including behavioral and emotional needs. After the onset of NCLB, many districts increased accountability by implementing a method of service delivery entitled response to intervention (RTI; Kavale & Spaulding, 2008). Thus, schools developed problem-solving teams that identified students who had needs that extended beyond the general education setting, the nature of the students' needs, and implementing evidence-based interventions to meet those needs. Through an RTI model, students were placed in tiers depending on the level of support that they needed in order to progress through the curriculum. Students who did not respond well to interventions at the most intensive tier (typically Tier 3 in most districts) were evaluated to consider eligibility for special education services. School districts incorporated aspects of RTI towards implementing a system of positive behavior supports (PBS), which was intended to provide prevention and intervention services to enhance one's quality of life and minimize problem behavior (Carr et al., 2002). PBS also incorporates a multi-tiered system of support, typically in the form of primary, secondary, and tertiary levels (Sugai & Horner, 2002).

School psychologists have an ethical obligation to address the needs of children with behavioral and emotional difficulties, even if the law states that children classified as socially maladjusted are not entitled to special education services. According to the practice standards prescribed by the National Association for School Psychologists (NASP), school psychologists should implement evidence-based interventions that promote alternative, positive approaches to student discipline, and they should assist parents and other caregivers in developing and implementing behavior change programs (NASP, 2010).

Many evidence-based interventions exist to address a variety of behaviors, as documented through the What Works Clearinghouse (n.d.), which was established to independently evaluate the internal validity of studies examining the effectiveness of interventions. Besides evaluating the internal validity of the study and determining whether it meets standards, the study must also demonstrate a functional relationship between the intervention and its effectiveness on at least three occasions (Kratochwill et al., 2013). Evidence for the efficacy of an intervention is strengthened when the effects of the intervention can be replicated across different cases and research groups.

### **Video Self-Modeling**

While video self-modeling (VSM) has existed prior to RTI and PBS, it employs many of the same principles of positive instruction on behavior that is promoted through PBS. Essentially, VSM entails observers viewing their positive performances of a targeted behavior via video, and researchers have demonstrated effectiveness across a range of ages, disability categories, and skills (Buggey, 2005). VSM studies also

illustrated that gains often occurred immediately after the intervention began and that they were often able to generalize across settings. Bellini and Akullian (2007) found that VSM may be designated as an evidence-based practice for addressing social-communication skills, functional skills, and behavior among children and adolescents with autism spectrum disorder. While Bellini and Akullian used the percentage of non-overlapping data (PND) as a means of calculating the effectiveness of VSM, other overlap methods were developed since then to evaluate the effectiveness of interventions, including methods that incorporate all of the data in a study and account for baseline trend (i.e., Tau-B), which PND fails to do (Wolery, Busick, Reichow, & Barton, 2010). Hitchcock, Dowrick, and Prater (2003) found that 18 VSM studies conducted within the school setting yielded moderate to strong outcomes, suggesting that VSM is a viable intervention for improving communication, behavior, and academic performance. However, they indicated that most studies utilized visual analysis of graphs in order to determine the efficacy of VSM and little information was provided about other types of techniques utilized by researchers to analyze the effectiveness of VSM.

### **Statement of Purpose**

There have been a variety of VSM studies that have investigated its efficacy in reducing aggressive behavior among children with various disabilities such as autism spectrum disorder, intellectual disability, or emotional disabilities (e.g., Axelrod, Bellini, & Markoff, 2014; Bilius-Lolis, Chafouleas, Kehle, & Bray, 2012; Buggey, 2005; Clark et al., 1993). However, there has been a dearth of studies examining the efficacy of VSM in addressing aggressive behavior among children designated as at-risk, which corresponds

with secondary prevention within the context of PBS and RTI. Furthermore, there have been few studies that have examined the efficacy of VSM beyond a visual analysis of graphs as well as inter-observer agreement. Therefore, the purpose of this study is to evaluate efficacy of video self-modeling (VSM) interventions with children identified as at-risk and who are exhibiting behavioral difficulties in the school setting in terms of aggression through multiple forms of analysis.

### **Research Questions**

Four broad research questions will be examined in this study; specific hypotheses will be presented in the Method chapter.

1. After implementation of a VSM intervention targeting aggressive behavior among at-risk elementary students, will the rate of aggressive behavior decline post-intervention as depicted through observational data?
2. What effects would VSM have on reducing problem behaviors including aggression, as depicted through parent and teacher reports on the Problem Behaviors component of the Social Skills Information Schedule (SSIS)?
3. What effects would VSM have on improving prosocial behaviors, as depicted through parent and teacher reports on the Social Skills component of the SSIS?
4. What effects would VSM have on improving executive functioning skills, as depicted through parent and teacher reports on the Global Executive Composite, Behavioral Regulation Index, and Metacognition Index of the Behavior Rating Inventory of Executive Function (BRIEF)?

## **Definitions**

The terms in this section directly relate to the relevant topics within this research study and include, but are not limited to, topics pertaining to aggression, response to intervention and video self-modeling.

**Aggression.** Verbal and physical actions performed by a living agent (Connor, 2002) intended to harm a living individual in some capacity, whether it is initiated or is in response to a provocation. Verbal aggression may include behaviors such as yelling, screaming, or teasing, while physical aggression may include behaviors such as hitting, kicking, pushing, tapping, or fighting.

**At-Risk.** Denotes students who are identified by their teachers as needing more support than what is typically provided within the general education setting to meet the needs of most students, but does not include students identified as having disabilities and/or who receive special education services (Slavin, Karweit, & Madden, 1989).

**Individuals with Disabilities Education Improvement Act (IDEIA).** An act reauthorized in 2004 that delineates how to provide special education services in order to meet the needs of children and adolescents with disabilities. In addition, eligibility determination, particularly for a Specific Learning Disability, may include data indicating whether the student responded adequately to high-quality instruction or intensive interventions and may include alternative research-based procedures (IDEIA, 2004).

**No Child Left Behind (NCLB).** A federal law signed by President Bush that intended for students to meet expected academic standards as well as social/emotional

standards for their grade level, as measured through high-stakes assessments developed by each state (Fletcher & Vaughn, 2009).

**Positive Behavior Supports (PBS).** A multi-tiered system of service delivery that emphasizes prevention and early intervention to reduce problem behavior and promote appropriate behavior (Jimerson, Burns, & VanDerHeyden, 2007).

**Primary Prevention.** This corresponds with the lowest or least intensive tier of instruction which may include school-wide or classroom-wide initiatives provided by all staff for all students which is intended to inhibit the development of problem behavior (Jimerson et al., 2007).

**Proactive Aggression.** Aggressive behavior that is initiated by an individual with the intention of achieving a desired outcome (Connor, Steingard, Cunningham, Anderson, & Melloni, 2004).

**Reactive Aggression.** Aggressive behavior that is enacted in response to provocation by another individual or perceived hostility (Connor et al., 2004).

**Response to Intervention (RTI).** A multi-tiered system of service delivery that integrates assessment and intervention to maximize student achievement and reduce behavior problems. Schools use data to identify students at risk for poor learning outcomes, monitor student progress, provide evidence-based interventions and adjust the intensity and nature of those interventions depending on a student's responsiveness (National Center on Response to Intervention, 2010).

**Secondary Prevention.** Corresponds with the second tier of instruction or intervention where students may be placed if they do not respond adequately to high-

quality instruction or primary preventative programs. Its purpose is to remove or reduce the impact of risk factors by increasing the availability of protective factors (Jimerson et al., 2007).

Social Learning Theory. Indicates that individuals learn behaviors through observation and imitation of other individuals who serve as models, or social agents (Bandura & Walters, 1963).

Tertiary Prevention. Corresponds with the third tier of instruction or intervention where students may be placed if they do not respond adequately to secondary preventative programs. Its purpose is to reduce the complexity, intensity, and severity of problem behaviors that are well-established (Jimerson et al., 2007).

Video Self-Modeling (VSM). An intervention modality that allows children to watch themselves performing a desired target behavior or skill with accuracy (Hitchcock et al., 2003).

## CHAPTER II

### LITERATURE REVIEW

This chapter will address several topics. First, the concept of aggression will be discussed in depth, including its subtypes, cognitive and developmental contributors, and prognosis of continuous aggressive behavior. Second, an overview of response to intervention and positive behavior supports will be provided, including a brief discussion of interventions at each tier intended to reduce aggressive behavior. Finally, the chapter will include an in-depth discussion of the literature surrounding video self-modeling, including its theoretical base, various techniques, research studies conducted with various disability populations, and the factors that contribute to an efficacious video self-modeling intervention.

#### **Aggression**

Aggression is a widely complex behavior that has been examined by various disciplines (i.e., psychology, criminal justice, education), which incorporate different approaches to characterizing and ultimately addressing aggression (Connor, 2002). Aggression is defined by the *Merriam-Webster Dictionary* as “a forceful action or procedure (as an unprovoked attack) especially when intended to dominate or master; the practice of making attacks or encroachments; hostile, injurious, or destructive behavior or outlook especially when caused by frustration” (“Aggression,” n.d.). Connor distinguished between actions that were violent and actions that were aggressive. While some acts could be both violent and aggressive, in order for an action to be aggressive, it

must be performed by a living agent such as a human or an animal (Connor, 2002). In other words, tornadoes may be classified as violent entities that can cause destruction, but they are not aggressive according to this definition because a tornado is not an organism. Connor (2002) indicated that it was essential for practitioners working with children to distinguish between adaptive and maladaptive acts of aggression, which can impact the appropriateness of interventions. For example, when one engages in aggressive acts in order to obtain scarce resources or as a means of self-defense or protection of within-group members, then he or she is likely engaging in adaptive aggression. On the other hand, maladaptive aggression, in addition to not fulfilling the criteria for adaptive aggression above, can also be unregulated, disinhibited, and lead to unhelpful outcomes (Connor, 2002).

Different entities may conceptualize aggressive and violent acts differently, which can lead to differing consequences for the aggressor. For example, the field of criminal justice may associate aggression with antisocial behavior or delinquency. Antisocial behavior violates the rules and laws of society and is illegal regardless of the age at which the act is committed, whereas delinquency includes a smaller subset of antisocial or criminal acts committed by a minor (Connor, 2002). The means of addressing aggressive behavior from this perspective includes punishing the aggressor for the crime committed; for example, serving time in prison would be an example of punishment in which the aggressor's freedoms are restricted. On the other hand, fields emphasizing mental health, such as psychology, may conceptualize aggression within the realm of some disruptive

behavior disorders and that aggressive behavior may be driven by some inner deficit with biological and environmental influences (Connor, 2002).

### **Subtypes of Aggression**

Within the school setting, educators often classify aggression as verbal or physical aggression, based on the descriptive nature of the act itself. Verbal aggression involves the intent to harm someone else through means of words, and may include teasing, taunting, or making threats (Reitman & Villa, 2004). In contrast to physical aggression, this includes the intent to harm someone else through physical behaviors such as biting, hitting, or shoving. While both verbal and physical aggression may be exhibited through overt acts such as bullying, another type of aggressive behavior, relational aggression, has also been identified in the schools. Relational aggression includes the intent to harm someone else through means of damaging peer relationships, and may include behaviors such as social exclusion or spreading rumors as a form of retaliation. Relational aggression is more likely to be displayed by girls (Crick, Casas, & Mosher, 1997).

Researchers have also attempted to conceptualize aggression along a continuum. For example, Frick and colleagues (1993) grouped aggressive acts within four quadrants, which were distinguished in part by whether actions were overt or covert. Overt aggression included openly confrontational acts of aggression, whereas covert aggression was hidden (Connor, 2002). Furthermore, overt and covert aggression could further be classified as either destructive or nondestructive (Frick et al., 1993). Thus, overt/destructive acts of aggression may include assault, fighting, and bullying, whereas overt/nondestructive acts may include defiance or oppositional behavior.

Covert/destructive acts may include stealing, fire setting, or vandalism, whereas covert/nondestructive acts of aggression may include substance use, running away, or truancy (Frick et al., 1993). Although aggression along the overt-covert continuum has been well validated in research, it has not been informative with respect to recommending interventions (Connor, 2002).

Aggression has also been classified along a proactive-reactive dimension, and this has informed interventions, particularly among boys in community samples (Connor, 2002). Reactive aggression has its roots in the frustration-aggression hypothesis, in which aggression was believed to have been born out of events that produced frustrations such as physical pain or psychological discomfort (Berkowitz, 1989). Reactive aggression entails a hostile, angry, defensive response to threat, frustration, or provocation (Connor et al., 2004; Dodge et al., 2003). Reactive aggression may be driven by dysregulated negative affect and hypervigilance to threat-related cues in the social environment (Ostrov, Murray-Close, Godleski, & Hart, 2013). Children who exhibit reactive aggression may have more of a tendency to make hostile attributions, and over time they may experience more peer rejection (Dodge et al., 2003; Ostrov et al., 2013). Proactive aggression, on the other hand, has its roots in social learning theory (Bandura, 1969; to be discussed later in this chapter) and includes unprovoked, deliberate, predatory, and coercive actions employed with the intention of obtaining a desired goal (Connor et al., 2004). Bullying behavior constitutes one form of proactive aggression (Li, Fraser, & Wike, 2013). Furthermore, children who exhibit proactive aggression were found to have good emotion regulation skills and were less likely to experience peer rejection during

early childhood, as it was associated with social dominance and leadership (Ostrov et al., 2013).

Connor and colleagues (2004) found that verbal intellectual ability and academic achievement was negatively correlated with proactive and reactive aggression; they reasoned that children whose language is underdeveloped may have more difficulty mediating conflict using that modality, and thus may be more prone to acting out aggressively. Furthermore, children with language deficits are less likely to engage in silent self-talk and, in turn, have more difficulty thinking through the consequences of their actions before acting or reacting (Connor, 2002). While Arsenio, Adams, and Gold (2009) attained similar findings with children more likely to exhibit reactive aggression, they found that proactive aggression was associated with *higher* verbal abilities, as well as more expected happiness following aggression, and fewer concerns about morality. Card and Little (2006) conducted a meta-analysis examining the relations between proactive and reactive aggression with psychosocial adjustment in childhood and adolescence. They found that although proactive and reactive aggression are both associated with poor psychosocial adjustment overall, reactive aggression had a stronger relationship with internalizing problems, emotional dysregulation, symptoms associated with attention-deficit hyperactivity disorder (ADHD), low social preference, peer rejection, and peer victimization than proactive aggression, albeit this difference was small.

## **The Social Information Processing Model**

Crick and Dodge (1994) proposed the social information processing (SIP) model as a framework for understanding how cognitive processing influences the behavior of children, particularly aggression. The SIP model includes five cognitive steps that ultimately lead to a behavioral response:

1. Encoding of external and internal cues;
2. Interpreting or cognitive representation of those cues;
3. Choosing and clarifying a goal;
4. Selecting or constructing a response;
5. Performing the response decision (Crick & Dodge, 1994; Li et al., 2013)

Lemarise and Arsenio (2000) noted that social interactions are also influenced by a variety of strong emotions, and that emotionality and the ability to regulate emotions also influence how social situations are processed at each step of the SIP model. They noted that children who have high emotionality but poor regulatory abilities are most likely to show deficits in social information processing. Li and colleagues (2013) argued that the SIP model could be applied to reactive as well as proactive aggression. For example, consider a scenario in which a child walks by and knocks off another child's puzzle. If the second child is a reactive aggressor, he may attribute hostile intent to the first child's action. On the other hand, if he is a proactive aggressor, he may believe that the other child was being hostile for fun and may enact aggression because that leads to positive outcomes. The differences in how proactive and reactive aggressors may process social information are illustrated in Table 1. Note that in this example, the aggression

types differ in how information is processed and the intended goal that is behind the aggressive response; however, Li and colleagues (2013) believed that biased processing can occur at each information-processing step.

Table 1

*Application of Crick and Dodge's (1994) SIP Model to Proactive and Reactive Aggression*

SIP Model Step	Proactive Aggression	Reactive Aggression
Encoding external and internal cues	"He knocked over my puzzle."	"He knocked over my puzzle."
Interpreting cues	Likely ambiguous	Likely intended to be hostile
Choosing and clarifying a goal	"I should teach him to be more careful and that I am in control."	"Justice must be served."
Selecting a response	"I'll knock him out."	"I'll knock him out."
Performing the response decision	Knocks the child out	Knocks the child out

Assessing the latent nature of cognitive processing driving aggressive behavior can be difficult to achieve via direct observations alone, and so researchers (e.g., Arsenio et al., 2009) have provided children with hypothetical situations via videos, pictures, and/or text, and then asked children how they would respond to those situations themselves. Limitations to this methodology may include that the emotions provoked by hypothetical situations may differ from corresponding real-life situations, and thus children may not be as personally invested. On the other hand, if children are asked to imagine themselves as the victim, they may under-report the degree to which they would respond in an aggressive manner in order to maintain social desirability (Li et al., 2013). Li and colleagues (2013) suggested having children respond on behalf of the victim when

presented with a hypothetical situation in order to increase the level of personal involvement and minimize the effects of social desirability.

### **Developmental Psychopathology of Aggression**

Developmental psychopathology is a field that considers a broad range of interacting individual child, parental, family, and environmental variables in the development, maintenance, and/or reduction/elimination of maladaptive aggression across development (Connor, 2002). Tremblay and colleagues (2004) found that preschool-aged children followed one of three developmental trajectories for aggression. Approximately 28% of their sample included children who displayed little or no aggression. The majority of the group (58%) displayed modest aggression, which eventually resolved as the children acquired more skills. Finally, approximately 14% of the sample displayed high physical aggression, which had the greatest likelihood of evolving into serious violence during adolescence and adulthood. Some of the other risk factors identified for membership in the high-aggression group were the presence of other siblings in the household (particularly older siblings), early motherhood (particularly with the first child), antisocial behavior by the mother prior to finishing high school, maternal smoking during pregnancy (Murray, Irving, Farrington, Colman, & Bloxsom, 2010), maternal postpartum depression, and low income. Many of these factors likely reflect the nature of the mother-child dyad before and after pregnancy.

Although Danforth, Connor, and Doerfler (2014) found that 85% of the variance in proactive aggression was explained by genetic factors and that reactive aggression also had genetic influences, there has also been extensive research on the impact of adverse

environments on the development of aggressive behavior. In addition to prenatal environmental factors such as maternal stress, maternal mental health, and fetal exposure to nicotine, Murray and colleagues (2010) found that economic stress from low socioeconomic status, adverse family dynamics, and low cognitive stimulation were also predictors of future conduct problems including aggression. In addition, parenting styles characterized by insensitivity and use of harsh or inconsistent discipline was also predictive of the degree to which children would grow up socially maladjusted (Haskett & Willoughby, 2006). Although Haskett and Willoughby (2006) had examined the broader concept of social maladjustment rather than the specific behavior of aggression, they noted that early experiences of harsh and abusive discipline and low parental warmth were associated with increased risk for aggression.

Patterson (1982) proposed the idea of coercion theory in which parents negatively reinforce children's difficult behaviors by giving in and not following through on discipline. For example, suppose a parent made a request to the child and the child refused to comply. The parent provided contingencies (e.g., "if you don't do X you will lose the privilege of Y"), but when the child still refused to comply, the parent did not follow through on administering the consequence. That cycle negatively reinforced the child's maladaptive behavior, including aggression, as the child learned that as he or she continued to be defiant or aggressive, he or she would eventually succeed at avoiding the parent's request. That pattern of relating would then carry over into the school setting with peers and teachers (Smith et al., 2014).

In addition to the adverse effects of maladaptive parenting on the development of aggressive behavior, Ziv (2012) found that children directly or indirectly exposed to violence were more likely to make hostile attributions and in turn were more likely to display conduct problems in preschool. Connor et al. (2004) found that younger children were more likely to display reactive aggression as they were more physical and unrestrained, while older children and adolescents were more likely to display proactive aggression as their planning abilities were better developed than those of younger children.

### **Potential Outcomes of Aggression**

Children who display high levels of aggressive behavior at young ages are at risk for developing a variety of impaired outcomes across multiple domains as they age. The more robust relationships between aggression and psychological disorders include conduct disorder, of which aggression is a core feature; the hyperactive-impulsive features of attention-deficit/hyperactivity disorder; mood disorders, particularly when symptoms include irritability and hostility, which may be behaviorally expressed among depressed children; post-traumatic stress disorder, which may be mediated by neurobiological responses to fears of threat; and substance use disorders (Connor, 2002). In addition, one of the core features of intermittent explosive disorder includes episodes of aggression (American Psychiatric Association [APA], 2013). Interestingly, the relationship between oppositional defiant disorder and aggression is not as strong as it is with other disruptive behavior disorders (Connor, 2002). While children with oppositional defiant disorder are likely to present with an angry/irritable mood and

argumentative/defiant behavior, they are much less likely to engage in reactive aggression or physical aggression (APA, 2013; Connor, 2002). In addition, the relationship between psychotic disorders and aggression is also weak and is likely because the incidence of the former is very rare among children compared with the incidence of the latter (Connor, 2002).

In the school setting, children who display high levels of aggression are at risk for experiencing significant academic difficulties, including lower reading ability (Connor, 2002). They may be more prone to receiving detentions, suspensions, and even expulsions depending on the infraction. They are less likely to be accepted by most of their peers, or they may forge friendships with maladjusted peers (Bagwell, 2004). Some children may be found eligible for special education services as a student with an emotional disability due to their excessive aggression; however, other children may be excluded from special education on the basis of social maladjustment (Gacano & Hughes, 2004). When they reach adolescence, children with higher levels of aggression are at risk of dropping out of school, developing problems with substance use or abuse, and joining gangs. As adults, they are at risk of having more contacts with the police and are more likely to be unemployed (Connor, 2002).

### **Interventions to Reduce Aggression**

There has been growing interest in identifying effective interventions designed with the intention of reducing childhood aggression. Given the myriad of adverse outcomes described above, effective interventions could potentially reduce overall health care costs as well as prison costs (Connor, 2002). The majority of interventions within

this domain has utilized a psychosocial approach and has targeted parenting as well as the child's social skills. According to Connor (2002), interventions that result in the most successful outcomes are aimed at children under the age of eight who have less severe problems and that employ preventative efforts as well as early intervention. Some of these programs utilize a cognitive-behavioral therapy (CBT) approach; the rationale behind programs rooted in CBT is that children who are aggressive are likely to have deficits in social cognition such as the over-attribution of hostile intent (Connor, 2002). Many of these interventions are discussed further in the next section.

### **Response to Intervention**

Response to intervention (RTI) has been described as a multi-tiered system of service delivery in which high-quality instruction and assessment methods are made available to all students (Barnes & Harlacher, 2008; Brown-Chidsey & Steege, 2010). The National Center on Response to Intervention (2010) provides the following description:

Response to intervention integrates assessment and intervention within a multi-level prevention system to maximize student achievement and to reduce behavior problems. With RTI, schools use data to identify students at risk for poor learning outcomes, monitor student progress, provide evidence-based interventions and adjust the intensity and nature of those interventions depending on a student's responsiveness, and identify students with learning disabilities or other disabilities. (p. 2)

The four essential components of RTI include a school-wide, multi-level instructional and behavioral system for preventing school failure, screening, progress monitoring, and data-based decision making with regards to disability identification as well as movement within the tiers (National Center on Response to Intervention [NCRTI], 2010). The practice of RTI has gained more widespread attention in the past decade after No Child Left Behind (NCLB) was passed by Congress in 2001 and signed into law in early 2002 (Kavale & Spaulding, 2008), as well as the reauthorization of the Individuals with Disabilities Education Improvement Act (IDEIA) in 2004. However, RTI is not a new way of providing services nor is it limited to the field of education. For example, in the medical field, it is not uncommon for a patient to visit a doctor due to one or more symptom(s), and the doctor will measure the patient's weight, blood pressure, and heart rate because those three areas are robust indicators of general physical health; thus, the doctor is utilizing screening measures. The doctor may ask the patient some additional questions about the nature of his symptoms as well as his medical history. At the end of the appointment, the doctor may prescribe medication to treat the symptoms. If the patient responds favorably to the medication, all is well; if there is no response, the doctor may perform additional tests and/or prescribe more intensive treatments. In the medical and educational settings, RTI procedures are utilized in order to implement treatments or interventions early, and treatment response may be used to formulate a diagnosis.

## **History of RTI**

The beginning of what eventually became RTI was formulated through the National Research Council study (Heller, Holtzman, & Messick, 1982), which addressed the disproportionality of children in special education, particularly those placed in educable mentally handicapped classrooms (equivalent to mild intellectual disability placements today). The authors recommended the following six principles, which later formed the framework of RTI:

1. Regular education teachers were responsible for providing multiple educational interventions and to note the impact of these interventions prior to making a referral for special education evaluation.
2. Assessment specialists were responsible for ensuring that the measures used validly assessed the functional needs of the individual child.
3. The placement team was responsible for demonstrating that any labeling or placement in a special program was likely to lead to improved outcomes not attainable in the regular education setting.
4. Likewise, the special education staff was responsible for demonstrating that high-quality instruction was being provided and that the goals for the student could not be achieved within the regular classroom.
5. Furthermore, the special education staff was responsible for demonstrating that the child should remain within special education.

6. Finally, the administrators were responsible for monitoring the pattern of special education placements as well as the types of instructional services being provided (Heller et al., 1982).

In the 1980s, schools formed student assistance teams in order to provide pre-referral interventions. The purpose of having pre-referral interventions was to provide help to students who were struggling within the general education setting. However, the concerns that teachers brought as well as the recommendations provided by the team members were usually not data-driven (Gersten & Dimino, 2006). Thus, L. S. Fuchs attempted to make the process more data-driven by constructing three phases of assessment in 1995 that expanded on the framework provided by Heller and colleagues (Vaughn & Fuchs, 2003). Phase I involved tracking the rate of growth for all students in order to determine whether the instructional environment was suitable for making progress. If the overall rate of growth was low across most or all children in the classroom compared to other children in the same school or district, then interventions would target classroom instruction. Phase II involved identifying individuals whose level of performance, as well as rate of improvement (ROI), were below that of the peers in his or her classroom in order to identify children who were at risk for poor outcomes. Phase III involved modifying and adapting the regular education classroom to determine whether it could become a productive learning environment for those children found to be at risk. If any of these children did not respond to these adaptations, then it was thought that they had a disability that rendered it difficult to benefit from the regular education setting (Vaughn & Fuchs, 2003)

As stated, RTI gained more popularity after NCLB was signed into law by President Bush in 2002. The intent of NCLB was to ensure that all students were meeting expected academic standards for their grade level, no children would “fall through the cracks,” and so economically disadvantaged children were assisted through Title I funding (Fletcher & Vaughn, 2009). Educators at every grade level and teaching every subject area were expected to create standards that the curriculum was expected to cover, and students’ progress through the curriculum was measured through high-stakes tests that were developed by each state. Under NCLB, states and districts were responsible for ensuring that a certain percentage of their students met or exceeded standards on state tests and that they were making adequate yearly progress (AYP) toward that goal (Kavale & Spaulding, 2008).

The other major issue that RTI intended to address centered on the issue of special education eligibility, particularly under the category of Specific Learning Disability (SLD). Historically, students had been identified as having a learning disability if tests revealed the presence of a significant discrepancy between their intellectual ability, as measured by tests of intelligence, and their academic skills, as measured by tests assessing reading, mathematics, and written and oral language. When IDEIA was reauthorized in 2004, it stated that an evaluation to consider SLD eligibility must permit the inclusion of data indicating whether the student responded adequately to high-quality instruction or intensive interventions, and may include alternative research-based procedures (IDEIA, 2004). Thus, the idea of immediately providing early intervention to struggling children at risk for school failure was intuitively appealing to stakeholders.

## **Positive Behavior Supports**

While RTI incorporates a multi-tiered prevention and intervention system to remediate academic and behavior problems, positive behavior supports (PBS), which has similar characteristics as RTI, also gained momentum starting in the 2000s. However, the roots of PBS originated from three sources. Applied behavior analysis (e.g., Baer, Wolf, & Risley, 1968) provides a number of assessment and intervention strategies based on operant principles. Normalization and inclusion subscribe to the notion that people with disabilities should be integrated with and have access to the same opportunities as others, including the general education setting. Finally, person-centered values are where interventions and strategies are judged not only based on efficacy but also with respect to their ability to enhance personal dignity, thus integrating humanism and empiricism (Carr et al., 2002). Person-centered values influence the types of interventions that may be designed for an individual with the intention of meeting that individual's specific needs and goals; the idea is that if an individual's needs are met, quality of life improves and problem behaviors are reduced or eliminated (Carr et al., 2002).

Traditional approaches to behavior management were likely to employ reactive consequences intended to punish antisocial or rule-violating behavior. For example, when school violence occurred, schools often established zero tolerance policies, hired more security, added surveillance cameras, and awarded detentions, suspensions and expulsions, even though the effectiveness of these policies had not been studied or validated adequately (Sugai & Horner, 2002). While the intention behind punishment was to decrease the occurrence of the behavior, if that behavior served a particular function or

purpose for that individual, the individual will not be motivated to change unless he or she is taught a more constructive replacement behavior. These reactive methods may be implemented at any time throughout the lifespan. On the other hand, PBS emphasizes prevention as well as early intervention intended to prevent problem behaviors from spiraling out of control by addressing them when they are not occurring or are rarely occurring (Carr et al., 2002). Research has found that early intervention has been crucial. For example, Walker, Ramsey, and Gresham (2004) found that children who do not learn to achieve their social goals other than through inappropriate behavior and/or coercive behavior patterns by the end of third grade will likely continue displaying some degree of antisocial behavior throughout their lives, which will subsequently be more resistant to additional interventions (Jimerson et al., 2007).

Like RTI, PBS also incorporates a multi-systems perspective as well as continuum of behavior support across multiple tiers. At the school-wide level, educators and administrators enforce clearly defined expectations for behavior by teaching and making sure that students understand the rules and expectations. While specifics may differ from school to school, school-wide expectations often include tenets of responsibility as well as respect towards oneself and others in the school. At the classroom level, teachers directly instruct students on the classroom-wide expectations and routines for typical classroom activities, provide active supervision and behavior management, and provide positive feedback to the students. Students may also be directly taught how the school-wide expectations relate to specific expectations and routines pertaining to non-classroom settings (e.g., hallways, restrooms, cafeteria, outdoor

settings) which may include regular opportunities to practice expectations (Jimerson et al., 2007). In addition to teaching, the role of staff includes active supervision, providing pre-corrections or reminders, and reinforcing positive behaviors. Finally, at the individual level, students who have not responded to the other systems may require more intensive, specialized, comprehensive, and individualized support, which may include a functional behavioral assessment (FBA) and individual behavior plan (Jimerson et al., 2007).

### **Approaches to Service Delivery**

Schools providing RTI and/or PBS include either a problem solving or standard protocol approach to service delivery. The problem solving approach is a process to develop, implement and evaluate interventions which has its roots in the behavioral consultation model described by Bergan (1977). Kratochwill and Bergan (1990) identified four stages in the problem-solving consultation model: problem identification, problem analysis, plan implementation, and plan evaluation.

Problem identification involves operationally defining the problem or problems of concern as well as establishing the discrepancy between current behavior and desired behavior in order to understand the magnitude of the problem (Jimerson et al., 2007; Kratochwill & Bergan, 1990). Problem analysis involves further exploration of the problem and is intended to determine why a problem is occurring. In this step of the problem-solving model, the consultant and consultee may determine whether the student lacks the appropriate skill or behavior in his or her repertoire, or whether the student has the skill or is able to perform the behavior but does not consistently do so (Jimerson et al., 2007). This step is crucial because the type of intervention needed to remediate a

skills deficit may be completely different from an intervention intended to remediate a performance deficit. For example, an intervention to address a skills deficit may involve teaching the student the skill, but an intervention to address a performance deficit may involve altering the contingencies so that the student is reinforced for performing the desired behavior, or providing additional opportunities for the child to perform the skill. Plan implementation involves selecting and implementing the intervention, and in this phase, data is collected to measure student progress as well as monitor treatment integrity (Kratochwill & Bergan, 1990). The final phase is plan evaluation, which involves data analysis to determine whether the intervention effectively changed the behavior (Jimerson et al., 2007).

The problem-solving approach has been popular because it capitalizes on the person-centered aspects of service delivery as it personalizes assessment as well as intervention. However, in order for the problem-solving approach to be effective, practitioners must have expertise in many assessment and intervention methods in order to select the tools most appropriate for any problem-solving situation (Fuchs & Fuchs, 2006).

Unlike the problem-solving approach, which is more individualized, the standard protocol approach involves the implementation of standardized assessments and interventions with a small group of individuals. Interventions may be provided for a fixed amount of time and evaluation of progress may occur at pre-set decision-making points (Fuchs & Fuchs, 2006). The standard protocol approach operates under a risk model, in which all students are screened for potential learning and behavioral difficulties, and

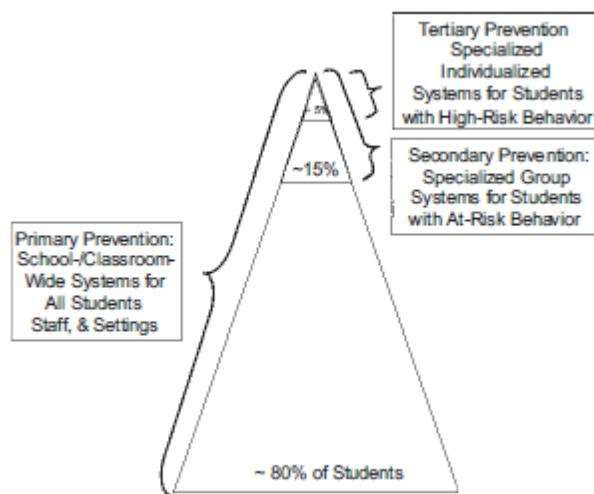
students who are identified as being at risk are given supplemental instruction or behavioral support that is evidence-based. One of the advantages of a standard protocol approach to RTI is that this method is more likely to ensure better quality control of instruction and program integrity (Jimerson et al., 2007).

Both approaches also differ with respect to conceptualizing nonresponse to intervention. The standard treatment protocol incorporates more intensive, evidence-based instruction and intervention, and so nonresponse is likely to be attributed to the presence of a disability rather than lack of good instruction. On the other hand, it is unclear whether students who do not respond to less intensive instruction but who respond to more intensive instruction have a disability. Just because they respond to intensive interventions delivered at higher tiers does not necessarily mean they will respond to instruction within the general education setting at a lower tier. Therefore, the standard treatment protocol is more likely to identify true positives as well as false negatives (i.e., the potential for making a Type II error increases). On the other hand, the problem-solving approach is less systematic, and so the likelihood of identifying more false positives (i.e., making Type I errors) increases (Fuchs & Fuchs, 2006).

### **Multiple Tiers**

One of the core components of RTI and PBS is the notion of a multi-tiered service delivery system, in which students who are screened and identified as having needs begin receiving services of relatively low intensity. If the student does not respond to intervention at a given tier, then he or she would be provided additional interventions at higher levels of intensity (Jimerson et al., 2007). Essentially, the “treatment” in the form

of an intervention is titrated to meet the needs of the child. Optimally, the majority of students (at least 80%) would respond to primary prevention services, while a small percentage of students (i.e., about 15%) would require secondary prevention services and an even smaller percentage (i.e., about 5%) would require tertiary prevention services, as illustrated in Figure 1 (Sugai & Horner, 2002).



*Figure 1.* An illustration of the multi-tiered system of service delivery (Sugai & Horner, 2002).

**Tier 1: Primary prevention.** The majority of students are placed at the lowest tier of instruction and intervention, which is otherwise known as primary or universal prevention. While all students are exposed to instruction or prevention programs, these programs should be sufficient to meet the needs for the majority of students. In the classroom setting, they receive scientifically validated instruction that is designed to meet the needs of most students (Fuchs & Fuchs, 2006). Primary prevention programs may include school-wide or classroom-wide initiatives intended to inhibit the development of

problem behavior by encouraging desired social behaviors and removing factors that promote or sustain problem behavior (Jimerson et al., 2007).

Barchia and Bussey (2011) found that the strongest school-based bullying and aggression prevention programs espoused core beliefs that aggression was wrong at the school and community levels. In other words, when teachers and other stakeholders utilized a consistent, school-wide approach to managing aggression where peers were more likely to intervene, students were less likely to behave aggressively because they were less likely to believe that their aggression would go undetected. Thus, for a primary prevention program to be effective, it is important that the entire school or community essentially be on the same page. However, Swearer, Espelage, Vaillancourt, and Hymel (2010) discussed several meta-analyses which found that whole-school approaches to reducing bullying have not been as effective as hoped or have yielded mixed results. Swearer and colleagues (2010) attributed their ineffectiveness to overreliance on self-report measures of bullying and victimization which may not be sufficient, lack of a theoretical framework that informs program evaluation, lack of socioecological interventions built into the program that are directed at peers and families, and lack of consideration of cultural factors that influence bullying behavior. Furthermore, as is the case with most primary prevention programs, schoolwide programs rarely involve direct intervention with the bullies (Swearer et al., 2010).

Several school-based primary prevention programs intended to reduce aggression and victimization in elementary school have been identified (Leff, Power, Manz, Costigan, & Nabors, 2001; Leff, Waasdorp, & Crick, 2010). The Promoting Alternative

Thinking Strategies (PATHS) Program (Kusche & Greenberg, 1995) can be implemented by elementary teachers and is intended to help children develop skills in problem-solving, self-control, and emotional regulation through activities such as discussion, direct instruction, modeling, and by viewing videotapes. Although the evidence surrounding implementation of the PATHS Program in the classroom and with a diverse population was promising, some of the limitations of the PATHS Program were its efficacy in unstructured school contexts such as the playground or the lunchroom (Leff et al., 2001).

The Second Step Program (Grossman et al., 1997) can also be implemented by preschool, elementary, and middle school teachers and is designed to teach students skills related to empathy, impulse control, and anger management through activities such as discussion, role-playing, modeling, corrective feedback, and contingent positive reinforcement. Unlike the PATHS Program, Second Step was found to demonstrate decreases in lunchroom and playground aggression, but these decreases were found through observation rather than by parent and teacher report (Leff et al., 2001).

The I Can Problem Solve (ICPS) program (Shure, 2001) is designed to reduce aggressive behavior and increase prosocial behavior among elementary-aged children and is also implemented within the classroom by teaching problem-solving skills. Although evidence has supported the efficacy of this program, it is longer than other programs and requires educators to be committed to implementing the program (Leff et al., 2010).

The Incredible Years Dinosaur Social Skills and Problem-Solving Child Training Program (Webster-Stratton & Reid, 2004) was designed to reduce or prevent conduct problems among early elementary-aged children through teaching skills such as

emotional literacy, empathy and perspective taking, friendship and communication skills, anger management, and interpersonal problem solving through activities such as videotapes and using puppets as models. Research has found potential benefits for this program for reducing aggression on the playground (Webster-Stratton & Reid, 2004).

**Tier 2: Secondary prevention.** Students who do not respond adequately to high-quality instruction or to preventative programs are placed on Tier 2, which also corresponds with secondary prevention. The purpose of secondary prevention programs is to remove or reduce the impact of risk factors by increasing the availability of protective factors (Jimerson et al., 2007); however, these interventions are typically conducted with a small group, rather than through school- or classroom-wide initiatives. In addition, compared to Tier 1, in which progress may be assessed three or four times a year, progress monitoring in Tier 2 may range from once a month to once a week.

Some of the Tier 2/secondary prevention programs with a stronger research base include Check In Check Out (CICO; Hawken, Pettersson, Mootz, & Anderson, 2005) and Check & Connect (Christenson, Stout, & Pohl, 2012). CICO is an intervention in which a student meets with a teacher or designated staff member at the beginning of the day to check preparation for the day in terms of materials as well as attitude. The teacher also reviews the expectations for appropriate behavior with the student. The student turns in a point sheet for the previous day and receives a new point sheet. The student's teacher(s) rate the student's ability to abide by the behavioral expectations in each subject area, and the parent signs the point sheet at the end of the day. CICO has been found to be effective with 70-75% of students on Tier 2 at reducing problem behavior and increasing academic

engagement and has also yielded positive ratings from teachers. CICO likely is most effective with students whose primary function of behavior is to seek attention (Hawken et al., 2005). Another intervention is the Check & Connect program, which is used with students of all ages who exhibit disengagement with school and who are at risk of dropping out, and is based on the student building and establishing a relationship with a mentor. The mentor also functions as a liaison between the home and the family. Check & Connect has an extensive research base, particularly as a truancy or dropout prevention program (Christenson et al., 2012).

Very few secondary prevention programs exist that target aggressive behavior in at-risk school-aged children, particularly those in the early elementary years. Most aggression programs aimed towards at-risk youth are geared towards older elementary students and adolescents. For example, the Incredible Years program described above (Webster-Stratton & Reid, 2004) was originally the equivalent of a secondary prevention program designed for young children at high risk of developing disruptive behavior disorders prior to being expanded to a universal prevention program aimed at all children.

The Problem Solving Skills Training Program (PSST), combined with Parent Management Training (PMT; Kazdin, Siegel, & Bass, 1992) utilizes a cognitive-behavioral approach that emphasizes the acquisition of problem-solving skills in reducing aggression and antisocial behavior, including generating alternative solutions to interpersonal problems, identifying the means to make friends, identifying possible consequences of behavior, making attributions to others, and perceiving how others feel. The parent management component focuses on child-rearing and parent-child interactions

as well as child behavior in the home, school, and community. Both programs use procedures such as modeling, shaping, fading, reinforcement, rehearsal, extinction, and mild punishments such as time-outs (Kazdin, 2011). Although research has supported the programs' effectiveness, intensive training is required to be able to effectively implement both PSST and PMT programs. Furthermore, no evidence was found that these programs were implemented within the school setting, as Kazdin and colleagues implemented the program within a clinical setting.

Skillstreaming (McGinnis, 2011) is a program designed to teach prosocial skills and can be used with children of all ages. Elementary students learn skills for classroom survival, making friends, working through feelings, replacement behaviors for aggression, and stress management, through modeling, role-playing, performance feedback and generalization to other situations. Research (e.g., Sheridan et al., 2011) has found the program to be effective in reducing maladaptive behaviors and teachers also rated it favorably.

**Tier 3: Tertiary prevention.** Students who do not respond adequately to secondary prevention and intervention efforts are moved to Tier 3, which corresponds with tertiary prevention. Some school districts consider Tier 3 synonymous with special education. The purpose of tertiary prevention programs is to reduce the complexity, intensity, and severity of problem behaviors that are well-established (Jimerson et al., 2007). Although these interventions may be implemented within a small group, they are most likely to be implemented individually and are based on functional behavioral assessment results. Compared to Tier 2, in which progress monitoring may range from

once a month to once a week, Tier 3 entails more frequent progress monitoring, sometimes daily.

One of the more established tertiary interventions for addressing behavioral and emotional needs within an RTI/PBS system is wraparound (Eber, 2001), which includes an individualized plan that is developed by the child, teacher, family, and community and is needs-based. Wraparound is described as a strength-based philosophy of care and may include services and supports such as mentors, respite, parent partners, and assistance for families, all rolled into a comprehensive, coordinated plan (Eber, 2001). Furthermore, in addition to school-based needs, wraparound addresses issues within multiple domains such as financial or spiritual needs. In addition, individualized behavior intervention plans can fall within Tier 3.

### **Summary of Interventions for Reducing Aggressive Behavior**

While all interventions discussed above differ in terms of intensity and other logistics, they share common goals of preventing or reducing aggressive behavior by increasing problem solving skills, promoting empathy, managing anger, as well as making and maintaining friendships, through similar means such as modeling, role playing, videotaped vignettes, discussion, and parent or family involvement. Many of these interventions employ principles of social learning theory, which is thought to be one of the contributing factors behind proactive aggression. In addition, many of these interventions use techniques to address issues related to the frustration-aggression hypothesis (e.g., managing anger) which is thought to underlie reactive aggression. At the secondary level or Tier 2, there are limited interventions that exist with the intention of

targeting aggressive behavior in children in early elementary grades. Given that early intervention is crucial, this is a concern. Furthermore, it is unclear whether some of the interventions listed at the secondary level are feasible for implementation within the school setting, and many of these interventions may also require educators to commit time to receive training in order to effectively implement the intervention. More recent research has examined the incorporation of technology-based interventions into an RTI paradigm (Smith & Okoto, 2010). The following section will discuss video self-modeling, an intervention that shares characteristics with the other interventions noted above but that does not have some of the same limitations.

### **Video Self-Modeling**

Video self-modeling (VSM) is an intervention that allows children to view themselves performing a desired target behavior or skill (Hitchcock et al., 2003). It has demonstrated efficacy in many research studies and with a variety of ages and student populations. This section will discuss the theories underlying VSM, including social learning theory and the zone of proximal development, highlight the format of VSM intervention, provide information on past research showcasing its efficacy, and discuss the application of VSM in the schools.

### **Social Learning Theory**

The development of VSM as an intervention modality was mainly influenced by the work of Albert Bandura in the 1960s which provided the impetus for social learning theory. Social learning theory posits that individuals learn behaviors through observation and imitation of other individuals who serve as models, or social agents (Bandura &

Walters, 1963). The conditions that facilitate learning include not only the model performing certain behaviors but receiving positive reinforcement for these behaviors, which the observer experiences vicariously (Bandura, Ross, & Ross, 1963). Social learning theory came forth as a result of the limitations behind operant conditioning developed by B. F. Skinner in the 1950s. Bandura argued that learning does not occur solely through trial-and-error as is depicted within operant conditioning, but can also take place even when the learner is not the direct recipient of reinforcers or punishers (Bandura, 1969; Bandura & Walters, 1963).

In a classic study known as the Bobo doll experiment, Bandura and colleagues investigated the imitation of aggressive behavior exhibited by an adult model (Bandura, Ross, & Ross, 1961). At that time, television was a fairly new form of technology, making media more accessible to children than the movies, and so this study was conducted in part due to concerns about the effects of exposure to violence as portrayed in the media. Bandura and colleagues (1961) hypothesized that children who were exposed to aggressive adult models would display aggressive behavior, while children exposed to adult models who were not aggressive would display behavior that was also non-aggressive. The aggressive adult models played with tinker toys near a Bobo doll, which was an inflated balloon doll, and committed pre-planned aggressive acts such as sitting on Bobo, punching Bobo in the nose, striking Bobo on its head with a mallet, tossing Bobo in the air, and kicking Bobo around the room. The non-aggressive adult models played with tinker toys near a Bobo doll but committed no such aggressive acts. Some children were also assigned to a control group that included no adult model at all.

After children watched the models, they were placed in the same room with Bobo and the other toys. Bandura and colleagues (1961) found that children exposed to aggressive models exhibited more aggressive behaviors than those exposed to non-aggressive models or no models. Additionally, children in the non-aggressive condition displayed more non-aggressive play than the children in the aggressive and control groups.

Bandura and the same colleagues then investigated the imitation of film-mediated aggressive models (Bandura et al., 1963). Children were randomly assigned to three experimental groups; in addition there was a control group which was not exposed to any model. The three experimental groups included observation of a real-life model behaving aggressively in live form, observation of a real-life model behaving aggressively on film, and observation of a cartoon character behaving aggressively on film, all using the format depicted in the 1961 study. Bandura and colleagues (1963) found that children who were exposed to film-mediated aggressive models displayed significantly more aggression than the control group, and they concluded that film can also serve as a potential source influencing social behavior.

The mechanisms behind observational learning in social learning theory involve imaginable and verbal representational systems. Modeled sequences of behavior are encoded and stored in the form of mental images; additionally they are verbally coded. Most cognitive processes involved in regulating behavior are primarily verbal and is a likely contributor to the speed at which observational learning can take place (Bandura, 1969). Bandura identified four main principles governing the process of effective observational learning:

1. Attentional processes – individuals must attend to the features of the behavior performed by the model in order to accurately perceive the cues.
2. Retention processes – individuals may use rehearsal and symbolic coding of modeled response sequences to strengthen long-term retention of events.
3. Motoric reproduction processes – individuals physically execute or perform the modeled behavior.
4. Incentive or motivational processes – individuals are more likely to perform the modeled behavior in the midst of favorable incentives or contingencies. Furthermore, children are more likely to imitate modeled behavior that was reinforced rather than behavior that was punished or had no rewarding incentives, even if learning and retention were equivalent across conditions (Bandura, 1969).

In addition to motivation through external incentives, children and adults are also more likely to perform modeled behavior when they are self-motivated to improve behavior. They are also more likely to imitate when they hold beliefs that they are capable of executing the behavior required to produce the desired outcome, otherwise known as perceived self-efficacy (Bandura, 1977, 1997). Self-efficacy, which entails judgments regarding personal capability, is independent from self-esteem, which entails beliefs regarding one's self-worth (Bandura, 1997). Perceived self-efficacy is derived from four sources: performance accomplishments, in which self-efficacy is developed through repeated successes and can generalize to other situations; vicarious experience, in which self-efficacy may be developed through observing others perform a behavior

without adverse consequences and then building expectations that they can also perform the same behavior and receive similar outcomes; verbal persuasion, where individuals are led to believe that they can accomplish a behavior; and emotional arousal, in which self-efficacy is influenced by lower levels of aversive, debilitating arousal (Bandura, 1977). Bandura noted that of these four sources of self-efficacy, performance accomplishments tended to be the most influential in inducing self-efficacy.

The characteristics of the model also influence the likelihood of imitation. Children are exposed to a variety of models, including parents, siblings, teachers, and peers. Bandura (1969) reviewed research documenting that models who are regarded as highly competent, experts, celebrities, or are perceived as having higher social status are more likely to be imitated by both children and adults than models who do not possess these qualities. In addition, real or perceived observer-model similarity can also influence the likelihood that imitation will occur, in that children are more likely to imitate models who exhibit more similar characteristics than those perceived as dissimilar; however, this is most likely to occur when similar models encounter reinforcing outcomes (Bandura, 1969).

Thus, Bandura emphasized that individuals can learn new skills by observing a model without experiencing the behavior firsthand (Bandura, 1969; Hitchcock et al., 2003). Furthermore, when the model is oneself, this strengthens self-efficacy as viewing oneself provides information on how to perform skills that are not yet mastered (Bandura, 1997; Hitchcock et al., 2003).

## **Zone of Proximal Development**

While social learning theory and its influence on VSM has been well-established in the literature, the zone of proximal development (ZPD), as formulated by Vygotsky, has not been discussed as extensively with respect to VSM. Vygotsky (1978) developed the theory of the ZPD under the framework of understanding the general relationship between learning and development and that learning should be matched in some manner with the child's developmental level. The ZPD is the area of potential development between the child's actual developmental level, or what level the child is able to perform independently, and his or her ability to complete tasks with the guidance of an adult or more capable peer (Shabani, Khatib, & Ebadi, 2010; Vygotsky, 1978).

The implications of the theory of the ZPD are that pedagogy should emphasize the learning of skills which the child has not yet mastered but are within reach (Vygotsky, 1978). Thus, the ZPD has formed the basis of the concept of scaffolding in designing instruction and intervention (Shabani et al., 2010), which can be extended to VSM. Assuming that the child is adequately motivated to perform the action, VSM interventions designed to target a skill within a child's ZPD are more likely to be effective than interventions addressing a skill outside the child's ZPD; that is, skills that the child has either already mastered or skills that the child cannot do even with assistance. Furthermore, the acquisition of skills within one's ZPD can be facilitated through the process of jointly creating video footage where the interventionist guides the student through the process of performing the skill, and then, through the magic of

editing, the child views him- or herself performing the skill independently. Thus, VSM involves learning from images of one's own future behavior or success (Dowrick, 1999).

### **Early Uses of VSM**

VSM intervention research initially emerged in the early 1970s. The first instance of the use of the term “self-modeling” was in a case study conducted by Creer and Miklich (1970) on a 10-year-old boy (“Chuck”) who displayed temper tantrums and overstepped personal boundaries with adults while he was in the hospital receiving treatment for asthma. Inspired by Bandura’s work in social learning theory, the researchers had Chuck role play effective social skills while being filmed, and then he later viewed the tape. Creer and Miklich found that while role-playing had no effect on Chuck’s behavior, viewing the videotape of himself did reduce the frequency of inappropriate behavior (Hitchcock et al., 2003).

Another early case study examining the efficacy of VSM within an elementary school setting was conducted by Davis (1979) on an 11-year-old boy (“Eric”) who received special education services in a self-contained setting due to behavioral difficulties. The VSM intervention targeted fighting and defiance towards the special education teacher. During the videotaping phase, the researcher created a videotape addressing fighting by having Eric role play desired behaviors (i.e., Eric chose not to fight and later received praise). The researcher also created a second videotape addressing Eric’s response to the teacher when given a directive (i.e., Eric complied with teacher’s directions and the teacher provided praise). After the videotaping and role playing phase, but before the videotapes were shown, a second baseline was collected

that showed that there was no effect of role playing on the frequency of fighting or defiant behavior. The researcher then had Eric watch the fighting video daily for two weeks and the compliance video for two more weeks. After the conclusion of the intervention, Eric maintained appropriate behaviors other than when a substitute teacher was present. Davis (1979) noted that the teacher was involved throughout the VSM process and that the role playing and videotaping were completed within the classroom environment.

### **VSM Procedures**

As noted above, in the early days of VSM research, investigators (e.g., Creer & Miklich, 1970; Davis, 1979) asked children to perform tasks or role play scenarios in which they were engaged in appropriate behaviors. Limited information was provided back then regarding the nature of the equipment used to create the videos or whether any editing was necessary. Kehle, Clark, Jenson, and Wampold (1986) conducted a study where three out of their four participants (males between ages 10 to 13 years old) viewed an edited videotape, while the fourth participant initially viewed an unedited videotape as a check for internal validity. During the filming phase, the researchers initially asked the children to behave differently than their usual behavior; this directive did not substantially reduce the amount of disruptive behavior exhibited, and so the tapes had to be edited to a significant degree. Each child in the experimental condition watched their edited tape of appropriate behavior, which lasted 11 minutes. The child in the control condition watched an unedited tape that also lasted 11 minutes. Each child watched their tape for five days, and Kehle and colleagues (1986) noted that near the end of the

intervention phase, the children had to be encouraged to watch their tapes because the novelty had subsided and the videos were too long. Nevertheless, the edited tapes yielded significant reductions in disruptive behavior among the three children in the experimental condition. While the unedited tape had no positive effect on the behavior of the child in the control condition, the child later watched an edited tape and his behavior also improved (Kehle et al., 1986).

As more VSM studies were conducted, researchers established general guidelines for implementing VSM interventions, including filming, editing, and viewing the videos which are discussed below.

**The filming phase.** Once the target behavior is established and information has been obtained regarding the function or trigger for the behavior through observations and interviews, the target behavior(s) may be incorporated as scenes in the video. Buggey (2007) suggested creating a storyboard that provided a layout of the scenes to be included in the video. In addition, children may participate in the planning process if they are able.

Depending on the target skill, the nature of a self-modeling video may follow either positive self-review (PSR) or feedforward (Collier-Meek, Fallon, Johnson, Sanetti, & Delcampo, 2012; Dowrick, 1999). PSR is used for a behavior or skill that the participant has previously performed but that is below an optimal level, whether it is newly learned or has not been maintained. PSR has commonly been used to increase desired or adaptive behaviors intermixed with undesirable behaviors; for example, decreasing disruptive behavior or increasing on-task behavior (e.g., Clare, Jenson, Kehle, & Bray, 2000). Another application of PSR may include presenting a positive image to

increase mood. Finally, a third application may be utilized to help participants re-learn skills that are not frequently used; for example, getting reacquainted with the routine of attending school after summer vacation (Dowrick, 1999).

In contrast, feedforward applies to videos depicting a skill not yet acquired or demonstrated, even though the child may have some aspects of that skill in his or her repertoire (Collier-Meek et al., 2012; Dowrick, 1999). Feedforward may be applicable in situations where the child demonstrates appropriate behavior or skills in specific settings but has not yet demonstrated the same skills in a new situation. For example, in cases of selective mutism where the child does not speak at school, he or she may be filmed answering questions freely at home that are asked by the parent, and then the tapes are edited to include the teacher asking the questions (Collier-Meek et al., 2012). Another type of feedforward application entitled the “hidden-support” technique may be used when making videos for participants with anxiety disorders or with physical disabilities. In this technique, physical or emotional support may be provided while making the video and then is removed from visibility during the editing process (Dowrick, 1999). Finally, a fairly common use of feedforward is in situations where skills are combined in new situations, such as learning to read or increasing expressive language. VSM targeting appropriate social skills and behavior using role playing incorporate both PSR and feedforward application (Dowrick, 1999). Within feedforward and PSR, VSM may also employ point-of-view modeling, in which filming is completed with the intention of eliciting the child’s viewpoint. For example, to demonstrate how to play with toys using

point-of-view modeling, the child's hands may be filmed performing the actions with the toy (Hine & Wolery, 2006).

Buggey (2005, 2007) highlighted two key methods for eliciting desirable behaviors within the filming phase of VSM:

1. Prompting the student to exhibit the appropriate behavior through role playing or imitation (Collier-Meek et al., 2012). According to Buggey (2005), this technique is less time-consuming and can work well in VSM interventions in which a child is trying to learn communication or social skills. In addition, children with behavioral difficulties have been able to role play appropriate responses to social situations (Buggey, 2007). In essence, this technique is akin to setting a social story into motion, and the video footage would include the child successfully demonstrating the skill or performing the behavior.
2. Recording the child's natural behavior to capture the student demonstrating the appropriate behavior, and then editing the tape so that only those behaviors are in the final product (Collier-Meek et al., 2012). As one may imagine, this method is more time-consuming; however, it may be necessary for students who may not have the ability or willingness to engage in role-playing activities (Buggey, 2007). While the study conducted by Kehle et al. (1986) attempted to engage the participants to produce desirable behaviors by role playing, the process of acquiring video footage morphed into this method because students did not comply with the directive to "be good."

**The editing phase.** Computer software such as iMovie (found on Macintosh programs) and Movie Maker (within Windows) are free and have greatly facilitated the editing process in depicting positive behaviors (Buggey, 2007). For example, to showcase a skill that a child was not able to complete independently without prompts, such as making a request, the adult creating the video may ask the child to repeat what he or she (the adult) says while the adult provided that request and broke it into smaller segments as needed. In the editing process, the parts of the footage where the adult was speaking would be removed so as to make the footage appear as if the child was independently making the request. Ultimately, most self-modeling videos last between two to five minutes in length; enough time to showcase the behavior while the child maintains attention (Collier-Meek et al., 2012; Dowrick, 1999). Once the video has been made, it may be exported either onto DVD or as a file that can be viewed on a computer.

**The viewing (intervention) phase.** Some researchers had participants view the videos in a private setting (e.g., Clare et al., 2000) while in other studies, students were shown the video in a corner of the classroom (e.g., Buggey, 2005). While any potential impact of the video viewing setting on the efficacy of VSM was not acknowledged by any researchers, Bellini and McConnell (2010) indicated that it was important for the student to be able to concentrate on and attend to the video itself with minimal distractions, including verbal input provided by the researcher; however, it has been deemed acceptable to reinforce or prompt the student to attend.

Several VSM studies included a week-long lapse between filming and viewing the tapes. During that week, researchers continued to collect behavioral data so as to

compare behavior after filming with behavior after viewing. In nearly all of those studies, students only exhibited significant changes in behavior or gains in performance after viewing the movies, not after filming (Buggey, 2007). With regards to the frequency of watching the video, Bellini and McConnell (2010) recommended that feedforward videos may be shown once a day in order to promote developing new skills, while PSR videos may be shown once or twice a week, but that it also depends on the target behavior (Collier-Meek et al., 2012).

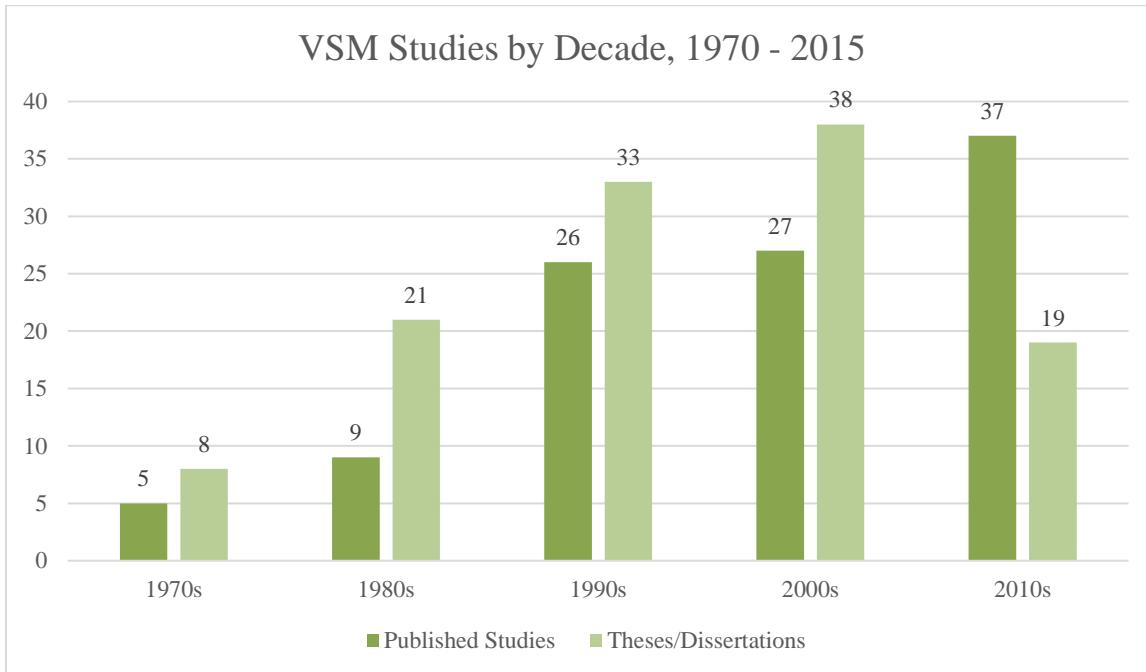
There has been no clear consensus regarding the frequency with which videos should be viewed. However, Dempster (1988) referenced many (non-VSM) studies that demonstrated the spacing effect and its impact on memory and learning. He found that greater learning and longer-term retention occurred when presentation of material was spaced out rather than massed, or crammed together. Inspired by Dempster's ideas, Hartley, Bray, and Kehle (1998) employed spacing between video viewings such that there was at least one day without watching the video interspersed with days in which the students watched the videos. All students significantly improved hand-raising response frequency and were able to maintain those gains after the intervention had concluded, but the researchers noted that this effect was not immediate and may have been attributed to spacing the intervention. While Hartley and colleagues (1998) argued in favor of several, spaced viewings of the video over a single viewing, no other researchers have reached a consensus on the optimal spacing between viewings; in other words, it is unknown whether watching the video every day or every other day impacts learning and retention.

## **Prevalence and Brief Review of VSM Studies**

Many studies have subsequently demonstrated the utility of VSM as a viable intervention across ages and various disabilities (Buggey, 2007). An approximate number of VSM studies conducted through August 2015 was obtained by typing “video self-modeling” in the Google Scholars database and by reviewing meta-analyses and literature reviews that included tables of VSM studies. Only original studies and meta-analyses investigating the use of VSM in some capacity were included, instead of solely video modeling (VM), video adult modeling (VAM), or video peer modeling (VPM), although some studies compared VSM to one of these other modalities. VM is a broader category that is often used to refer to an individual watching a film of another individual serving as the model, while VAM and VPM refer to specific types of other-models depicted in the video. Therefore, from 1970 through August 2015, 104 journal articles and 119 dissertations and theses related to VSM were located (Bellini & Akullian, 2007; Buggey & Ogle, 2012; Gelbar, Anderson, McCarthy, & Buggey, 2012; Hitchcock et al., 2003; Madaus & Ruberto, 2012; Prater, Carter, Hitchcock, & Dowrick, 2012).

Figure 2 shows the frequency of articles disseminated by decade. The numbers provided per decade are higher than Buggey and Ogle (2012) estimated; however, that may be because they excluded studies which included VSM as part of a package of three or more components, while that was not considered in this review. Remarkably, the number of journal articles related to VSM published within only the past five and a half years (37) is slightly greater than half of the total number of VSM-related journal articles published within the previous 40 years (67) and is likely a testament to the increasing

popularity of VSM as a viable intervention, as well as the increased accessibility of technology.



*Figure 2.* Journal articles and theses/dissertations disseminated by decade. The number of theses/dissertations obtained from 1970 – 2010 was taken from Buggey and Ogle (2012), while this author obtained the number of theses/dissertations completed between 2010 and 2015.

**Attention deficit/hyperactivity disorder.** While several studies were published over the last 45 years examining the efficacy of VSM in reducing off-task or disruptive behavior that may be fairly common among children with attention deficit/hyperactivity disorder (AD/HD), two studies were found examining the efficacy of VSM in participants diagnosed with AD/HD and both were published in 1992. Walker and Clement (1992) implemented VSM to target peer relationships and on-task behaviors with six first- and second-grade male students who were all diagnosed with AD/HD.

They created two videos: The “recovery from distraction” video entailed students learning self-controlling statements which they repeated on video. The edited tape showed students providing self-instructions to enable themselves to stay on task and ignore distractions. The “continuous on-task behavior” video included the same content but without self-instruction, and this video had greater impact on improving target behaviors than the first video (Madaus & Ruberto, 2012; Walker & Clement, 1992). Woltersdorf (1992) studied the effects of VSM in reducing target behaviors such as fidgeting, distractibility, vocalization, and math performance among four students aged nine and 10 who were all diagnosed with AD/HD. In this study, a confederate child was included in the video to serve as the distractor. Results indicated a reduction of all target behaviors as well as improved math performance (Madaus & Ruberto, 2012).

**Autism spectrum disorder.** Although the overwhelming majority of VSM studies have been completed with individuals with autism spectrum disorder (ASD), the earliest study found was published in 1995 – 25 years after the first VSM study – and only a few studies were published in the late 1990s. However, VSM research using the ASD population exploded in the 2000s and has persisted to the present date. In total, 38 published studies (37%) were found that included children with ASD as participants. The behaviors targeted within ASD have been heterogeneous, possibly to reflect the diverse symptomatology exhibited within this population (Gelbar et al., 2012). VSM research studies have targeted a variety of skills, such as increasing language and communication skills and reducing tantrums (Buggey, 2005), increasing social engagement and social initiation (Bellini, Akullian, & Hopf, 2007; Buggey, 2012), increasing functional math

performance (Burton, Anderson, Prater, & Dyches, 2013) and decreasing off-task classroom behavior (Coyne & Cole, 2004). Bellini and Akullian (2007) found that studies targeting functional skills tended to yield the highest intervention effects, followed by social-communication functioning and behavioral functioning, based on the percentage of non-overlapping data (PND); however, all three dependent variables yielded PNDs greater than 75 and were all deemed as “effective” interventions (Scruggs & Mastropieri, 1998).

**Developmental delays.** For the purposes of this literature review, studies included in this section were completed with preschool-aged participants identified as eligible for special education services due to developmental delay, which is a special education category recognized by most states. Buggey and Ogle (2012) identified two studies that examined the use of VSM in addressing language delays (Buggey, 1995), and requesting behavior (Hepting & Goldstein, 1996) among preschool children with developmental delays. Both Buggey (1995) as well as Hepting and Goldstein (1996) found that the preschoolers made gains in their linguistic skills after participating in VSM, but the behaviors did not generalize readily to situations beyond what was dictated in the tapes.

Studies examining the use of VSM as a behavioral intervention with preschoolers have yielded more mixed results. Although participants were diagnosed with oppositional defiant disorder rather than a developmental delay, Clark and colleagues (1993) investigated the utility of VSM to reduce disruptive and aggressive behavior among children between the ages of three and six years old, using a reversal design across ten

weeks. In addition, VSM was compared with VPM as well as a control tape. Based on the observations and teacher and parent reports, Clark and colleagues found no significant differences between baseline behavior and behavior after VSM implementation, and VSM was also not shown to be any more effective with this group over peer modeling. While the participants' ages were thought to be a contributing factor to the ineffectiveness of VSM in this study, Clark and colleagues (1993) indicated that additional unknown factors also may have affected the results. Love (2014) completed a thesis on a three-year-old boy receiving early intervention services who was identified as at risk for developing AD/HD. He received a VSM intervention to teach play and adaptive skills. While the VSM intervention was successful in teaching the child to take turns rolling a ball, it was not as successful in getting the boy to sit for longer periods of time, which may either reflect attention towards that video or that the skill may have been beyond the scope of the child's developmental abilities (Love, 2014).

**Emotional and behavioral disorders.** When encompassing the full gamut of externalizing and internalizing disorders, 24 studies examining individuals with emotional and behavioral disorders (EBD) or other psychological issues (e.g., phobias, selective mutism) were published and comprise the second largest group (23%) of VSM studies after ASD. Unlike ASD studies, however, VSM studies that include individuals with EBD and associated conditions were conducted since the beginning of VSM research. Since a wide variety of diagnoses fall into this category, the behaviors targeted through VSM also varied, ranging from compliance (Axelrod et al., 2014), improving self-concept (Schaefer, 2015), remediating selective mutism (Pigott & Gonzalez, 1987)

and reducing disruptive or inappropriate behaviors including behaviors such as out-of-seat behavior, arguing with teachers or peers, hostile or aggressive behavior, and exhibiting self-injurious behavior (Baker, Lang, & O'Reilly, 2009).

For example, Possell, Kehle, McLoughlin, and Bray (1999) used VSM to reduce disruptive behavior by involving the participants in the design and editing of the videos as an attempt to enhance motivation, making more than one video per student to maintain interest and attention as well as enhance generalizability, and spacing the viewing of videos by at least two days (Dempster, 1988). Possell and colleagues found that the eight-year-old participants significantly reduced disruptive behavior, whereas there were no significant changes among the five-year-old participants; the authors noted that the older students were able to select appropriate footage for removal during the editing process, whereas the younger students were not able to do the same (Possell et al., 1999).

**Intellectual (cognitive) disabilities.** Two studies examining VSM as an intervention for children identified as having cognitive disabilities were conducted between 1970 and 2010 (Buggey & Ogle, 2012). For example, Brown and Middleton (1998) examined the use of VSM in reducing and maintaining the reduction of self-stimulation (i.e., hand-flapping) behaviors in a child with an intellectual disability and found that it was as effective at achieving the desired effects as overcorrection. Since 2010, eight studies (one dissertation/thesis) were conducted that included participants with intellectual disabilities; however, five of those studies included participants who had comorbid diagnoses of autism spectrum disorder. While the targeted goal often involved improving functional skills (e.g., Appleby, Johnson, Bowens, Franco, & Reece, 2015),

Bilias-Lolis, Chafouleas, Kehle, and Bray (2012) investigated the utility of VSM in reducing disruptive behavior among three adolescents with intellectual disabilities, which included angry outbursts, intrusive behavior, poor boundaries, and non-compliance. The researchers created five intervention tapes that included appropriate classroom behavior and were watched over the span of ten days.

**Learning disabilities.** Although several studies were conducted between 1970 and 2010 examining the efficacy of VSM in addressing academic deficits, only one study (i.e., Hitchcock, Prater, & Dowrick, 2004) was found where the majority of participants were identified as having learning disabilities, specifically reading disabilities, and where VSM targeted reading (Buggey & Ogle, 2012; Prater et al., 2012). Another study examined off-task behavior where two of the participants also were diagnosed with “severe” learning disabilities (Clare et al., 2000). Since 2010, three studies (two theses/dissertations) have examined the use of VSM in improving academic skills among students identified with learning disabilities. Decker and Buggey (2012) compared the effectiveness of VSM and VPM in improving oral reading fluency among children with learning disabilities. One study utilized participants who were diagnosed with dyslexia (Maguire, 2015), while the other study targeted writing skills among students identified as having specific learning disabilities and was the only VSM study found addressing written language (Miller, 2013). Interestingly, more VSM studies were found targeting reading performance among students identified as at-risk for developing reading disabilities (see upcoming section) or among students identified as having other disorders (e.g., emotional disabilities, autism) than among students actually diagnosed with reading

disabilities. No studies were found in the past and present examining the use of VSM in targeting math performance among students with learning disabilities in math including dyscalculia, although a couple of studies did investigate math improvement using VSM among students with other diagnoses (e.g., intellectual disabilities).

**Physical disabilities.** Buggey and Ogle (2012) identified two studies conducted between 1970 and 2010 that addressed VSM focusing on physical disabilities, including teaching a girl with cerebral palsy to lift her legs when walking (Dowrick, 1983) and teaching children with spina bifida to swim (Dowrick & Dove, 1980). Since 2010, one study (a thesis) was conducted using preschoolers who all had physical delays in development in which the intervention addressed the use of walkers (Smith, 2014).

**Speech language disorder.** Two studies addressing participants with speech language disorders (excluding selective mutism and speech/language delays associated with other disorders) were conducted between 1970 and 2010 (Buggey & Ogle, 2012). One study addressed stuttering while the other study addressed grammar and language use, and all participants were either adolescents or adults. Since 2010, one study examined the use of VSM with voice disorders by replacing coarse speech with “cleaner, healthier speech” that resembled the participant’s original voice (Shen, Ti, Cheung, & Patel, 2015).

**Traumatic brain injury.** One study addressing participants with traumatic brain injury (TBI) was completed prior to 2010 and addressed using VSM to improve cooking performance (Buggey & Ogle, 2012; McGraw-Hunter, Faw, & Davis, 2006). All of these participants were adults; no studies were found examining the use of VSM with children

or adolescents who experienced TBI. Since 2010, no studies have been found addressing the use of VSM in addressing skills of participants (children, adolescents, or adults) who have experienced a TBI.

**No identified disabilities.** Typically developing participants are individuals identified as having no developmental disabilities or developmental delays. Buggey and Ogle (2012) identified five studies published prior to 2010 that included participants with no identified developmental delays or disabilities that addressed improving behaviors. For example, Hartley, Bray, and Kehle (1998) used VSM to improve classroom participation among students within the general education setting who had no identified disabilities or significant academic deficits but were identified by their teachers as displaying too much off-task behavior. Schwan and Holzworth (2003) used VSM with 13 regular and special education students who all exhibited disruptive classroom behavior, and this study included a control group of thirteen participants who did not receive VSM. While they found that inappropriate behavior decreased more in the VSM group than in the control group, the authors did not provide demographic information regarding the sample of participants in special education, nor did they indicate whether any differences occurred among the regular and special education groups or whether that variable was controlled. In addition, the sports psychology literature includes studies examining the use of VSM among typically developing individuals to improve self-efficacy and athletic performance in gymnastics (Winfrey & Weeks, 1993) and volleyball (Zetou, Kourtesis, Getsiou, Michalopoulou, & Kioumourtzoglou, 2008). Since 2010, one study was

completed to investigate the use of VSM within gymnastics to improve self-regulatory processes (Ste-Marie, Rymal, Vertes, & Martini, 2011).

**At-risk students.** Slavin, Karweit, and Madden (1989) defined “at-risk” students as individuals whose intelligence may be within normal limits but who are not acquiring the basic skills necessary to achieve in school and in life, and may include students eligible for special or compensatory education. For the purposes of this literature review, at-risk students include individuals as described by Slavin and colleagues but excluding individuals identified as having disabilities and/or who receive special education services. They may, however, be enrolled in compensatory or intervention programs outside the purview of special education.

Buggey and Ogle (2012) referenced one three-part study conducted prior to 2010 in which participants included children who experienced difficulties with math achievement (Schunk & Hanson, 1989). Schunk and Hanson indicated that the children were all enrolled in “below grade level” classes as their mathematics scores were below the 35<sup>th</sup> percentile on a standardized achievement test, but none of the children received special education services. Additionally, one of the four participants in Hitchcock and colleagues’ (2004) study was at risk in the area of reading, and while the other three children were in special education, participation in the VSM intervention yielded similar improvements for all participants. Since 2010, three studies have examined the use of VSM in addressing reading achievement among students identified as at-risk in the area of reading. One study (Ayala & O’Connor, 2013) investigated the use of VSM in improving reading decoding skills among ten first grade students who had responded

poorly to a Tier 2 reading intervention within RTI. The other two studies (Montgomerie, Little, & Akin-Little, 2014; Robson, Blampied, & Walker, 2015) examined VSM in improving oral reading fluency and comprehension.

Only one study was found examining the use of VSM in addressing problem behavior with students on Tier 2 of RTI. Bales (2010) completed a thesis in which she investigated the use of VSM as an intervention to decrease off-task behavior among two elementary-aged students. Bales conducted a functional behavior assessment on both students to gain specific information regarding the nature of the off-task behavior as well as previous interventions attempted within Tier 1; this information was collected through a teacher interview. For example, one of the students exhibited off-task behavior throughout most of the school day, but was least likely to occur when the teacher worked individually with him. Furthermore, consequences included gaining teacher and peer attention and escape from difficult and/or non-preferred tasks. Bales (2010) found that one of the students made gains in on-task behavior after participating in the VSM intervention, while the other student did not. The former student was a first grader who indicated that he enjoyed watching his video. The latter student was a sixth grader who indicated that he did not enjoy watching his video because he watched it too much. Bales noted that the videos were edited to portray skills of exhibiting on-task behavior that the students had not yet achieved which may have been within the older student's awareness and contributed to his lack of enjoyment watching the video. On the other hand, she also noted that the older participant was more aware of the videotaping process, and his on-task behavior caught on tape may have been "putting on a show" or pretending to be on-

task, which could have impacted his motivation to improve his behavior (Bales, 2010).

Lastly, the duration of intervention implementation was shorter for the older student which may have also impacted the effectiveness of his results.

### **Application of VSM within the School Setting**

Hitchcock and colleagues (2003) identified and reviewed 18 studies that investigated the use of VSM to address academic and behavioral skills within the school setting among students with disabilities and students who were at risk. The studies generally yielded moderate to strong outcomes in increasing the rate or frequency of desired classroom behavior skills and academic performance. Furthermore, Hitchcock and colleagues (2003) found that improvements were maintained over time and, aside from a couple of studies (i.e., Davis, 1979; Possell et al., 1999), the effects of VSM were found to generalize to different settings and situations.

In spite of the potential that VSM has as a viable school-based intervention through research, VSM is still under-utilized in practice. Intervention teams may gravitate toward selecting interventions that are perceived as easy to implement without considering the effectiveness of the intervention (Bellini & McConnell, 2010). Although Hitchcock and colleagues (2003) noted that VSM was time- and cost-effective, VSM was not regularly implemented in the schools due to limited exposure and training, perceived difficulty in producing and editing videos, and perceived limited time and resources, including lack of access or ability to purchase equipment (Buggey, 2007; Collier-Meek et al., 2012). However, as technology has become more accessible with the advent of smartphones and tablets, as well as editing software to streamline the editing process,

many of these technological barriers have been reduced or removed (Bellini & McConnell, 2010). This may explain why the prevalence of VSM studies drastically increased in the 2000s and 2010s.

### **What Makes VSM Effective?**

Researchers generally agree with Bandura's (1969) assertion that observational learning requires the learner to attend to the model and have found it applicable to VSM (Bellini & Akuillian, 2007; Buggey, 2005). Factors such as the novelty of the video and watching oneself on film help to facilitate attention. On the other hand, it can be more difficult for children to attend to videos that exceed five minutes, particularly if they are either very young or if they have more difficulty sustaining attention than expected for their chronological age. In addition, children who are susceptible to distractibility and who have more difficulty focusing attention may need to be prompted to continue watching the video. However, the impact of attending to the video has not been thoroughly investigated in VSM research.

Dowrick (1999) proposed that in cases where the goal of VSM is to increase consistent performance of an adaptive skill (i.e., PSR), students may find that watching themselves successfully engaging in that adaptive behavior increases the chances that they will perform that behavior in the future, a component found in social cognitive theory (Bandura, 1977). Furthermore, when a targeted behavior or skill is role-played and captured on film, the process of viewing the video likely enables the student to consolidate learning and help it become context independent (Dowrick, 1999). Buggey (2007) also acknowledged the role that memory played in applying the skill depicted in

the video. For example, he conducted a study on students with ASD who engaged in tantrums prior to participating in VSM intervention. The videos depicted the children engaging in more appropriate responses to situations that typically triggered tantrums. Not only did the tantrums decrease significantly, but the teachers also reported that when they caught the students in the beginning stages of a tantrum, they would make comments like “whoops” and then cease the behavior (Buggey, 2007). Most school-based VSM studies have established that the skills acquired as part of the intervention were maintained as well as generalized to other settings or situations (Hitchcock et al., 2003).

In addition to memory consolidation, VSM effectiveness and generalizability may also be impacted by one’s motivation to acquire and apply the skill (Buggey, 2007). The behavior or skill depicted in the video must have value to the individual engaging in the self-observation, and perceived self-efficacy can also increase motivation to carry out a skill (Bellini & Akuillian, 2007; Dowrick, 1999). In situations where the child is distressed because he or she is not grasping a skill, it may certainly be motivating to view oneself performing the skill on video. However, motivation to learn a new behavior may be more tenuous in situations where the child reaps benefit from engaging in the inappropriate behavior (e.g., proactive aggression), and the burden is then on the interventionist to show how the appropriate behavior will meet the child’s needs more effectively than the inappropriate behavior. While watching videos of themselves can be an enjoyable activity for many children, and thus motivating, very little research has thoroughly investigated the role motivation plays in the implementation of VSM interventions, particularly in cases when VSM was not effective.

While VSM research has demonstrated effectiveness in a majority of studies, a few studies have yielded mixed or less favorable results. For instance, as noted earlier, Clark and colleagues (1993) found that VSM was not as effective with preschool-aged children at reducing aggressive and oppositional behaviors, and they attributed the results to the cognitive capacities that they believed the children had due to their age. In other cases, VSM may not have been as effective when the children were not motivated to change their behaviors or did not attend to the salient components of the video. Feedforward VSM techniques may not be as effective in cases when the “future” skill depicted within the video was not within the child’s ZPD, and so it is essential to have working knowledge of the child’s current developmental levels (Buggey, 2007).

### **Chapter Summary**

Aggression is behavior that is intended to invoke pain or hurt another individual. Aggression may be initiated in order to achieve a goal, or it may be enacted as a response to perceived hostility (Connor, 2002). While genetics and other prenatal factors may contribute to the predisposition to engage in aggressive behavior, research suggests that aggression is influenced by maladaptive social information processing mechanisms as well (Li et al., 2013). Parenting has also been examined as a contributing factor to aggressive behavior, such that those who have high risk of continuous aggressive behavior have parents who may not have or consistently enforce expectations of appropriate behavior. Furthermore, parents who are aggressive are likely to have children who engage in aggressive behavior through observational learning (Bandura, 1969).

Effective prevention and early intervention programs targeting aggression are crucial, as they help to reduce health care and prison costs in the long term (Connor, 2002). Responses to intervention (RTI) as well as positive behavior supports (PBS) have enabled educators to implement interventions early within the school setting, before children are identified as having disabilities or fall through the cracks. Efficacious interventions to address aggression range along a continuum, from school-wide interventions at the universal or primary level to individualized interventions at the tertiary level. These interventions incorporate a variety of techniques such as modeling, coping strategies, problem solving, and discussion about various social situations. However, few Tier 2 or secondary level interventions exist that target aggressive behavior in young children, and those that do exist may not be feasible to implement within the school setting or require an intensive time and financial commitment.

Video self-modeling (VSM) has been found to be a viable intervention for addressing a variety of behaviors among students with and without identified disabilities. Like many other interventions described in this chapter, VSM is based on social learning theory (Bandura, 1969) as well as the zone of proximal development (Vygotsky, 1978). VSM has been used to reduce aggressive behavior among children with disabilities, but its efficacy at preventing or reducing aggression among children identified as at risk has not previously been examined in the literature.

## CHAPTER III

### METHOD

This chapter will present the proposed research design utilized to test the research questions as well as a discussion of the participants, procedures, measures, and data analysis. This study was completed within a research team that has investigated the efficacy of video self-modeling with various populations. Approval for this study was provided by the university's Institutional Review Board (IRB) as well as by the superintendent and the school district personnel in the participating school district.

#### **Participants**

Participants nominated by their teachers were recruited from a suburban school district in North Texas. According to the information provided on the district's school report cards which were obtained from its website, this school district had a total enrollment of approximately 4,003 students in the 2014-2015 school year and was comprised of three elementary schools, a middle school, and a high school. Participants attended two of the three elementary schools (Elementary A and B). In 2014-2015, Elementary A enrolled 553 students, while Elementary B enrolled 721 students. Table 2 displays a side-by-side comparison of demographic information for the two elementary schools, the district, and the state of Texas. Compared with the state of Texas, this school district had a larger Caucasian population; smaller Hispanic, African American, and Asian populations; and a larger bi- or multi-racial population. In addition, fewer students in this district were identified as economically disadvantaged, but more students were

found eligible to receive special education services. Interestingly, the demographic makeup of the two elementary schools differed from one another. Elementary A had a larger African American population and a smaller Hispanic population, but what was most notable was that its proportion of students who were economically disadvantaged and who received special education services were both consistent with that of the district. In contrast, Elementary B included a considerably larger body of students classified as economically disadvantaged and a smaller percentage of students classified as eligible for special education services, both of which mirrored the demographics of the state of Texas.

Table 2

*Demographic Makeup of the Participating Schools, District and the State of Texas*

	Elem. A	Elem. B	District	State
<b>Race/Ethnicity</b>				
African American	10.8	5.7	7.0	12.6
Hispanic	21.7	33.4	26.6	52.0
Caucasian	56.6	52.6	58.2	28.9
Native American	1.4	1.0	0.9	0.4
Asian	2.4	1.5	2.2	3.9
Pacific Islander	0.2	0.0	0.1	0.1
Bi- or Multi-racial	6.9	5.8	4.9	2.0
<b>Student Group</b>				
Econ. Disadvantaged	35.1	55.8	37.9	58.8
Special Education	11.8	9.2	11.0	8.5

*Note.* Numbers reported in percentages.

All kindergarten, first, and second grade students (ages five to eight years old) without a special education eligibility were given the opportunity to participate; this

grade range was selected in order to ensure the provision of preventative and early intervention services. During the recruitment process, teachers were provided descriptions of behaviors on the aggression observation form (i.e., physical aggression such as grabbing or pushing and verbal aggression such as teasing; see Appendix F) and were asked to nominate one or two students who were most likely to exhibit any of these behaviors. Fourteen participants were initially recruited via teacher nomination and consented to participate in the VSM intervention. As this study was examining VSM as a secondary prevention tool, participants who were identified as eligible for special education services due to any disability were not eligible for the study. After the baseline data were collected, 2 out of the 14 participants were found eligible for special education services; because they no longer met inclusion criteria of having no disability warranting special education, they were withdrawn from the study. Participants were not excluded if they were receiving additional non-special education interventions as those were available to all students at the campuses who were in need. All participating teachers reported implementing classroom-based interventions periodically (e.g., redirection, time-outs, etc.) with the participants; however, only one participant (i.e., RK) was reportedly receiving school-based counseling services in addition to participating in the study.

Of the remaining 12 participants, four more participants received the intervention but were removed from the data analysis due to incomplete observation data; thus the remaining eight participants were included in the analysis. Five participants attended Elementary A while the other three participants attended Elementary B. Table 3 provides

the demographic makeup of the eight participants. All eight participants yielded complete observation data and teacher rating scales at baseline and at intervention. Five of the eight parents completed the BRIEF and SSIS at baseline, and four of the eight parents completed the BRIEF and SSIS at intervention. Each parent completed the rating scales during at least one of the phases (i.e., no participant had a complete absence of rating scales), but only JS and LN's parents completed both rating scales during both phases.

Table 3

*Demographic Makeup of Participants*

Participant	Gender	Grade	Age	Ethnicity	School
JS	Male	K	5	White	A
LN	Male	K	6	White	A
MJ	Male	K	5	Biracial	A
SR	Male	2	8	White	A
RK	Male	2	8	White	A
AH	Female	K	5	White	B
CG	Male	K	6	White	B
SJ	Male	K	5	White	B

**Ethical Considerations**

Informed consent was obtained from the parents, as well as the students' teachers, stating that they understood the nature of the project and their role in the study (see Appendices G and H). Parents provided consent on behalf of their children participating

in the VSM intervention as well as their own involvement; teachers provided consent for their own involvement in the VSM intervention, both of which will be discussed shortly. Parents and students were provided information regarding the nature of the VSM intervention and that if they chose to participate, they could withdraw from participation at any time. Parents were informed that each VSM intervention video would be accessible as a DVD to their child, his/her teacher, the investigator, and the parents, and that the raw footage would be maintained by the investigator. Parents also elected one of three options at the conclusion of the intervention: receiving a copy of their child's video while the investigator keeps a copy of the video for educational purposes; receiving a copy of their child's video while all other copies are destroyed; or all copies of their child's video are destroyed after the completion of the research study. In addition, the students who participated also provided assent and were offered minor incentives such as prize box rewards for participating in the study.

Every effort was made to maintain confidentiality of study records. All participants were assigned an identification number which appeared on all pre-intervention and post-intervention documents. All documents with identifiable information (i.e., the consent forms) were kept in a filing cabinet in a locked room. Data obtained from the participants during the study were entered into a Microsoft Excel database which was password protected and organized based on the participants' identification number. Only this author and other study designees had access to the data and to the codes.

## **Procedures**

This study utilized a multiple-baseline AB research across subjects design.

According to Dugard, File, and Todman (2012), this design is appropriate when there are at least two participants, the intent of the study is to test the effectiveness of an intervention, a series of observations is possible for each participant before and after the intervention, and it is possible to choose the intervention point at random for each participant. A multiple-baseline design also allows for demonstration of any effects within and across participants (Horner et al., 2005). For the current study, the introduction of the independent variable (IV; the VSM intervention) was staggered across multiple participants so that any changes in the dependent variable (DV; aggressive behavior) that occur only when the IV is introduced would provide stronger support for the hypothesis. One of the main limitations of utilizing a multiple-baseline AB research design was that the VSM intervention would be withheld for a certain period of time for all except the first participant, even though they would eventually receive the intervention (Smith, 2012). Another potential limitation or issue may involve when participants are selected to receive the treatment if it is based on need rather than random determination (Kratochwill et al., 2013). For example, if the most aggressive participant was selected to receive the intervention first, then the external validity may be affected. In this case, however, participants were grouped based on grade and school – the kindergarten students at Elementary A (i.e., JS, LN, and MJ) received the intervention first, followed by the second graders at Elementary A (i.e., RK and SR), and then the kindergarten

students at Elementary B (i.e., AH, CG, and SJ). The participants were grouped in this manner due to accessibility.

Once the parents and teachers provided informed consent and the participants provided informed assent, the study proceeded through several phases: the baseline phase, the intervention phase which comprised the filming and viewing phases, and the post-intervention phase. The baseline phase essentially represented the “control” condition for each participant as it was intended to elicit a representative sampling of behavior prior to manipulating the IV (Smith, 2012). Progress monitoring occurred throughout the baseline and post-intervention phases.

### **Baseline Phase**

The baseline phase began by obtaining information from the teacher and the parent. The teacher interview form is presented in Appendix A and the parent interview form is presented in Appendix B. The teacher and parent interviews took place prior to observing the student, as the information gleamed from those interviews determined some of the logistics of the observation. The purpose of the teacher interview was to narrow down a specific target behavior to be changed through the VSM intervention, and so questions were provided with the intent of seeking information with regards to the frequency, duration, and intensity of the target behavior, as well as the teacher’s perceptions of when the target behaviors were most likely to occur. The purpose of the parent interview was to determine whether the parent perceived the participant exhibiting similar behaviors at home (including frequency, duration, and intensity) as well as to obtain information on how the parent addressed the behavior.

In addition to the baseline interview, both parents and teachers completed standardized assessments, including the Social Skills Information Schedule (SSIS; Gresham & Elliott, 2008) and the Behavior Rating Inventory of Executive Function (BRIEF; Gioia, Isquith, Guy, & Kenworthy, 2000). The SSIS and the BRIEF were selected to provide quantitative information regarding the perceptions of the teacher and parent with regards to the participants' behavior and skills before and after the intervention. Specifically, the SSIS provides information regarding social competence as well as the degree to which problem behaviors occur. The BRIEF provides information regarding executive functioning skills, which can influence how a child manages frustrating situations. More in-depth information on the SSIS and BRIEF are discussed in the Outcome Measures section of this chapter.

Each participant was then observed a minimum of four times prior to the filming phase, which exceeded the minimum requirement of three data points recommended by What Works Clearinghouse as well as Division 16 of the American Psychological Association, the latter of which represents school psychology (Kratochwill et al., 2013; Smith, 2012). Since lunch and recess were less structured times of the day in which children were more likely to socialize, behavior was observed in those settings unless the information provided in the teacher interview indicated that observation within a different setting (i.e., the classroom) would be more appropriate. This was the case for all three students at Elementary B (i.e., AH, CG, and SJ), who were observed at lunch and in the classroom. Fifty percent of observations were conducted with a co-rater in order to obtain inter-rater reliability. Additional information about these measures is discussed in the

Outcome Measures section of this chapter. Taken together, this information was utilized to determine baseline frequency and severity of aggressive behavior targeted for the VSM intervention as well as form SMART goals (see Appendix I), which are described by O'Neill (2000) as strategic, measurable, attainable, results-oriented, and time-bound.

### **Intervention Phase: Filming and Viewing**

After the baseline phase was completed with each participant, the filming phase commenced in which participants met with the investigator for several sessions in groups of two or three. The first session consisted of planning the video with the participant in which a storyboard outlining the movie was created as suggested by Buggey (2007). This storyboard included at least one scenario in which the participant exhibited an appropriate behavior that replaced aggression. Videos were constructed using either positive self-review or a feedforward application (Dowrick, 1999).

The second session consisted of role playing or rehearsing the skills that would ultimately appear in the video. During this session, the camcorder used to film the participant was present but turned off so that the participant would be comfortable working in its presence. The third and fourth sessions consisted of filming the participant. To simulate social situations, other peers participating in the study appeared in a student's video.

Between the fourth and fifth sessions, the video footage was edited using Movie Maker and iMovie software (Collier-Meek et al., 2012) and burned onto a DVD. During the fifth session, the participant watched his or her video for the first time in a quiet setting with minimal distractions, as recommended by Bellini and McConnell (2010). All

of the teachers determined where and when the participants would watch their videos, once every day for 10 consecutive school days. Treatment integrity was obtained through a movie watching checklist which the teacher completed as the child watched the film. The checklist also included a mutually agreed upon reinforcer that the child received after he or she watched his/her movie for 10 days. An example of the checklist is included in Appendix E. This component of the intervention phase lasted approximately four weeks for filming and editing and two weeks for viewing. Finally, the sixth session concluded by discussing the positive behavior and how to generalize that behavior to new settings.

The videos for each participant demonstrated the target behaviors which were derived from the SMART goals. For example, MJ's parents and teachers indicated that he was most likely to react aggressively by yelling and screaming when he was not first in line. So in his video, MJ is shown in different clips where he is standing and walking quietly in line, including when he was first. LN's target behaviors reflected maintaining boundaries as he tended to grab other students either in line or at recess and play wrestle with them. His video also showed positive examples of him standing quietly in line and maintaining boundaries with other students. SR's target behaviors also reflected difficulties maintaining boundaries as he would grab other students or push them during recess, so his video had various scenarios where he addressed other students in a prosocial manner (i.e., greeting them, asking them to play, and so forth).

### **Post-Intervention Phase**

After the intervention phase concluded, the post-intervention phase began. The data collected during the baseline phase (i.e., parent and teacher rating scales, interviews

with parent and teacher [see Appendix C and D], and at least four observations per student) were also collected during the post-intervention phase. The purpose of the interviews was to provide qualitative information on whether positive change in behavior had been observed within the school or home setting. The standardized rating scales were provided to determine whether any quantitative changes occurred. As in the baseline phase, at least two of the four observations were conducted with another rater to obtain data on inter-rater reliability.

## **Outcome Measures**

### **Direct Observations**

As stated, one method for measuring changes in the DV is to conduct direct observations of the participants. Direct observations are a popular method of evaluating change in the DV as they are more sensitive to detecting changes over time (Smith, 2012). All observational data were collected using the form provided in Appendix F which includes operational descriptions of aggressive behavior. Each participant was observed at one-minute intervals for a total of 30 minutes and the presence or absence of aggressive behavior was recorded. The form also included additional codes to specify the type of aggressive behavior that occurred. A comparison peer of the same gender was also observed and coded similarly during every three-minute interval.

While a minimum of four observations was conducted per participant per phase, 50% of observations in each phase were conducted with a co-rater to assess inter-observer agreement, as recommended by Kratochwill and colleagues (2013). The author and two graduate students were the “lead” observers for all participants, and two more

research team members (one undergraduate and one graduate student) were co-raters. Prior to conducting observations, all observers were trained with video vignettes of children obtained through YouTube to practice using the observation form. Although the participants were observed by different researchers (i.e. participants at Elementary A were observed by a different dyad than participants at Elementary B), each participant (and comparison peer) was observed by the same dyad during the baseline and post-intervention phases.

Since the ratings obtained were on a nominal scale (i.e., rating the presence or absence of aggressive behavior), inter-observer agreement was computed using both percent agreement as well as Cohen's (1960) kappa statistic. As there are strengths and limitations to using both percent agreement and Cohen's kappa, McHugh (2012) recommended calculating both statistics. Percent agreement is simply the number of observations in which the raters agree divided by the total number of observations, and values range from 0%, or 0.00 (no agreement) to 100%, or 1.00 (perfect agreement). Agreement levels of at least 80% are considered acceptable (Kratochwill et al., 2013). Cohen's kappa measures the percentage agreement when agreement due to chance is removed (e.g., random guessing) and is a more conservative estimate of agreement than percent agreement (McHugh, 2012). Cohen's kappa was computed using Microsoft Excel. Values ranged from -1.0 (perfect disagreement) to +1.0 (perfect agreement), with a value of 0 indicating random agreement (Hallgren, 2012; McHugh, 2012; Wood, 2007). Wood (2007) noted that a kappa value of .60 and higher would be considered an acceptable standard of agreement for research purposes and that kappa values should

likely be at least .80 for applied decision-making purposes. McHugh (2012) provided the following guidelines for interpreting Cohen's kappa, which was used in this study to inform decisions regarding baseline levels and the efficacy of the intervention for each participant: 0 - .20 (no agreement), .21 - .39 (minimal agreement), .40 - .59 (weak agreement), .60 - .79 (moderate agreement), .80 - .90 (strong agreement), above .90 (almost perfect).

### **Social Skills Improvement System**

The Social Skills Improvement System (SSIS) rating scales (Gresham & Elliot, 2008) are designed to evaluate the frequency of social skills, competing problem behaviors, and academic competence among children ages 3 to 18 years old. The SSIS can be completed by teacher, parent, or student and takes about 15 to 20 minutes to complete. In this study, the SSIS was distributed to the teachers and parents of each participant during the baseline and post-intervention phases. The teacher elementary form has 57 items and the parent form has 49 items (Gresham, Elliott, Vance, & Cook, 2011). The teachers and parents rated the frequency of participants' behavior on a 4-point Likert scale (never, seldom, often, and almost always). The Social Skills scale is comprised of subscales measuring communication, cooperation, assertion, responsibility, empathy, engagement, and self-control. The Problem Behavior scale consists of subscales measuring externalizing, bullying, hyperactivity/inattention, internalizing, and autism spectrum characteristics. The Academic Competence scale is found on the teacher form of the SSIS and includes items pertaining to student performance in reading, math, motivation, parental support, and general cognitive functioning (Gresham & Elliott,

2008; Gresham, Elliott, Cook, Vance, & Kettler, 2010). Responses on the SSIS generate standard scores ( $M = 100$ ,  $SD = 15$ ) on all subscales and composites. Higher scores on the Problem Behaviors scale (i.e.,  $SS > 115$ ) reflect endorsement of more problematic behaviors than would be expected for that child's age. Lower scores on the Social Skills and Academic Competence scale (i.e.,  $SS < 85$ ) reflect endorsement of fewer social skills or academic competency compared to the average for individuals in his or her norm group.

According to the manual, the SSIS was normed on approximately 4,700 children aged 3 to 18 years old across 34 states and Puerto Rico, with demographics intended to represent the United States population in 2006 by gender, race/ethnicity, socioeconomic status, and geographic region (Gresham & Elliott, 2008; Gresham et al., 2011). The teacher form was normed on 550 children (275 boys; 50% of the sample) ages 5 – 12, and the parent form was normed on 2,000 children (1,000 boys; 50% of the sample) ages 5 – 12.

The SSIS presents with good psychometric properties. The test-retest reliability estimates for the Total Social Skills score was .82 for teachers and .84 for parents. Test-retest reliability for the Total Problem Behavior scores were .83 for teachers and .87 for parents, and test-retest reliability for each of the subscales ranged from .75 to .86 for the teacher form and .72 to .87 for the parent form (Gresham & Elliott, 2008; Gresham et al., 2010). Internal consistency reliability for the Social Skills and Problem Behavior composites on both teacher and parent forms in the 5 – 12 age group was strong ( $\alpha = .95 - .97$  on the teacher forms;  $\alpha = .94 - .95$  on the parent forms). Although the main

composites showed stronger reliability, the subscales on both forms demonstrated good internal consistency reliability as well ( $\alpha = .78 - .93$  on the teacher forms;  $\alpha = .74 - .89$  on the parent forms; Gresham et al., 2011). This sample yielded all excellent internal consistency reliability ( $\alpha = .90 - .94$  on both teacher and parent forms).

The SSIS also demonstrated satisfactory validity. Subscales comprising the Social Skills scale on both teacher and parent forms were moderately to highly correlated with one another, but their strongest relationships were with the Social Skills composite; the same was found with the Problem Behaviors scale on both forms (Gresham et al., 2010). When compared with other rating scales such as the Behavior Assessment System for Children – Second Edition (BASC-2), the Social Skills Rating System (SSRS), and the Vineland Adaptive Behavior Scale – Second Edition (Vineland – II), the SSIS demonstrated moderate to high concurrent validity (Gresham et al., 2010). Gresham et al. (2010) found that teachers and parents were most likely to agree with one another in the areas of externalizing and hyperactivity problem behavior, whereas they were less likely to agree in the areas of internalizing and bullying problem behavior.

### **Behavior Rating Inventory of Executive Function**

The Behavior Rating Inventory of Executive Function (BRIEF) rating scales (Gioia et al., 2000) are designed to evaluate executive function behaviors in the home and school environment among children ages 5 to 18 years old. The BRIEF can be completed by teacher, parent, or student and takes about 10 to 15 minutes to complete. In this study, the BRIEF was distributed to the teachers and parents of each participant during the baseline and post-intervention phases. The teachers and parents rated the frequency of

participants' executive functioning on a 3-point Likert scale (never, sometimes, and often). The teacher and parent forms each have 86 items which generate eight clinical scales as well as the Behavioral Regulation Index, Metacognitive Index, and the Global Executive Composite (Gioia et al., 2000). The Global Executive Composite provides an overall representative picture that incorporates all clinical scales. The Behavioral Regulation Index measures how well the rated child can shift cognitive set and modulate emotions and behavior through appropriate inhibitory control, and is comprised of the Inhibit, Shift, and Emotional Control subscales. The Metacognition Index measures how well the rated child can cognitively self-manage tasks, monitor performance, and problem solve in a variety of contexts, and is comprised of the Initiate, Working Memory, Plan/Organize, Organization of Materials, and Monitor subscales (Gioia et al., 2000). Responses on the BRIEF generate standard scores ( $M = 50$ ,  $SD = 10$ ) on all subscales and composites. Higher scores (i.e.,  $T > 65$ ) reflect significantly elevated levels of executive dysfunction (Gioia et al., 2000). In addition, two scales (Inconsistency and Negativity) are provided to assess validity of rater responses.

According to the manual (Gioia et al., 2000), the BRIEF parent form was normed on 1,419 normative children and adolescents (604 boys; 42.6% of the sample) and 852 children and adolescents with clinical diagnoses (583 boys; 68.4% of the sample) such as learning disabilities or attention deficit hyperactivity disorder (ADHD). The BRIEF teacher form was normed on 720 normative children and adolescents (317 boys; 44.0% of the sample) and 475 children and adolescents with clinical diagnoses (331 boys; 69.7% of the sample) such as those described above. The demographics for both forms were

intended to represent the United States population in 1999 by gender, race/ethnicity, and socioeconomic status (Gioia et al., 2000). However, one of the limitations of the BRIEF is that the standardization sample was obtained from many public and private schools all within the state of Maryland, rather than from all 50 states in the country; thus, there may be cultural differences between geographic regions in the United States (e.g., Maryland and Texas) that are not accounted for within this standardization population, even when other demographic characteristics are representative (Baron, 2000).

The BRIEF presents with satisfactory psychometric properties. The test-retest reliability estimates were high for the Behavioral Regulation Index, Metacognitive Index, and Global Executive Composite, ranging from .79 to .92 in both parent and teacher forms among the normative and clinical samples (Baron, 2000). Gioia et al. (2000) found that inter-rater reliability between parent and teacher was moderate ( $r = .32$ ), which was expected and thought to reflect differences between the school and home environments as well as the teachers' and parents' perceptions. Internal consistency reliability was also high for parent and teacher forms as well as clinical and normative samples ( $\alpha = .80 - .98$ ; Baron, 2000; Gioia et al., 2000). Among this sample, internal consistency reliability was high for both teacher and parent ( $\alpha = .95 - .97$ ). When compared with other behavior rating scales, particularly on scales measuring inattention, impulsivity, and learning, the BRIEF demonstrated moderate to high concurrent validity. When compared with measures emphasizing behavioral and emotional functioning, the BRIEF demonstrated moderate to high divergent validity (Gioia et al., 2000). Predictive validity analyses indicated that parents and teachers of children diagnosed with ADHD, Inattentive Type

or ADHD, Combined Type rated them higher on the Working Memory and Inhibit scales on the BRIEF than parents and teachers of children within the normative sample (Baron, 2000).

## **Data Analysis**

### **Visual and Statistical Analyses of Observations**

As stated, at least four data points were collected per participant per phase and analyzed via visual and statistical analyses. Kratochwill et al. (2013) outlined the process for conducting a visual analysis:

1. Documenting a predictable baseline pattern of data reflecting consistent level, trend, and variability.
2. Examining the data within each phase to determine the presence of any patterns (i.e., is there a predictable pattern of responding).
3. Examining the data between each adjacent phase to determine whether an effect of manipulation of the intervention occurred.
4. Integrate all information to determine whether there were at least three demonstrations of an effect of the intervention (p. 31).

Thus, the level reflects mean performance; the trend represents the slope, and the variability refers to the range or spread of data (Horner et al., 2005; Kratochwill et al., 2013). In addition, visual analysis entailed examining the immediacy of the effect, or the change between the last three data points in one phase and the first three data points of the next phase (Kratochwill et al., 2013). Thus, if the participant demonstrates behavioral improvement immediately after viewing the video, then one may draw conclusions

regarding the contribution of the intervention to the behavioral change. Visual analysis also considered the degree to which the data points from each phase overlapped with one another; the smaller the overlap, the greater the likelihood of an effect (Kratochwill et al., 2013).

Within a multiple-baseline AB design, statistical analysis entailed obtaining effect size estimates using nonparametric and parametric statistical methods. In large-sample studies, the effect size would reflect the magnitude of the difference between groups, whereas in small-*n* studies such as this study, the effect size reflected the magnitude of the difference between the baseline and the intervention, which went beyond establishing statistical significance or merely reporting the existence of an effect (Sullivan & Feinn, 2012). One of the advantages of utilizing nonparametric statistical methods was that fewer assumptions were required such as normally distributed data (Kratochwill et al., 2013). Some nonparametric methods include overlap approaches, such as the percentage of non-overlapping data approach (PND; Scruggs, Mastropieri, & Casto, 1987), the percentage exceeding the median approach (PEM; Ma, 2006), the percentage of all non-overlapping data approach (PAND; Parker, Hagan-Burke, & Vannest, 2007), the non-overlap of all pairs approach (NAP; Parker & Vannest, 2009), and tau for non-overlap with baseline trend control (Tau-U; Parker, Vannest, Davis, & Sauber, 2011). Some parametric methods include regression-based estimates such as the Allison-MT (mean plus trend) method (Allison & Gorman, 1993) that predicts the effectiveness of an intervention while controlling for trend in the baseline phase if a positive trend exists (Ross & Begeny, 2014). Other effect size estimates include obtaining the standardized

mean difference (e.g., Hedges, Pustejovsky, & Shadish, 2012). As there is disagreement in single-case design analysis pertaining to optimal methods for detecting change, Kratochwill and colleagues (2013) recommended obtaining one or more nonparametric estimates and a regression-based estimate and comparing each estimator via a sensitivity analysis. Therefore, in this study, observations were analyzed using the NAP approach, the Tau-U approach and the Allison-MT method of regression.

**Overlap (nonoverlap) methods.** Some overlapping approaches (i.e., PND and PEM) do not consider all baseline data, as non-overlap is based on one data point, whether it is the highest data point (PND) or the median data point (PEM); therefore, variability within baseline data is overlooked. PAND does consider all baseline data as they represent the proportion of all data remaining after removing the minimum number of data points which overlap between the baseline and intervention phases (Parker et al., 2007). Half of the single-case design studies generated a 1.00 effect size when using PEM, indicating that PEM has a very high ceiling effect (Parker & Vannest, 2009). Some of the limitations with using PND are that its value decreases towards zero as the number of data points increases and it does not have an established sampling distribution (Shadish, Rindskopf, & Hodges, 2008). A limitation of PAND was that it was found to generate similar results for data sets with and without treatment (Manolov, Solanas, & Leiva, 2010). The PND, PAND, and PEM methods lack sensitivity or the ability to discriminate among very successful interventions when the percentage nears 100% (Parker et al., 2007), and they also do not account for trends within baseline data. In contrast, NAP and Tau-U have the most power (Brossart, Vannest, Davis, & Patience,

2014; Parker, Vannest, & Davis, 2011), consider all of the data, and in the case of Tau-U, considers the baseline trend.

The NAP approach strives to estimate the probability that a score randomly drawn from the intervention phase will exceed that of a score randomly drawn from the baseline phase. Thus, unlike PND and PEM, it compares all combinations of  $N_{\text{baseline}} \times N_{\text{intervention}}$  data points (Parker & Vannest, 2009). When the intervention data point is larger than its baseline counterpart, then that constitutes a non-overlapping pair. The NAP index can manually be calculated by dividing the total number of non-overlapping pairs by the total number of comparisons; however, in this study, it was calculated using the calculator at the single case research website (Vannest, Parker, & Gonon, 2011). This calculator also provided confidence intervals, which indicated the confidence or assurance in the obtained effect size. NAP scores range from 0.50 to 1.00; if NAP (AUC) = .50, then the probability of the scores of one group exceeding the scores of the other group is 50%, or at chance levels. One of the limitations of NAP is that like other non-overlapping indices, it does not correct for baseline trend nor does it discriminate well among the top 10% of successful interventions (Parker, Vannest, & Davis, 2011).

The Tau-U approach was developed by Parker, Vannest, Davis, and Sauber (2011) and is the only one of the overlapping approaches to control for monotonic trend. Each data point is compared to all data points ahead of it in time, thus generating many pairwise comparisons among the data points within the baseline phase, within the intervention phase, and between the baseline and intervention phase (Brossart et al., 2014). Thus, unlike NAP, which only includes pairwise comparisons between phases,

Tau-U comparisons are also made within baseline or within intervention phases. In this study, Tau-U compared the baseline and intervention phases while controlling for baseline trends. Tau-U was also calculated using the calculator at the single case research website (Vannest et al., 2011). Tau-U scores range from 0.00 to 1.00, with higher scores indicative of a greater effect.

**The Allison-MT method.** As recommended by Kratochwill et al. (2013), this study will also incorporate a parametric technique to supplement non-parametric measures. The Allison-MT (mean plus trend) method is an ordinary least squares regression technique devised by Allison and Gorman (1993) that predicts the effectiveness of an intervention while controlling for trend in the baseline phase. This method does not control for trends in the intervention phase as they should be attributed to the intervention (Ross & Begeny, 2014). When the Allison-MT method was compared with other regression models (e.g., Parker & Brossart, 2003), it was found to produce large effect sizes and had the strongest level of power. The Allison-MT method was also regarded as a more flexible approach compared to standardized mean difference approaches such as Cohen's *d* or Hedges's *g* (Parker et al., 2005). The Allison-MT method was calculated using the procedure outlined by Ross and Begeny (2014), which entailed performing a linear regression analysis on the baseline data. If the resulting slope was negative, then a multiple linear regression analysis would be performed on all data. Both of these procedures were completed using SPSS. The effect sizes range from 0.00 to 1.00 with higher scores indicative of a greater effect.

Although Cohen (1988) provided guidelines for evaluating effect sizes (i.e.,  $d = .20$  is “small,”  $d = .50$  is “medium,” and  $d = .80$  is “large”), these are more applicable towards studies with larger samples of participants. Single-case design studies tend to generate higher effect sizes in comparison with larger-group research. For instance, in comparing a variety of effect size estimators, the median ( $50^{\text{th}}$  percentile) effect sizes ranged from .63 to .72 (Parker, Vannest, & Davis, 2011). These will be taken into consideration when evaluating effect sizes. For non-overlap methods, Parker and Vannest (2009) recommended that NAP scores of 0 to .65 represented weak effects, .66 to .92 represented medium effects, and that .93 to 1.00 represented strong effects. These guidelines would also be used for interpreting Tau-U (Rakap, 2015; Rispoli et al., 2013).

### **Analysis of the Social Skills Improvement System**

In this study, both the Social Skills and Problem Behavior scales were evaluated as they provided information regarding social skills acquisition deficits (based on “never” ratings on social skills items) as well as social skills performance deficits (based on “seldom” ratings on social skills items; Gresham & Elliott, 2008). Specifically, the baseline and post-intervention scores were compared using the Jacobson-Truax reliable change index (JT RCI; Jacobson & Truax, 1991) to determine whether there was a clinically significant increase in Social Skills scores and a clinically significant decrease in Problem Behavior scores. The JT RCI was calculated by dividing the difference between baseline and intervention scores by the standard error of the differences, and RCI values were deemed statistically significant if the absolute value exceeded 1.96 (Jacobson & Truax, 1991). When higher scores are deemed more favorable, as is the case

with SSIS Social Skills scores, that value should be positive; when lower scores are associated with better outcomes, as is the case with SSIS Problem Behavior scores, that value should be negative. In addition to statistical significance, the clinical significance of RCI values was assessed using the criteria for clinical and nominal significance (Bauer, Lambert, & Nielson, 2004; Jacobson & Truax, 1991). Clinical significance is met when an individual moves two standard deviations away from the SSIS baseline group mean at baseline (above the mean for Social Skills scores; below the mean for Problem Behavior scores). Bauer et al. (2004) found that this cutoff yielded high sensitivity as few scores beyond that threshold represented false negatives. Nominal significance is met when post-intervention scores fall within the average range on both SSIS Social Skills and Problem Behavior scores. When compared to other statistical methods, the RCI was found to be an appropriate method of evaluating the effects of various interventions within small sample sizes (Schmitt et al., 2013).

### **Analysis of the Behavior Rating Inventory of Executive Function**

In this study, the Global Executive Composite on the BRIEF was evaluated as it provided information about an individual's overall level of executive functioning. In addition, the Behavioral Regulation and Metacognition Indexes were examined as they were the two factors generated through exploratory factor analysis when the BRIEF was developed (Gioia et al., 2000). Specifically, the baseline and post-intervention scores were compared using the JT RCI (Jacobson & Truax, 1991), as discussed earlier in the chapter, to determine whether there was a clinically significant decrease in Global Executive Composite scores. In this case, lower scores are associated with better

outcomes, thus, favorable RCI values should be negative. In addition to statistical significance, the clinical significance of RCI values will be assessed using the criteria for clinical and nominal significance, as discussed earlier in the chapter (Bauer et al., 2004; Jacobson & Truax, 1991). Clinical significance is met when an individual moves two standard deviations away from the BRIEF baseline group mean at baseline (below the mean for the Global Executive Composite scores). Nominal significance is met when post-intervention scores fall within the average range on the BRIEF Global Executive Composite.

### **Summary and Revisiting Questions and Hypotheses**

Participants included kindergarten and second grade students from a suburban school district in the North Texas area. Parents and teachers provided consent and students provided assent to participate. The design followed the format of a multiple-baseline AB design in which participants received the VSM intervention at different points. Baseline and post-intervention data consisted of conducting informal parent, teacher, and student interviews, multiple observations, and obtaining input from parents and teachers through the SSIS and the BRIEF. The independent variable was the onset of the VSM intervention, while the dependent variables included the frequency of aggression as measured through observations, ratings of social skills on the SSIS, ratings of problem behaviors on the SSIS, and ratings of executive functions on the BRIEF. Data analysis of observations included a visual analysis, non-overlap analysis via the NAP and Tau-U procedures to obtain effect size, and a regression analysis using the Allison-MT method. All of these methods were compared with one another to determine if VSM had

an effect on reducing the observed frequency of aggressive behavior. In addition, inter-observer agreement was calculated using Cohen's kappa. Data analysis of the SSIS and of the BRIEF involved calculating the Jacobson-Truax RCI.

The data were analyzed with respect to specific hypotheses taken from the research questions outlined in Chapter 1, which include:

1. After implementation of a VSM intervention targeting aggressive behavior among at-risk elementary students, will the rate of aggressive behavior decline post-intervention as depicted through observational data?
  - a. Hypothesis 1: It is hypothesized that the frequency of aggressive behavior depicted through observations will be significantly lower after the VSM intervention than at baseline.
2. What effects would VSM have on reducing problem behaviors including aggression, as depicted through parent and teacher reports on the Problem Behaviors component of the SSIS?
  - a. Hypothesis 2: It is hypothesized that Problem Behaviors scale scores from the SSIS will be significantly lower after the VSM intervention than at baseline.
3. What effects would VSM have on improving prosocial behaviors, as depicted through parent and teacher reports on the Social Skills component of the SSIS?
  - a. Hypothesis 3: It is hypothesized that Social Skills scale scores from the SSIS will be significantly higher after the VSM intervention than at baseline.

4. What effects would VSM have on improving executive functioning skills, as depicted through parent and teacher reports on the Global Executive Composite, Behavioral Regulation Index, and Metacognition Index of the BRIEF?
  - a. Hypothesis 4a: It is hypothesized that the Global Executive Composite from the BRIEF will be significantly lower after the VSM intervention than at baseline.
  - b. Hypothesis 4b: It is hypothesized that the Behavioral Regulation Index from the BRIEF will be significantly lower after the VSM intervention than at baseline.
  - c. Hypothesis 4c: It is hypothesized that the Metacognition Index of the BRIEF will be significantly lower after the VSM intervention than at baseline.

This chapter presented the research questions and hypotheses as well as the research design. The data collection procedures and analytic methods used to answer the research questions were presented and discussed in depth. The validity and reliability of the BRIEF and SSIS were presented. Results of the data analysis are presented in the following chapter.

## CHAPTER IV

### RESULTS

This chapter presents the results of the study, including a preliminary analysis in which a description of the variables in the dataset were obtained, and primary analyses to address each research question (see Chapters 1 and 3). As stated in the previous chapter, data from direct observations, the BRIEF, and the SSIS were analyzed using multiple techniques as recommended by Kratochwill et al. (2013), including visual analysis, non-overlap of all pairs (NAP), Tau-U, the Allison-MT method of regression, and the reliable change index (RCI). All measures, with the exception of Allison-MT, are nonparametric.

#### **Preliminary Analysis**

#### **Descriptive Statistics**

Eight participants were involved in the VSM intervention and data analysis. Table 4 provides the frequencies and percentages of the demographic information for all participants, which is discussed in more detail in Chapter 3. Overall, the sample predominantly consisted of Caucasian male participants who were enrolled in kindergarten. Although no data could be obtained on the gender make-up of the district as well as the two elementary buildings represented in this analysis, it is likely that this sample has proportionally more males than in the school or district population. The sample has proportionally more Caucasian participants than in the school or district population, even though the majority of the student body in both elementary buildings is Caucasian. However, there is no representation of the student body who is Hispanic or

African American within the sample. See Chapter 3 for more information pertaining to the demographic makeup of the two elementary schools and the school district that participated in this study.

Table 4

*Frequencies and Percentages for Demographic Variables*

	<i>n</i>	%
Gender		
Female	1	12.5
Male	7	87.5
Grade		
K	6	75.0
1	0	0.0
2	2	25.0
Ethnicity		
Caucasian	7	87.5
Biracial	1	12.5

*Note.* The biracial participant was half Caucasian, half African American.

Descriptive statistics for the Behavior Rating Inventory of Executive Function (BRIEF) and the Social Skills Information Schedule (SSIS) are presented in Table 5. As stated and described in more detail in Chapter 3, the BRIEF composites include the Behavioral Regulation Index (BRI), the Metacognition Index (MI) and the Global Executive Composite (GEC). The means for all subscales of the BRIEF (baseline and intervention) exceeded the average score of 50 as indicated in the manual, indicating that all raters, on average, reported more executive functioning difficulties than what was deemed average in the standardization population. The teachers' scores, on average, were

all significantly elevated based on the guidelines provided in the BRIEF manual (i.e.,  $T > 65$ ), whereas the parents' scores were, on average, not significantly elevated ( $T < 65$ ).

The SSIS composites include the Social Skills (SS) and Behavior Problems (BP) composites, as stated and described in Chapter 3. The means for all Social Skills subscales (baseline and intervention) were lower than the average score of 100 as indicated in the manual; however, the teachers' scores, on average, were all significantly depressed based on the guidelines provided in the SSIS manual (i.e.,  $SS < 85$ ), whereas the parents' scores were, on average, within the average range (i.e., SSs between 85 and 115). The means for all Behavior Problems subscales (baseline and intervention) were higher than the average score of 100; however, the teachers' scores, on average, were all significantly elevated based on the guidelines in the manual (i.e.,  $SS > 115$ ), whereas the parents' scores were again, on average, within the average range.

Table 5

*Descriptive Statistics for the BRIEF and SSIS*

	N	M	SD	Min	Max
<b>BRIEF-T</b>					
BRI-B	8	71.13	13.20	55.00	93.00
BRI-I	8	67.13	7.51	57.00	79.00
MI-B	8	67.00	10.46	46.00	78.00
MI-I	8	69.38	8.68	56.00	79.00
GEC-B	8	69.75	6.67	62.00	81.00
GEC-I	8	70.00	7.75	59.00	80.00

BRIEF-P						
BRI-B	5	60.40	11.95	50.00	76.00	
BRI-I	4	59.50	12.01	47.00	75.00	
MI-B	5	51.80	12.72	37.00	68.00	
MI-I	4	56.75	13.10	45.00	70.00	
GEC-B	5	55.80	13.08	42.00	73.00	
GEC-I	4	58.50	13.28	46.00	74.00	
SSIS-T						
SS-B	8	82.63	9.78	72.00	95.00	
SS-I	8	83.13	6.31	73.00	91.00	
BP-B	8	121.50	16.11	102.00	146.00	
BP-I	8	120.00	16.58	106.00	147.00	
SSIS-P						
SS-B	5	93.80	14.08	76.00	109.00	
SS-I	4	89.75	15.13	68.00	101.00	
BP-B	5	105.60	17.47	83.00	126.00	
BP-I	4	107.25	15.24	89.00	123.00	

*Note.* BRIEF-T = Behavior Rating Inventory of Executive Function – Teacher Form; BRIEF-P = Behavior Rating Inventory of Executive Function – Parent Form; SSIS-T = Social Skills Information Schedule – Teacher Form; SSIS-P = Social Skills Information Schedule – Parent Form; BRI-B = Behavioral Regulation Index – baseline; BRI-I = Behavioral Regulation Index – intervention; MI-B = Metacognitive Index – baseline; MI-I = Metacognitive Index – intervention; GEC-B = Global Executive Composite – baseline; GEC-I = Global Executive Composite – intervention; SS-B = Social Skills – baseline; SS-I = Social Skills – intervention; BP-B = Behavioral Problems – baseline; BP-I = Behavioral Problems – intervention.

Several Pearson correlational analyses were run to compare relationships between the scores on the teacher and parent forms for the BRIEF and SSIS, and to compare each of the measures with one another. Each teacher/parent comparison occurred on each subscale at the same point in time on both the BRIEF and the SSIS (e.g., the GEC at baseline for both sets of raters). No significant relationships emerged between teacher and parent forms ( $p > .05$ ), other than on the Social Skills subscale at baseline on the SSIS, suggesting that teachers and parents generally held differing perceptions of each participant's skills in behavior regulation, metacognition, social skills, and behavior problems. See Table 6 for more information.

Table 6

*Correlations between Teacher and Parent Forms on the BRIEF and SSIS*

	<i>r</i>
BRIEF	
BRI-B	-.19
BRI-I	.81
MI-B	.02
MI-I	.67
GEC-B	-.25
GEC-I	.90
SSIS	
SS-B	.92**
SS-I	.43
BP-B	.69
BP-I	.93*

*Note.* See Table 5 for explanation of abbreviations. Eight teacher forms (both baseline and intervention), 5 parent forms (baseline), and 4 parent forms (intervention) were included in the analysis. \*\*Based on  $p < .05$ . \*Marginal significance ( $.05 < p < .10$ ).

No significant relationships were found between the BRIEF and the SSIS on any subscales save for the parents' responses on the Behavioral Regulation Index on the BRIEF and the Behavioral Problems subscale on the SSIS, both at baseline,  $r(3) = .95$ ,  $p = .05$ , and at intervention,  $r(2) = 1.00$ ,  $p < .05$ . While this result must be cautiously interpreted due to the low sample size used in the analysis, it nevertheless supports that both the BRIEF and the SSIS did not significantly overlap with one another in terms of what they were intended to measure.

### **Inter-rater Reliability**

As stated in the previous chapter, 50% of all baseline and post-intervention observations were conducted with a co-rater to assess inter-rater reliability, or inter-observer agreement. Inter-rater reliability was calculated by obtaining percent agreement (converted into decimal format) and Cohen's kappa, and results are provided in Table 7. Out of 32 observations, nearly all observations ( $n = 31$ ) met the minimal percent agreement threshold (i.e., .80 or higher); however, when agreement due to chance (e.g., guessing) was taken into account, only 25% of the observations ( $n = 8$ ) met the threshold for Cohen's kappa (i.e., .60 or higher). Thus, a substantial number of observations yielded high agreement that was also likely due to chance factors. Situations that are likely to generate high percent agreement and a lower Cohen's kappa include the observation of a low-frequency behavior. For example, there were several observations in which neither rater observed any occurrence of aggressive behavior during the 30-minute interval. Therefore, their percent agreement was 100% (i.e., they completely agreed that aggressive behavior was absent for the entire interval), and because the percent of

*expected* agreement was also 100%, Cohen's kappa could not be calculated (i.e., it would entail dividing by zero, which is not allowed in mathematics). Xu and Lorber (2014) tested and compared several inter-rater reliability statistics and found that many of them (e.g., Holley & Guilford's *G*) are less sensitive to low base rates than Cohen's kappa. In addition, another limitation of utilizing Cohen's kappa is that the overall estimate of agreement is obtained, whereas it may be warranted to report the agreement on the presence and the absence of an observed behavior (Cicchetti & Feinstein, 1990). In contrast, the observations that yielded acceptable Cohen's kappa values included higher agreement of the presence of a behavior in addition to its absence.

Table 7

*Inter-rater Reliability*

Participant	Observation	Percent Agreement	Cohen's kappa
JS	Baseline 1	.87	.59
	Baseline 2	.93	.47
	Post 1	.97	.65
	Post 2	1.00	-
LN	Baseline 1	.80	.39
	Baseline 2	.90	.62
	Post 1	1.00	1.00
	Post 2	.97	.65
MJ	Baseline 1	.97	.65
	Baseline 2	.90	.35
	Post 1	.90	.62
	Post 2	.93	.00
SR	Baseline 1	.93	.79
	Baseline 2	.77	.38
	Post 1	.93	.79
	Post 2	1.00	-
RK	Baseline 1	.83	.44
	Baseline 2	.90	.53
	Post 1	.93	-.03
	Post 2	1.00	-

AH	Baseline 1	<b>1.00</b>	-
	Baseline 2	<b>1.00</b>	-
	Post 1	<b>1.00</b>	-
	Post 2	<b>1.00</b>	-
CG	Baseline 1	<b>1.00</b>	-
	Baseline 2	.97	.00
	Post 1	<b>1.00</b>	-
	Post 2	<b>1.00</b>	-
SJ	Baseline 1	<b>1.00</b>	-
	Baseline 2	<b>1.00</b>	-
	Post 1	<b>1.00</b>	-
	Post 2	<b>1.00</b>	-

*Note.* JS, LN, MJ, SR, and RK attended the same school and were thus observed by the same two raters; AH, CG, and SJ attended a second school and were observed by an additional two raters. Scores in **boldface** represent meeting the minimal threshold of inter-rater reliability for that statistic.

### Primary Analyses

Nonparametric tests were conducted to examine the following research questions as presented earlier in this dissertation.

#### Research Question One

One hypothesis has been proposed to address the first research question: It is hypothesized that the frequency of aggressive behavior depicted through observations will be significantly lower after the VSM intervention than at baseline. Testing this hypothesis entailed visual analysis and statistical analysis using non-overlap of all pairs (NAP; Parker & Vannest, 2009), Tau-U (Parker, Vannest, Davis, & Sauber, 2011), and Allison-MT regression (Allison & Gorman, 1993; Ross & Begeny, 2014), per the recommendations of Kratochwill and colleagues (2013).

Observations are depicted in Figure 3 and reflect a non-concurrent multiple baseline design. Three participants (i.e., JS, LN, and MJ) were observed for baseline in

December and early January and the intervention was implemented in late January and February. The post-intervention data were collected in March. Two participants (i.e., SR and RK) were observed for baseline in late January and early February and the intervention was implemented in late February and March. The post-intervention data were collected in April. The remaining three participants (i.e., AH, CG, and SJ) were observed for baseline in late February/early March and the intervention was implemented in late March and April. The post-intervention data were collected in May of that school year.

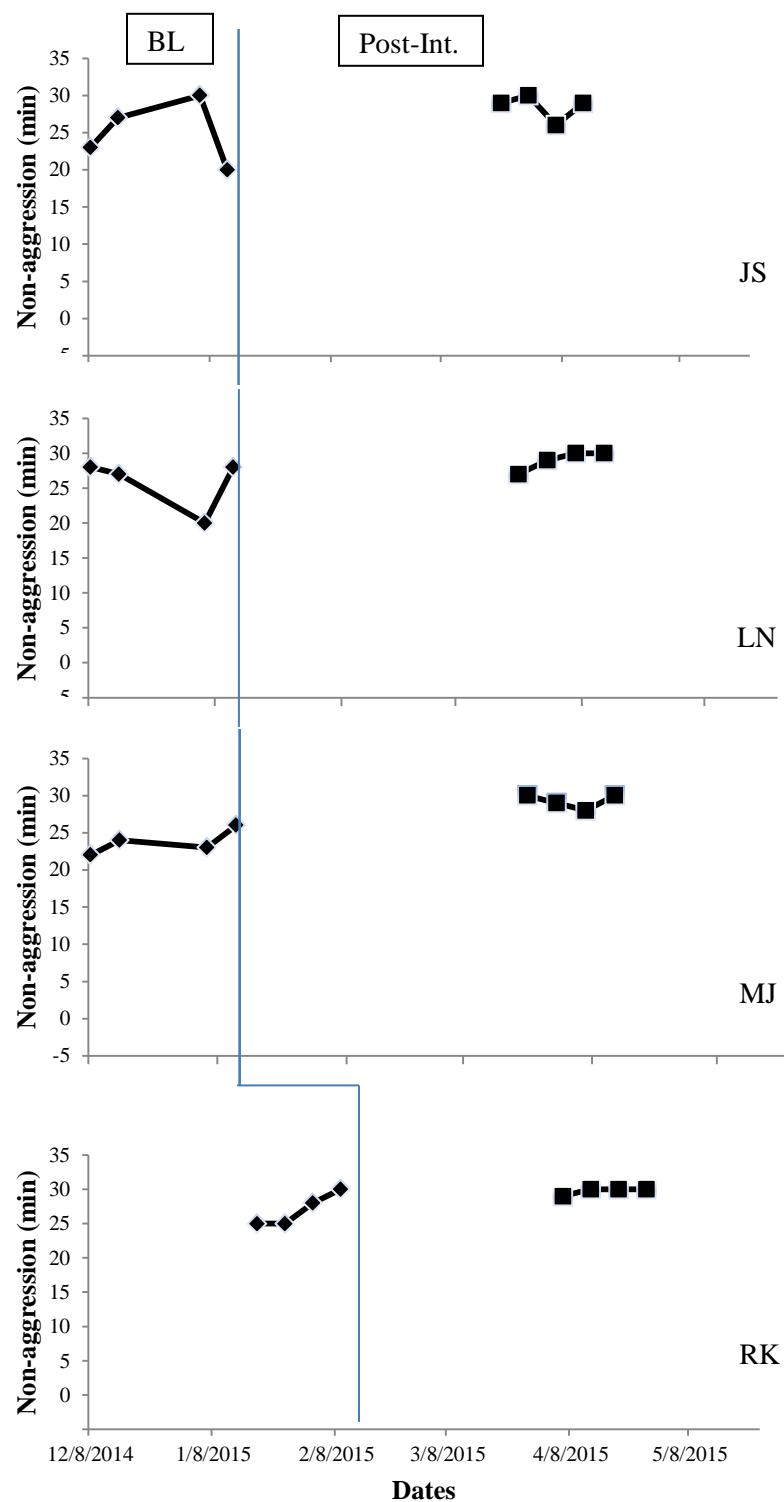
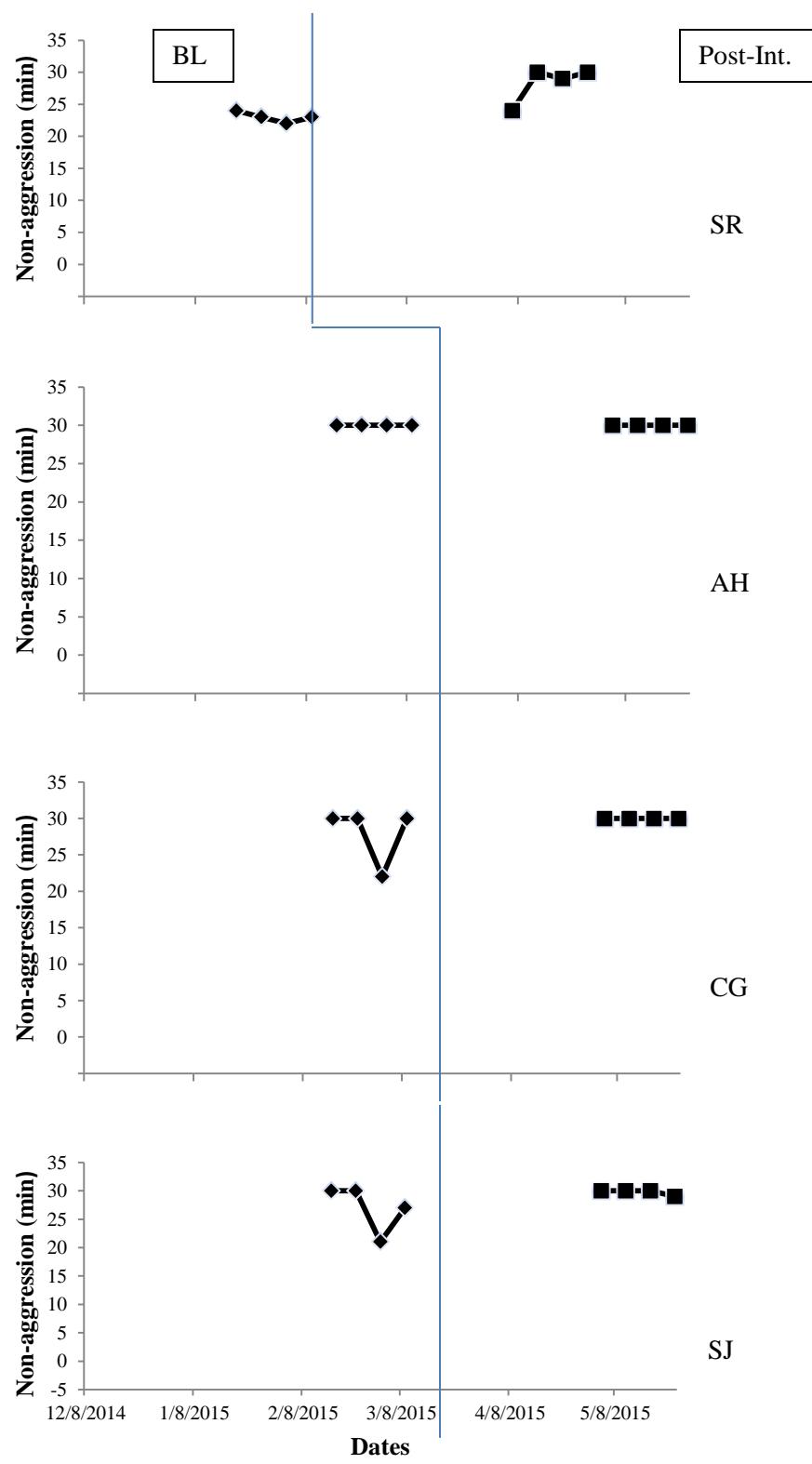


Figure 3. Graph of observations for all participants. BL = baseline; Post-int. = post-intervention.



*Figure 3 (continued).* Graph of observations for all participants. BL = baseline; Post-int. = post-intervention.

**Visual analysis.** The level, trend, and variability among the data in both baseline and intervention phases were examined. As stated in the previous chapter, the level reflects mean or average performance; the trend represents the slope, and the variability reflects the range or spread of data per phase (Kratochwill et al., 2013). Additionally, patterns within and between phases were examined for each participant. Analysis of the overlap between the baseline and intervention phases is discussed further in the statistical analysis section.

Table 8 and Figure 3 provide information on the level, trend, and variability for each participant. The level represents the average number of minutes within a 30-minute interval in which the participant displayed aggression-free behavior; thus, higher levels represent more non-aggressive behavior. The variability represents the spread of data points; the lower the variability, the more consistency the participant displayed in his or her behavior during each observation and thus was less likely to have atypical observations. The trend represents the slope of the data. Larger trends comprise a higher slope within each phase, and like variability, may reflect inconsistency within that phase. Positive trends reflect more non-aggressive behavior with each successive data point in a phase, whereas negative trends reflect less non-aggressive behavior (or conversely, more aggressive behavior) with each successive data point in a phase.

Table 8

*Level, Variability, and Trend in Baseline and Intervention Phases*

Participant	Baseline			Intervention		
	Level (M)	Variability (SD)	Trend ( $\beta$ )	Level (M)	Variability (SD)	Trend ( $\beta$ )
JS	25.00	4.40	-0.18	28.50	1.73	-0.30
LN	23.75	1.71	0.83	29.25	0.96	-0.14
MJ	25.75	3.86	-0.23	29.00	1.41	0.91
RK	27.00	2.45	0.95	29.75	0.50	0.78
SR	23.00	0.81	-0.63	28.25	2.87	0.76
AH	30.00	0.00	0.00	30.00	0.00	0.00
CG	28.00	4.00	-0.26	30.00	0.00	0.00
SJ	27.00	4.24	-0.55	29.75	0.50	-0.78

In the baseline phase, the average number of non-aggressive intervals ranged from 23.00 for SR to 30.00 for AH ( $M_{\text{allbaseline}} = 26.19$ ,  $SD_{\text{allbaseline}} = 2.29$ ). The group as a whole had a narrower range of average non-aggressive intervals during the intervention phase, which ranged from 28.25 for SR to 30.00 for AH and CG ( $M_{\text{allinterlevel}} = 29.31$ ,  $SD_{\text{allinterlevel}} = 0.72$ ). Thus, the group as a whole improved in terms of the average amount of aggressive behavior displayed between baseline and intervention phases. On an individual level, with the exception of AH whose average was 30.00 during both baseline and intervention phases and thus experienced no change (i.e., she displayed no aggressive behavior during any observations in both phases), all participants individually displayed less aggressive behavior on average during intervention than at baseline.

The variability among participants as a group was more spread out during the baseline phase ( $M_{allbasevar} = 2.68$ ) than in the intervention phase ( $M_{allintervar} = 1.00$ ), meaning that as a group, participants' non-aggressive behavior was more consistent across observations during the intervention phase than at baseline. With the exception of SR, whose variability increased from baseline (0.81) to intervention (2.87), all other participants individually had decreases in variability or no change, as was the case with AH. While AH had no variability across observations in both phases, the variability across baseline phases was as high as 4.40 for JS, and the variability across intervention phases was as high as 2.87 for SR. Thus, each individual participant, with the exception of SR, exhibited more *consistent* non-aggressive behavior in the intervention phase than at baseline. In SR's case, as seen in Figure 3, most of the variability in the intervention phase is likely accounted for by the behavior observed during the first observation of the intervention phase, as his behavior was more consistent in all subsequent observations.

As seen in Table 8, baseline and intervention trends were measured using standardized coefficients. Within the baseline phase, six out of eight participants experienced either no trend or a negative trend, indicating that they exhibited more aggressive behavior in subsequent observations compared to earlier observations. Two participants (LN and RK) experienced a positive trend in their baseline data, or that their non-aggressive behavior improved through the course of the baseline phase; however, this was not statistically significant for LN, whereas this trend was marginally significant for RK and may reflect improvements in behavior before commencement of the intervention. Within the intervention phase, five out of eight participants all experienced

either no trend or a positive trend, indicating that their non-aggressive behavior continued to improve through the course of the intervention phase. Three participants (JS, LN, and SJ) experienced negative trends in the intervention phase; however, none of these slopes were statistically significant or large. Thus, none of the participants experienced significant increases in aggressive behavior during the intervention phase.

**Non-overlap of all pairs (NAP).** NAP was measured using the calculator at the single case research website (Vannest et al., 2011) and results of the NAP analysis are displayed in Table 9. As discussed in Chapter 3, NAP scores closer to 1.00 reflect a higher estimate that the probability that a score randomly drawn from the intervention phase will exceed that of a score randomly drawn from the baseline phase, whereas  $NAP = 0.50$  means that the probability of the scores of one group exceeding the scores of the other group is 50%, or at chance levels. Thus, higher NAP effect sizes reflect significantly lower frequencies of aggressive behavior at intervention than at baseline.

As seen in Table 9, hypothesis 1 was statistically supported for LN ( $NAP = 1.00$ ) and SR ( $NAP = 0.97$ ),  $p < .05$ , and represents strong effects per Parker and Vannest's (2009) recommendations for NAP effect size interpretation, as discussed in Chapter 3. Hypothesis 1 was moderately supported for four participants who demonstrated medium effects, even though they were not at statistically significant levels,  $NAPs = 0.69 – 0.85$ ,  $p > 0.05$ . Hypothesis 1 was not supported for AH ( $NAP = 0.50$ ) and CG ( $NAP = 0.63$ ) as both participants yielded weak effect sizes.

Table 9

*Non-overlap of All Pairs*

Participant	NAP	Z	p	CI (90%)
JS	0.72	1.01	0.31	-0.28 – 1.15
LN	1.00	2.31	0.02**	0.29 – 1.71
MJ	0.81	1.44	0.15	-0.09 – 1.34
SR	0.97	2.17	0.03**	0.23 – 1.65
RK	0.85	1.59	0.11	-0.03 – 1.40
AH	0.50	0.00	1.00	-0.71 – 0.71
CG	0.63	0.57	0.56	-0.46 – 0.96
SJ	0.69	0.87	0.39	-0.34 – 1.09

*Note.* NAP = non-overlap of all pairs. CI = confidence interval of NAP at 90%.

Significant effects represented by  $p < .05$ .

**Tau-U.** Tau-U was also measured using the calculator at the single case research website (Vannest et al., 2011) and results of the Tau-U analysis are displayed in Table 10. First, baseline trend was examined for each participant as part of Tau-U in order to control for any monotonic effects. Higher positive Tau-U effect sizes within baseline reflect the presence of a positive trend. Nearly all of the participants failed to exhibit a statistically significant baseline trend ( $\tau_s = -0.50 – 0.67$ ,  $p > .05$ ), although RK's baseline was marginally positively trended ( $\tau = 0.83$ ,  $p = .09$ ). Thus, while the visual analysis revealed that RK and LN had positively sloped baselines, statistical analysis indicated that LN's positive slope was not significant and RK's was marginally significant. See Figure 3 for an illustration of all of the participants' baseline and intervention data points.

Similar to NAP and as discussed in Chapter 3, Tau-U scores closer to 1.00 reflect a higher estimate that the probability that a score randomly drawn from the intervention phase will exceed that of a score randomly drawn from the baseline phase. Thus, higher Tau-U effect sizes reflect significantly lower frequencies of aggressive behavior at intervention than at baseline. As seen in Table 10, hypothesis 1 was again supported for LN ( $\tau = 1.00$ ) and SR ( $\tau = 0.97$ , both  $p < .05$ ), and represents strong effects per Parker and Vannest's (2009) recommendations for effect size interpretation. Hypothesis 1 was moderately supported for only one participant (MJ) who demonstrated a medium effect even though it was not statistically significant,  $\tau = 0.71$ ,  $p > .05$ . When baseline trend was not controlled, RK also demonstrated a medium effect,  $\tau = 0.75$ ,  $p > .05$ ; however, after controlling for trend this effect was weak,  $\tau = 0.41$ ,  $p > .05$ . Hypothesis 1 was not supported for the remaining participants (i.e., JS, AH, CG, and SJ) whose effect sizes were all weak as well as statistically insignificant,  $\tau_s = 0.00 - 0.46$ ,  $p > .05$ .

Table 10

*Tau-U with Nonoverlap with Baseline Trend Control*

Participant	Tau-U (BL)	<i>p</i> (BL)	Tau-U (BL vs. I)	<i>p</i> (BL vs. I)
JS	0.00	1.00	0.45	0.31
LN	0.67	0.17	1.00	0.02**
MJ	-0.17	0.73	0.71	0.11
SR	-0.50	0.31	0.97	0.03**
RK	0.83	0.08*	0.75 (0.41)	0.11 (0.39)

AH	0.00	1.00	0.00	1.00
CG	-0.17	0.73	0.40	0.56
SJ	-0.50	0.31	0.46	0.39

*Note.* BL = baseline; I = intervention. Values in parentheses reflect Tau-U and *p*-value after controlling for baseline trend. Significant effects represented by  $p < .05$ ; marginally significant effects represented by  $.05 < p < .10$ .

**Regression analysis.** An Allison-MT (mean plus trend) regression analysis was performed using SPSS as well as the procedure outlined by Ross and Begeny (2014), and results are displayed in Table 11. First, a simple linear regression was performed on the baseline data using time as a predictor variable. Positive slopes are indicative of a positively trended baseline. Then, a multiple regression procedure was implemented on baseline and intervention data using time, treatment, and their interaction as predictor variables. Effect sizes were measured using adjusted  $r^2$ , which was selected because  $r^2$  may provide a high estimate of effect size when there are multiple predictors (Field, 2009). Nevertheless, (non-adjusted)  $r^2$  coefficients are also provided for comparison. As with the other effect size measures, larger effect sizes (i.e., closer to 1.00) represent higher magnitudes of change from baseline to intervention or lower frequencies of aggressive behavior seen at intervention than at baseline.

As seen with Tau-U, nearly all of the participants failed to exhibit a statistically significant positive baseline trend save for RK,  $F(1, 2) = 18.00, p = .05$ . See Figure 3 for an illustration of all of the participants' baseline and intervention data points. As seen in Table 11, hypothesis 1 was again supported for LN,  $F(2, 5) = 17.50, p < .05$ , adjusted  $r^2 =$

0.83, and SR,  $F(2, 5) = 8.46, p < .05$ , adjusted  $r^2 = 0.68$ , but represented medium effects per Parker and Vannest's (2009) recommendations for effect size interpretation. RK also demonstrated a statistically significant effect when baseline trend was not controlled,  $F(2, 5) = 6.59, p < .05$ , adjusted  $r^2 = 0.62$ ; however, this effect was weak even without controlling for baseline trend. Controlling baseline trend would have weakened the effect further. In addition, Hypothesis 1 was not supported for the remaining participants (i.e., JS, MJ, AH, CG, and SJ) whose effect sizes were all weak as well as statistically insignificant, adjusted  $r^2$ s = 0.00 – 0.12,  $p > .05$ .

Table 11

*Allison-MT Effect Sizes*

Participant	$\beta$ (BL)	$p$ (BL)	$r^2$ (BL & I)	Adj. $r^2$ (BL & I)	$p$ (BL & I)
JS	-0.18	0.82	0.30	0.01	0.42
LN	0.83	0.17	0.88	0.83	0.01**
MJ	-0.23	0.77	0.30	0.02	0.41
SR	-0.63	0.37	0.77	0.68	0.03**
RK	0.95	0.05*	0.73	0.62	0.04**
AH	0.00	1.00	0.00	0.00	1.00
CG	-0.26	0.74	0.17	-0.16	0.63
SJ	-0.55	0.45	0.37	0.12	0.31

*Note.* BL = baseline; I = intervention. \*\*Significant effects represented by  $p < .05$ ; marginally significant effects represented by  $.05 < p < .10$ .

**Summary of effect sizes.** Table 12 provides a comparison of all effect sizes obtained through NAP, Tau-U, and Allison-MT. Regardless of the measure used,

Hypothesis 1 was supported for both LN and SR as they both experienced significant improvements in non-aggressive behavior from baseline to intervention. With the exception of those two participants, all other participants had lower Tau-U effect sizes compared to NAP. While Tau-U is likely to yield more conservative results, especially when controlling for baseline trend, NAP is also based on the ROC curve, and so a NAP score of 0.50 is essentially akin to a Tau-U score of 0.00, as both reflect outcomes that are completely due to chance. Allison-MT yielded lower effect sizes than Tau-U, which was inconsistent with Ross and Begeny's (2014) results when they compared Allison-MT to Tau-U. The significant effects seen for LN and SR cannot be attributed to the time at which the intervention was introduced, as they received the intervention at different points (likewise, participants who received the intervention at the same time as LN and SR did not experience significant effects).

Table 12

*Summary of All Effect Sizes*

Participant	NAP	Tau-U	Allison-MT
JS	0.72	0.45	0.30
LN	1.00**	1.00**	0.88**
MJ	0.81	0.71	0.30
SR	0.97**	0.97**	0.77**
RK	0.85	0.41†	0.73**
AH	0.50	0.00	0.00
CG	0.63	0.40	0.17

SJ	0.69	0.46	0.37
<i>Note.</i> Allison-MT effect sizes represented as $r^2$ . †Tau-U effect size when baseline was detrended. **Effect sizes significant at $p < .05$ .			

### **Research Question Two**

One hypothesis was proposed to address the second research question: It is hypothesized that Problem Behaviors scale scores from the SSIS will be significantly lower after the VSM intervention than at baseline. Testing this hypothesis entailed obtaining the Reliable Change Index (RCI) as a measure of clinically and statistically significant change (Jacobson & Truax, 1991). As stated in Chapter 3, RCI scores are measured using z-scores and scores lower than -1.96 represent significant declines in problem behavior. Among the teacher reports, only SJ experienced clinically significant change as his teacher reported his problem behaviors to be above average at baseline ( $SS = 131.00$ ) whereas they were within the average range at intervention ( $SS = 110.00$ ),  $z = -2.24$ ,  $p < .05$ . Furthermore, because SJ's teacher placed him within the average range at intervention, he also achieved nominally significant change.

For only two out of eight participants (JS and LN) did parents complete both baseline and intervention rating scales; nevertheless, no significant changes were reported between baseline and intervention,  $p > .05$ .

### **Research Question Three**

One hypothesis was proposed to address the third research question: It is hypothesized that Social Skills scale scores from the SSIS will be significantly higher after the VSM intervention than at baseline. As with the second research question, testing

this hypothesis entailed obtaining the Reliable Change Index (RCI) as a measure of clinically and statistically significant change (Jacobson & Truax, 1991). This time, however, scores higher than +1.96 represent significant increases in prosocial skills. Hypothesis 3 was not supported for any of the participants on the teacher report as no one attained clinically significant change,  $p > .05$ .

For only two out of eight participants (JS and LN) did parents complete both baseline and intervention rating scales; nevertheless, no significant changes were reported between baseline and intervention,  $p > .05$ .

#### **Research Question Four**

Three hypotheses were proposed to address the fourth research question: It is hypothesized that the Global Executive Composite from the BRIEF will be significantly lower after the VSM intervention than at baseline, that the Behavioral Regulation Index from the BRIEF will be significantly lower after the VSM intervention than at baseline, and that the Metacognition Index of the BRIEF will be significantly lower after the VSM intervention than at baseline. As with the second and third research questions, testing these hypotheses entailed obtaining the Reliable Change Index (RCI) as a measure of clinically and statistically significant change (Jacobson & Truax, 1991). Furthermore, as with the Problem Behavior scores, RCI scores lower than -1.96 represent significant declines in problem behavior.

Hypothesis 4a (the Global Executive Composite) was supported for CG on the teacher report as the difference between baseline and intervention was clinically significant,  $z = -4.98, p < .05$ . In addition, the changes that were reported were also

nominally significant, as CG's GEC was elevated at baseline ( $T = 73.00$ ) but within the average range at intervention ( $T = 59.00$ ). Hypothesis 4b (the Behavior Regulation Index) was supported for AH and SJ on the teacher report. In AH's case, she did not experience nominally significant change, as her teacher's ratings of her behavior regulation were elevated at baseline ( $T = 93.00$ ) and at intervention ( $T = 75.00$ ). Nevertheless, the difference was clinically significant,  $z = -3.41$ ,  $p < .05$ . Likewise, SJ also experienced clinically significant change that was not nominally significant,  $z = -2.84$ ,  $p < .05$ . His teacher reported his behavior regulation to be elevated at baseline ( $T = 83.00$ ) and at intervention ( $T = 68.00$ ). Hypothesis 4c (the Metacognition Index) was supported for CG on the teacher report as the difference between baseline and intervention was clinically significant,  $z = -4.06$ ,  $p < .05$ . In addition, the changes that were reported were also nominally significant, as CG's Metacognition Index was elevated at baseline ( $T = 78.00$ ) but was within the average range at intervention ( $T = 59.00$ ).

For only two out of eight participants (JS and LN) did parents complete both baseline and intervention rating scales; nevertheless, no significant changes were reported between baseline and intervention,  $p > .05$ . Table 13 includes a summary of all RCI scores for all participants among the teacher forms.

Table 13

*Reliable Change Indices for the SSIS and the BRIEF*

Participant	SSIS-SS†	SSIS-BP	BRIEF-GEC	BRIEF-BRI	BRIEF-MI
JS	-0.68	0.43	2.47	0.76	1.71
LN	-0.34	0.21	1.77	1.71	0.21
MJ	-0.68	-0.32	-1.41	-1.33	-0.43
SR	1.02	0.11	1.77	0.57	1.28
RK	1.02	0.64	0.00	-0.57	0.21
AH	0.17	-0.53	-0.35	-3.41**	1.50
CG	1.02	0.43	-4.95**	-0.95	-4.06**
SJ	1.19	-2.24**	1.41	-2.84**	3.63

*Note.* Based on teacher reports at baseline and intervention. †Positive scores indicate desired change on the Social Skills scale on the SSIS. \*\*Clinical significance at  $p < .05$ .

### **Summary of Findings**

This chapter presented the results of the study, including a preliminary analysis in which a description of the variables in the dataset were obtained, and primary analyses to address each research question. Teachers and parents completed the SSIS and the BRIEF, and observations were conducted for each participant before and after the VSM intervention. Results are interpreted with the knowledge that the demographics are not representative of the student body within that school district, as the sample predominantly consists of Caucasian male participants who were in kindergarten.

Descriptively, teachers as a whole tended to rate the participants as having fewer social skills than average and as having more problem behaviors and executive functioning difficulties than average. In contrast, parents, as a whole, rated their children within the average range in those same areas. Furthermore, no significant relationships were found between teacher and parent ratings on most subscales, or between the BRIEF and the SSIS themselves. Inter-observer agreement was met for nearly all observations when based on percentage agreement; however, when agreement due to chance was factored, inter-observer agreement was met for only 25% of the observations.

Hypothesis 1 (aggression will decline as measured through observations) was partially supported. A visual analysis of the observations indicated that the group as a whole improved in terms of the average amount of aggressive behavior displayed between baseline and intervention phases, and almost all participants individually displayed less aggressive behavior on average during intervention than at baseline. As a group, participants' non-aggressive behavior was more consistent across observations during the intervention phase than at baseline (i.e., there was less variability), and this was also the case for nearly every individual participant. Most participants did not improve in non-aggressive behavior during the baseline phase, as evidenced by either no trend or a negative trend, whereas most participants experienced improvement in their non-aggressive behavior throughout the course of the intervention phase. Statistical analyses indicated that regardless of the method used, two participants both experienced significant improvements in non-aggressive behavior from baseline to intervention that

cannot be attributed to the time at which the intervention was introduced, as they received the intervention at different points in time.

Hypotheses 2 through 4c were tested via the SSIS and the BRIEF and clinical and nominal change was measured using the Reliable Change Index. Hypotheses 2 and 4a – 4c, which all address reduction of problem behavior and executive dysfunction, were all partially supported via teacher report but not supported through parent reports. Hypothesis 3, which addresses improving social skills, was not supported via teacher or parent reports. Thus, VSM as an intervention to reduce aggressive behavior among at-risk students has some merit; however, there are also factors that practitioners ought to consider when implementing and evaluating this intervention which will be discussed in more depth in the following chapter.

## CHAPTER V

### DISCUSSION

The primary goal of this study was to examine the efficacy of video self-modeling (VSM) as a secondary prevention tool in reducing aggressive behavior among elementary-aged children. This chapter presents the discussion of the results provided in the previous chapter, including implications for school psychological practice, limitations, and future directions for research.

#### **Research Question One**

After implementation of a VSM intervention targeting aggressive behavior among at-risk elementary students, will the rate of aggressive behavior decline post-intervention as depicted through observational data? It was hypothesized that the frequency of aggressive behavior depicted through observations would be significantly lower after the VSM intervention than at baseline. This hypothesis was tested using visual and statistical analyses, including non-parametric and parametric procedures, as recommended by Kratochwill and colleagues (2013).

From the perspective of visual analysis, seven out of eight participants individually and as a group displayed less aggressive behavior after the implementation of the VSM intervention than at baseline. The eighth participant (AH) did not improve only because she displayed no aggressive behavior during any of the observations in both phases. In addition to less aggressive behavior in general, seven out of eight participants displayed more consistent, stable non-aggressive behavior after the intervention was

completed than at baseline; however, when the first observation was not considered, the eighth participant (SR) also demonstrated more consistent behavior after the intervention was completed. To this writer's knowledge, while intervention research has primarily investigated the effects of a given intervention by examining improvement in behavior after its implementation, there have been no intervention studies, let alone studies examining VSM, that have considered the stability in behavior before and after the intervention and whether that influences the conclusions drawn about its efficacy. Lastly, six out of eight participants displayed either a negative or no trend at baseline, indicating that their behavior did not improve significantly prior to receiving the intervention. Five out of eight participants experienced either no trend or a positive trend at intervention, indicating that their non-aggressive behavior improved through the course of the intervention phase; however, the other three participants did not experience significant increases or relapses in aggressive behavior during the intervention phase. While specific factors contributing to trends in this study are unknown, the presence of trends in the desired direction at baseline or in the less desired direction at intervention are important for school psychologists and other practitioners to monitor as they can influence when to add, remove, modify, or change an intervention.

Since statistical analysis considers the probability that changes in behavior are due to the intervention rather than chance as well as the magnitude of the effect, there is a greater efficacy threshold that would have to be met compared to visual analysis alone. In this study, two nonparametric procedures (NAP and Tau-U) and one parametric procedure (Allison-MT regression) were utilized to obtain effect size. While all

procedures differed with respect to the magnitude of the effect that was generated, they all led to the same conclusions as to which participants had meaningful effect sizes. Specifically, the VSM intervention was found to yield statistically significant effects in two out of the eight participants' (LN and SR) aggressive behavior, regardless of the procedure used to measure effect; however, this effect was strong when utilizing NAP or Tau-U, whereas it was medium when utilizing Allison-MT. In addition, two other participants (AH and CG) demonstrated no statistically significant effects on any analytic technique. Beyond those participants, there were differences in effect size magnitude and classification. The non-overlap of all pairs (NAP) technique tended to elicit the most liberal results, as the remaining four participants all demonstrated medium effects. Tau-U was more conservative in comparison as it yielded a medium effect for one participant. Manolov, Losada, Chacon-Moscoso, and Sanduvete-Chaves (2016) indicated that NAP was preferable to Tau-U because it was easier to compute and because Tau-U was found to overcorrect. Allison-MT was the most conservative as effect sizes were even lower than Tau-U. This finding was interesting and contradicts Ross and Begeny (2014) where they found that Allison-MT yielded higher effect sizes than Tau-U. Ross (personal communication, May 18, 2016; also see Maggin et al., 2011) recommended that each phase include at least six data points; given the fact that each phase in this study included four points, that may impact the interpretation of Allison-MT.

In addition to the statistical procedures used to obtain each effect size, another factor that may have led to non-support for the hypothesis for some students is that they exhibited relatively low frequencies of aggressive behavior in the observations at

baseline, and thus there was no substantial room for improvement at intervention. This was especially the case for AH, who failed to demonstrate any aggressive behavior during any of the observations conducted before and after the VSM intervention, but several other participants also displayed aggressive behavior less than ten percent of the 30-minute observation period on most occasions. Conversely, the participants who did demonstrate statistically significant effects (LN and SR) also displayed more aggression at baseline (approximately 25 to 33% of the observation period), and so there was room for improvement. The relatively low frequency with which these behaviors occurred may not be an uncommon phenomenon with students receiving Tier 2 or secondary interventions, and regardless of the intervention being implemented, school psychologists and other intervention personnel may need to take that into consideration when evaluating the effectiveness of a Tier 2 intervention.

### **Research Questions Two, Three, and Four**

The remaining research questions were combined in this section as they all addressed behavioral change as measured through parent and teacher input on behavioral rating scales, and they were all tested using the Reliable Change Index (RCI; Jacobson & Truax, 1991). The second research question asked: What effects would VSM have on reducing problem behaviors including aggression, as depicted through parent and teacher reports on the Problem Behaviors component of the SSIS? It was hypothesized that the Problem Behaviors scale scores from the SSIS would be significantly lower after the VSM intervention than at baseline. Only one out of the eight participants (SJ) experienced clinically and nominally significant change in scores on the teacher report

before and after the VSM intervention, and no participants experienced clinically or nominally significant change in scores on the parent report. Although not significant, two more participants in addition to SJ had change in the desired direction as illustrated by negative RCI scores.

The third research question asked: What effects would VSM have on improving prosocial behaviors, as depicted through parent and teacher reports on the Social Skills component of the SSIS? It was hypothesized that the Social Skills scale scores from the SSIS would be significantly higher after the VSM intervention than at baseline; however, this was not statistically supported on the parent or teacher reports for any of the participants. Nevertheless, five out of eight participants yielded higher and more positive Social Skills scores at intervention on the teacher report even if the changes in these scores were not clinically significant.

The fourth research question asked: What effects would VSM have on improving executive functioning skills, as depicted through parent and teacher reports on the Global Executive Composite, Behavioral Regulation Index, and Metacognition Index of the BRIEF? It was hypothesized that the Global Executive Composite, the Behavioral Regulation Index, and the Metacognition Index from the BRIEF would be significantly lower after the VSM intervention than at baseline. The first and third hypotheses (i.e., the GEC and the MI) were supported for one out of eight participants (CG) on the teacher form and the change that occurred was clinically and nominally significant. In addition to CG, the GEC was lower for two additional participants at intervention than at baseline, and the MI was lower for one additional participant after intervention. The second

hypothesis (i.e., the BRI) was supported for two out of eight participants (AH and SJ) on the teacher form as they both experienced clinically significant change; however, neither experienced nominally significant change. Three additional participants also had lower BRI scores at intervention even though this change was not clinically significant. No participants experienced clinically or nominally significant change on the parent reports.

There are several possible explanations accounting for the lack of behavioral change reported by the teachers and especially by the parents. The VSM intervention was implemented within the school setting, and the target behaviors or skills addressed may have either not been regarded as a concern within the home setting, or the intervention may not have been as easily generalizable outside of the school setting. Given the narrow focus of the VSM intervention, it might have demonstrated greater efficacy within the home environment if the intervention was targeting specific aggressive behaviors that the parents voiced as occurring within that environment. Within a response to intervention (RTI) paradigm, it is imperative that school psychologists assess how the behavior of concern manifests itself in multiple settings as that can influence the nature of the intervention.

Although statistically significant effects were obtained for only two out of eight participants, all participants demonstrated some improvement in non-aggressive behavior and exhibited very little aggressive behavior after intervention, as depicted through observations. Interestingly, however, the participants who demonstrated the least amount of improvement in the observations (i.e., AH, CG, and SJ) were also the ones whose teachers rated them as demonstrating the most improvement on the BRIEF and/or the

SSIS. Likewise, the participants who demonstrated the most improvement in the observations (i.e., LN and SR) were not rated by their teachers as demonstrating improvement to the same degree on the rating scales. The latter situation may be attributed to the narrow focus of the VSM intervention; for example, if a specific observable behavior or skill was the focus of the intervention, then the VSM intervention may have effectively addressed that behavior if significant improvements were observed after the conclusion of the intervention. On the other hand, broad rating scales may measure more than what is addressed through the VSM intervention. For example, the Social Skills scale on the SSIS, which was not found to improve significantly for any participants after the intervention was completed, may address skills for a wide variety of social situations besides just situations that entail the replacement of aggressive behavior. Thus, the Social Skills scale may not be sensitive in detecting changes due to an intervention specifically addressing aggressive behavior, even if a side benefit of that intervention is to improve social skills. Furthermore, not all of the items in a subscale may be related to aggression to the same degree. For example, the Emotional Control subscale on the BRIEF includes several items which may relate to aggressive behavior (e.g., “Has explosive, angry outbursts”) but also has other items which may not relate as strongly to aggression (e.g., “Mood changes frequently”). Even the way many of the items are phrased may also be too broad to effectively measure specific behaviors. The perception of an “angry outburst” may be different from one rater to another. Furthermore, many items that appear to relate to aggression (i.e., include words and phrases such as “angry outbursts” and “reacts strongly”) may be more applicable towards

reactive aggression, whereas aggression that is primarily proactive may not elicit an elevated Emotional Control score on the BRIEF. Global rating scales may also not be as sensitive to change as narrower measures. Schaeffer (2015) found that the Behavior Assessment System for Children – Second Edition (BASC-2) was not sensitive enough to detect changes in behavior as a result of the VSM intervention and she attributed that in part to the global nature of the subscales. The BRIEF and the SSIS may also be too broad to effectively measure specific behavior changes.

The former situation (i.e., more improvement detected in rating scales than in observations) is less clear. In this particular study, the aforementioned participants did not demonstrate significant improvement in observations because they exhibited non-aggressive behavior for a high percentage of the time even at baseline and there was little room for improvement. Thus, the more pertinent issue may involve understanding the discrepancy between rating scale input and observational data at baseline, which could influence the nature of the intervention. For example, a discrepancy may occur if the student is more aggressive in the presence of the teacher but was observed in settings where the teacher was not present, such as lunch.

In addition, the outcomes of any rating scale measurement can be influenced by factors such as social desirability and rater bias, including observer bias. Social desirability occurs when the rater answers items in the way they think the researcher or practitioner wants them answered (Fisher, 1993). Rater bias occurs when raters interpret rating scale items differently or the ratings are influenced by the raters' own characteristics (Hoyt, 2000). For example, the teachers' expectations of their students'

behavior coupled with his or her perceptions of the participant's actual behavior can influence rater bias. Teachers' expectations can be influenced by the climate within a school including school-wide expectations for positive behavior; it is thought that the results of this particular study were partially influenced by such systems issues. For instance, the participants who were reported as demonstrating more favorable change on behavior rating scales (i.e., AH, CG, and SJ) all attended the same elementary school, whereas the participants who demonstrated more favorable change through observations (i.e., LN, SR, and RK and MJ to some extent) all attended the same elementary school as one another. Additionally, not all parents completed each of the rating scales. While there may be differences between parents who completed forms and those who did not, all parents did complete forms in at least one of the phases. A possible explanation for the lack of follow-through by parents may be due to the teachers not checking with the parents on the progress of those forms, as the students who did not submit complete forms tended to be from the same classes.

Observer bias is similar to rater bias in that it occurs when the way observations are recorded are influenced by the observer's own characteristics. This study attempted to minimize observer bias as much as possible. Although different observers were assigned to different elementary buildings, all observers received the same training, and at least half of all observations were conducted with a co-rater to assure inter-observer agreement. As stated in the previous chapter, nearly all observations met the minimal percent agreement threshold (i.e., .80 or higher); however, when agreement due to chance

(e.g., guessing) was taken into account, only 25% of the observations met the threshold for Cohen's kappa (i.e., .60 or higher).

### **Limitations**

This study is of course not without limitations. In addition to the limitations noted in the previous sections such as possible social desirability, lack of sensitivity with the SSIS and BRIEF, rater bias and observer bias due to different observers at each school, there are other potential threats to internal validity. For instance, this study had no control group of students identified as at-risk in the area of aggressive behavior who did not participate in the VSM intervention for comparison. However, in single case research, the baseline phase is regarded as the “control” as it represents the absence of the intervention (Kratochwill et al., 2013). Furthermore, the onset of the intervention varied from participant to participant in order to control for changes that occurred due to the time of the school year.

Another potential threat to internal validity was the possibility that participants were involved in other concurrent interventions while the VSM intervention was being implemented. For ethical reasons, participants were not withdrawn from interventions already in place; however, students were excluded from receiving the VSM intervention through this study if they were receiving services through special education. For instance, two students whose parents initially consented for them to participate were later withdrawn from the study and did not receive the VSM intervention because they were found eligible for special education services and no longer participating in “Tier 2” per the definition established in this study. However, when they were withdrawn the

collection of baseline and post-intervention data ceased, so no comparisons could be made with regards to participants who received the VSM intervention with those who did not. Aside from interventions and accommodations that the teachers attempted to implement within the classroom (e.g., redirection, classroom behavior plan), the only reported concurrent intervention implemented outside the classroom was RK participating in a counseling group once every two weeks, which began in the middle of the VSM intervention, after baseline data had been collected.

Another potential threat to internal validity involved the number of observations that were conducted at baseline and at intervention, although it exceeded the minimum of three observations per phase as recommended by Kratochwill and colleagues (2013). Much like larger sample sizes are desirable in many research studies as they are more likely to represent the population being studied (Field, 2009), larger samples of observations are also desired as they are more likely to represent the population of behavior for a participant, especially if there is minimal variability among the observations (Kratochwill & Levin, 2014).

Finally, on a related note, another limitation included the fact that observations were only conducted during the baseline and post-intervention phases, and not during the implementation of the VSM intervention, which is typically part of a true multiple baseline design. This decision was made because due to the schedules of the researcher and assistants; it was not feasible to be at the schools for enough hours to implement the intervention and conduct observations simultaneously. However, this lapse makes it more difficult to connect changes in behavior to the timing of the intervention. A way that that

could be rectified in future studies is to delegate who would collect the data and who would implement the intervention, which may involve different team members. Although a potential drawback is that the person implementing the intervention would not have the first-hand knowledge of the students' behaviors seen at baseline, an additional bonus is that the participants' behavior post-intervention would likely be less influenced by the observer(s) because they would not associate the observer(s) with the VSM intervention.

This study also has potential threats to external validity that should be considered. For example, the sample size was much smaller than would be seen in large-sample research. Although the largest sample size found in VSM research was 89 participants (Cream et al., 2010), the sample in this current study was larger than has been found in most VSM studies (*mdn.* = 3). In addition, the participants involved in this study all resided in north Texas and attended a suburban school district, rendering it difficult to generalize the findings to other parts of the country or in other types of school districts. Although aggressive students reside all over the country, the nature and definition of aggression as well as factors influencing aggressive behavior can manifest differently in other regions, different types of school districts, or in any other type of group likely to embody different cultural values than the participants in this study. For example, these findings may not generalize well towards an urban population where the student body may encounter different threats not typically present among suburban students. In those instances, aggressive behavior may serve an adaptive purpose (Connor, 2002) and maladaptive aggression may require a different type of treatment. The cultural backgrounds were not explored extensively for these participants but may have been a

relevant factor in determining the efficacy of the VSM intervention. The sample of participants was fairly homogeneous (i.e., predominantly white male kindergarteners) and so the results may be difficult to generalize to student populations of different races and ethnicities, females, or older students.

In addition to generalizability to other parts of the country as well as other cultural groups, these findings may not generalize well to the home setting as the intervention took place within the school setting. Although parents are ideally kept abreast of their children's educational experiences including participation in RTI, the majority of school-based interventions are implemented within the school setting, especially in Tiers 1 and 2. With regards to positive behavioral interventions, parents do not become an integral part of the intervention until the child reaches the tertiary or Tier 3 level of support (i.e., wraparound), although some secondary or Tier 2 interventions (i.e., Parent Management Training; Kazdin et al., 1992) may involve the parents to some degree.

Depending on the skill that is being targeted in the video, the progress made through the VSM intervention may not generalize effectively in the setting outside of the video. For example, one participant's video depicted him standing quietly in line and he acknowledged that he liked that he was behaving well in the video. However, when he was observed post-intervention when his class was standing in line, other students were trying to bait him to get him to react, which he did. The video as was depicted did not show how the participant could have responded to the baiting; had the VSM intervention been explored from that angle, he could have utilized the skills that would have been self-modeled as a response towards those students.

## **Future Directions**

Although there is extensive literature discussing different types of aggressive behavior and biological and environmental factors that contribute to higher levels of aggression (e.g., Connor, 2002), most of the literature discusses individuals who display clinical levels of aggression who are likely to exhibit aggression to similar degrees in the school as well as in the home setting. Research has investigated the influence of the school environment on reinforcing and upholding bullying and aggressive behavior (e.g., Espelage, Polanin, & Low, 2014), and school-wide positive behavioral support initiatives may include involving parents in reducing and eliminating aggressive behavior. However, there is scant research on environment-specific aggressive behaviors, which children without identified disabilities (i.e., children at risk) may be more likely to exhibit compared to children with identified behavioral or emotional disabilities. Signs of environment-specific aggressive behavior may appear if there are significant disparities between parent and teacher reports in interviews or on behavior rating scales. Future research can investigate the prevalence of environment-specific aggression and factors that may contribute to its specificity (e.g., expectations set by parent and/or teacher).

Future studies can expand on the outcome of this study with regards to VSM as well as interventions to address aggressive behavior. As noted in the previous section, this study has limited generalizability to other parts of the country and other cultural groups. Future research can examine the efficacy of VSM in addressing aggressive behavior among students within an urban environment. These videos would likely have to go beyond showcasing positive skills displayed by the student and include the self-

modeling of strategies for dealing with difficult social situations in the student's school, neighborhood, or community. It would especially be essential for urban students (if they are able) to provide input into the making of the video, because they are not only the most knowledgeable about their backgrounds, but that may also help increase their motivation, which Bandura has noted as an important component of social learning. In addition, future research can also investigate the efficacy of VSM in addressing aggressive behavior among different cultural groups as a means of understanding how VSM may be most effectively implemented with these groups. For example, aggression that was targeted in this study included physical and verbal aggression; however, female students are more likely to engage in relational aggression (Connor, 2002), which was not a focus in this study. Future studies may examine how VSM may address relational aggression as well as bullying from the perspectives of the perpetrator, victim, and bystander. For example, a VSM video could show a bystander self-modeling how to react to a bullying situation.

Furthermore, VSM has been found to be effective with a wide variety of populations, as discussed in Chapter 2. Future VSM research could examine the logistics behind VSM and its efficacy. For example, can additional effects placed in the video impact the efficacy of VSM? VSM research has also not extensively examined the roles that attention and motivation play in VSM's effectiveness. Technological advances may also influence future research in VSM. For example, as the child watches the VSM video, eye tracking technology may help determine which aspects of the video the child is watching. In addition, creating interactive videos involves fairly new technology, and

future VSM research could examine whether making interactive VSM videos facilitates attention to the video.

Finally, future research can examine how VSM may be implemented within each of the tiers of RTI. VSM has traditionally been implemented at the equivalent of the tertiary or Tier 3 level, which is characterized by interventions implemented at a higher intensity towards individuals or very small groups (Jimerson et al., 2007). Future studies could examine the utility of VSM within wraparound services (Eber, 2001), which often includes supports designed to help parents manage their children's conduct in order to increase prosocial behavior. This study examined the utility of VSM as implemented with students at Tier 2. Future studies may investigate the implementation of VSM to small groups of students at a time where they make, watch, and discuss the VSM video together. In addition, research on VSM may examine its utility at Tier 1, which would involve an entire group. From a logistical standpoint, implementing a *self*-modeling intervention could be difficult at this tier since it entails the entire student body, but it may be feasible in a situation promoting the enforcement of basic tenets upheld by a school. For example, if the goal is to enforce being respectful to other peers, the VSM video could include all of the students demonstrating prosocial behavior and resolving conflicts, with several videos featuring different students.

## **Conclusion**

This study examined the efficacy of VSM as an intervention to address aggressive behavior among at-risk elementary students receiving Tier 2 interventions. The results of the study suggested that VSM could be a viable intervention to address aggressive

behavior. When aggressive behavior was assessed through observations, most participants demonstrated less aggression after the completion of the intervention, and for two of those participants the differences were statistically significant. For participants whose aggressive behavior was not significantly reduced after the VSM intervention, they exhibited relatively low frequencies of aggressive behavior at baseline, while participants who demonstrated substantially reduced aggressive behavior displayed the most aggression prior to the onset of the intervention. Behaviors that are of higher frequency among Tier 3 students or students with more intense needs may be of lower frequency among Tier 2 students, and so school psychologists and other intervention personnel may consider this when evaluating the efficacy of any Tier 2 intervention.

When aggressive behavior was assessed through rating scales, most participants did not demonstrate significant change in the areas of problem behaviors, social skills, and executive functions. The VSM intervention was implemented within the school setting, and due to its narrow focus, may not have been as generalizable outside of that setting. Thus, school psychologists would have to consider how the behavior of concern manifests itself in multiple settings as that can influence the nature of the intervention. In addition, the rating scales may have been too broad and not sensitive enough to capture any changes in behavior that may have occurred after the completion of the VSM intervention. Future research may investigate aggression in specific contexts as well as the efficacy of VSM in addressing aggressive behavior among culturally different students and in reducing relational aggression and bullying behavior. Furthermore, VSM

may also be explored as a viable intervention to address aggressive behavior across all tiers of RTI.

Aggressive behavior is a school- and community-based problem that can be related to bullying as well as destructive ways of coping with stressful situations. Historically, aggression was addressed reactively through disciplinary means. More recently, schools have strived to address aggressive behavior through prevention and early intervention. VSM has the potential to be a time- and cost-effective approach to addressing aggression within the schools. School psychologists may consider how VSM could be implemented to address aggression among at-risk children by accounting for its frequency and the contextual factors contributing to aggression and incorporating those into designing the intervention.

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## **APPENDIX A**

### **Teacher Interview – Baseline**

### **Teacher Interview - Baseline**

Date: \_\_\_\_\_

ID: \_\_\_\_\_

1. Does your student display aggressive behaviors? If so, describe the nature of the aggression in more detail.
  
  
  
  
  
  
2. When do you most likely see these behaviors? What things occur before the aggression takes place?
  
  
  
  
  
  
3. What happens after the aggression? What consequences does the child receive?
  
  
  
  
  
  
4. On a scale of 1 to 10 (10 = highest levels of aggression), how would you rate the child's level of aggression?
  
  
  
  
  
  
5. Describe your perception of the child's academic ability.
  
  
  
  
  
  
6. Does your student have or appear to have friends? Does your student display aggressive behavior towards any specific type of people?

## **APPENDIX B**

### **Parent Interview - Baseline**

### **Parent Interview - Baseline**

Date: \_\_\_\_\_

ID: \_\_\_\_\_

1. Does your child display aggressive behaviors? If so, describe the nature of the aggression in more detail.

2. When do you most likely see these behaviors? What things occur before the aggression takes place?

3. What happens after the aggression? What consequences does the child receive?

4. Has your child been aggressive in the past, or is it something that has started this year?

5. On a scale of 1 to 10 (10 = highest levels of aggression), how would you rate the child's levels of aggression?

6. Does your child have or appear to have friends? Does your child display aggressive behavior towards his or her siblings or towards any specific type of people?

**APPENDIX C**  
**Teacher Input Form – Post-intervention**

## **Teacher Input Form – Post-intervention**

1. Behavior targeted through video self-modeling:
  2. Have you seen improvement or change in this targeted area since the intervention? If so, describe the change.
  3. On a scale of 1 – 10, how easy was it to implement the VSM intervention?
  4. What aspects of this project would you like to see changed, or what suggestions (if any) do you have?
  5. Any other questions or concerns related to your participation in this project?

**APPENDIX D**  
**Parent Input Form – Post-intervention**

## **Parent Input Form – Post-intervention**

1. Behavior targeted through video self-modeling:
  2. Have you seen improvement or change in this targeted area since the intervention?
  3. Did your child discuss the process of making the movie?
  4. Would you be interested in your child participating in a video self-modeling research study in the future?
  5. Any other questions or concerns?

**APPENDIX E**  
**Movie Watching Reinforcement Form**

### **Movie Watching Reinforcement Form**

**Teachers:**

**Prior to pressing play, please make sure:**

- 1. The movie is ready prior to calling over the student.**
- 2. You limit distractions by permitting the student to watches his/her own movie alone (without other children around).**
- 3. You provide minimal verbal interactions with the student while he/she watches the video.**

\_\_\_\_\_ **watched his/her movie all of these days!**

Monday	Tuesday	Wednesday	Thursday	Friday
Monday	Tuesday	Wednesday	Thursday	Friday

**After watching your movie 10 times, you will receive \_\_\_\_\_!**

**APPENDIX F**

**Aggression Observation Form**

### **Aggression Observation Form**

Student Name: \_\_\_\_\_ Date: \_\_\_\_\_ Teacher/Subject: \_\_\_\_\_

Time In/Out: \_\_\_\_\_ / \_\_\_\_\_ Class Size: \_\_\_\_\_ Class Activity: \_\_\_\_\_

Observer: \_\_\_\_\_ Observation #: \_\_\_\_\_

Interval	Time	Target Student			Peer		
		Behavior	Type	Examples	Behavior	Type	Examples
1	1 min.	+ P V	I R				
2	2 min.	+ P V	I R				
3	3 min.	+ P V	I R		+ P V	I R	
4	4 min.	+ P V	I R				
5	5 min.	+ P V	I R				
6	6 min.	+ P V	I R		+ P V	I R	
7	7 min.	+ P V	I R				
8	8 min.	+ P V	I R				
9	9 min.	+ P V	I R		+ P V	I R	
10	10 min.	+ P V	I R				
11	11 min.	+ P V	I R				
12	12 min.	+ P V	I R		+ P V	I R	
13	13 min.	+ P V	I R				
14	14 min.	+ P V	I R				
15	15 min.	+ P V	I R		+ P V	I R	
16	16 min.	+ P V	I R				
17	17 min.	+ P V	I R				
18	18 min.	+ P V	I R		+ P V	I R	
19	19 min.	+ P V	I R				

20	20 min.	+ P V	I R				
21	21 min.	+ P V	I R		+ P V	I R	
22	22 min.	+ P V	I R				
23	23 min.	+ P V	I R				
24	24 min.	+ P V	I R		+ P V	I R	
25	25 min.	+ P V	I R				
26	26 min.	+ P V	I R				
27	27 min.	+ P V	I R		+ P V	I R	
28	28 min.	+ P V	I R				
29	29 min.	+ P V	I R				
30	30 min.	+ P V	I R		+ P V	I R	

### Summary of Observations

Example	Symbol	Example	Symbol
Punching	PU	Taunting	TT
Slapping	SL	Threats	TH
Shoving	SH	Inciting Aggression	IA
Kicking	K	Teasing	TE
Tugging Clothing/Arm	TU	Screaming	SC
Tapping on Body	TP		
Chasing/Grabbing	CG		
Play Wrestling	PW		
Biting/Spitting	BS		
Object Aggression	OA		

**Target Student:**

No Aggression: \_\_\_\_\_ / \_\_\_\_\_ = \_\_\_\_\_ %

Physical Aggression: \_\_\_\_\_ / \_\_\_\_\_ = \_\_\_\_\_ %

Verbal Aggression: \_\_\_\_\_ / \_\_\_\_\_ = \_\_\_\_\_ %

**Peers:**

No Aggression: \_\_\_\_\_ / \_\_\_\_\_ = \_\_\_\_\_ %

Physical Aggression: \_\_\_\_\_ / \_\_\_\_\_ = \_\_\_\_\_ %

Verbal Aggression: \_\_\_\_\_ / \_\_\_\_\_ = \_\_\_\_\_ %

**Key**

**+ = No Aggressive Behaviors; I = Initiating Aggressive Behaviors; R = Reacting with Aggressive Behaviors**

**P = Physical Aggression –examples:**

<b>Example</b>	<b>Symbol</b>	<b>Definition</b>	<b>Total</b>
Punching	PU	Done with a closed fist in either the forehand or backhand to any part of the body.	
Slapping	SL	Done with open palm in either forehand or backhand to any part of the body.	
Shoving	SH	Done as a blocking motion with either forearm or palm that physically moves another.	
Kicking	K	Any kicking motion that is done with clear, malicious intent.	
Tugging Clothing/Arms	TU	Pulling or tugging on clothing or arms to pester or distract another.	
Tapping on Body	TP	Tapping on or otherwise touching another's shoulder, back, head, or leg to pester or distract.	
Chasing/Grabbing	CG	Running after or grabbing another in an effort to touch or impede progress in a manner that is harassing.	
Play Wrestling	PW	Grabbing another as if to throw or force them to the ground. Acting in a rough, aggressive way but with a clear, malicious intent.	
Biting/Spitting	BS	Biting occurs when teeth come into contact with a person or their clothing. Spitting occurs when saliva is produced and is forced from the mouth towards another individual or their possessions.	
Object Aggression	OA	Intentionally using physical force to damage or to attempt to damage their own or others' materials.	

**V = Verbal Aggression –examples:**

<b>Example</b>	<b>Symbol</b>	<b>Definition</b>	<b>Total</b>
Taunting	TT	Use of unkind or slanderous remarks with intention of harming another's reputation or standing (i.e., "You're ugly and you smell!").	

Threats	TH	Use of statements that profess future harm or danger of future harm to another. This would include nonverbal gestures (i.e., raising a fist and pointing to a person and saying “I’m gonna rip your face off and throw you down the stairs!”).	
Inciting Aggression	IA	Verbal or nonverbal encouragement to others to commit physical or verbal aggression (i.e., “Go kick Tommy in the butt because he’s a loser!”).	
Teasing	TE	To pester, annoy, or upset another by use of jokes, questions, noises, or other verbal/nonverbal means. Other nonverbal means would include making faces or imitating behavioral characteristics of another (i.e., pulling the corners of your eyelids upwards and saying “Now I look just like Li! Open your eyes, open your eyes, open your eyes!”).	
Screaming	SC	Producing a loud, high-pitched noise and/or using statements at an increased volume to indicate displeasure or cause harm.	

## **APPENDIX G**

### **Teacher Consent Form**

**TEXAS WOMAN'S UNIVERSITY**  
**CONSENT TO PARTICIPATE IN RESEARCH**  
***Teacher Consent Form***

**Title: The Efficacy and Utility of Video Self-Modeling Interventions**

Principal Investigator: Wendi L. Johnson, PhD.....wjohnson4@twu.edu  
940/898-2329

Co-Investigator: Mark Ruggles, PhD.....mruggles@ldisd.net  
940/497-8455

**Explanation and Purpose of the Research**

You and your child or adolescent are being asked to participate in a research study examining the use of video self-modeling (VSM) as an intervention for social, behavioral, or functional skill deficits. The purpose of this research is to determine the effectiveness of VSM with students of various ages and differing areas of need.

**Description of Procedures**

Video self-modeling (VSM) is an intervention method where a positive behavior is captured on video through the use of supports such as peer modeling, direct teaching of the skill, or role-play situations (acting out based on a script). The video is then edited where the supports are removed and the final product is a 2-3 minute “movie” where the child views him/herself engaging in only the positive, desired behavior. Previous research in this area demonstrates that the child is more likely to engage in the desired behavior after viewing his/her behavioral success on video.

The project will begin with the “pre-intervention phase” where a behavior or skill will be identified through interviews with the parent, teacher and student, and possibly classroom or community observations with direct assessments and the completion of screening instruments and/or standardized rating scales. Next during the intervention phase, your students will participate in individual or small group sessions that work on specific skill development through educational games or activities, role plays, or direct teaching of the behavior or skill. Then, the desired behavior will be captured on video through imitation, or role playing. Children often enjoy having the opportunity to be the “star” in their own movie. The researchers will then edit the footage and splice together a 2-3 minute movie of the student engaging in the desired positive behavior or skill. Lastly, during the “post-intervention” phase, the skill or behavior that was worked on will be monitored to determine if the child has mastered the skill and is able to display it in various settings.

**Potential Risks**

A potential risk for involvement in this project may be loss of educational time if the project is being completed through your child’s school. The estimated time that your child will need to participate will be 30 minutes, one time per week for a six week period for the skills training and video-taping time. Additionally, approximately 15 minutes will

be utilized in the beginning to gain assent from the child, describe the project, and discuss the behavior or skill that will be worked on in the intervention. Approximately 45 minutes before and after the intervention will be utilized to obtain a direct assessment of working memory and other types of skills. After the movie is completed, the child will watch their movie one time a day (5 minutes) for two weeks. The estimated total time for involvement for your child is approximately five hours over the school year, with the majority of time involvement occurring in the middle of the school year. The goal is to target a behavior or skill that may be impeding your student's educational progress so by intervening in this area, your student's overall educational progress may improve.

Another potential risk is the loss of confidentiality. The student's privacy will be protected at all times. Only those individuals directly involved in the project (e.g., instructional staff, research team) will have access to the video footage. During the study, the video footage will be maintained by the researcher. Once each child's movie is put together, it will be provided to the classroom teacher (if being completed in a classroom setting) on a DVD. You as the classroom teacher are being asked to sign this consent form stating an understanding of the importance of maintaining the confidentiality of the participants. Each participant will be given a code number at the initiation of the project. This code number will be used on all rating scales, observation forms, and interview forms. The master list with the code number and corresponding participant's name will be stored separately from the other identifiable data. There is a potential risk of loss of confidentiality in all email, downloading, and internet transactions. Parents are given the option of what will be done with the videos upon the conclusion of the study. Parents can choose to have all videos destroyed, obtain a copy of the video on DVD and destroy all other footage, or obtain a copy on DVD and the primary investigator maintains a copy for educational and training purposes. The interviews will be held over the phone or in a private location. A code number, not your child's real name, will be used on all identifiable information. All paper documents will be stored in a locked cabinet in the researcher's locked office. The videos will be saved on a computer in a locked room. The paper documents will be shredded within 5 years after the study is finished. The results of the study may be reported in scientific magazines or journals but the student's names or any other identifying information will not be included.

There is also the potential loss of anonymity. As instructional staff and the other students in the classroom will know who is participating, there is no guarantee of anonymity. Instructional staff and students will be informed of the nature of the study and assent will be obtained from the students for their participation. Parents and students have the right to withdrawal from the project at any time.

Potentially there may be some feelings of embarrassment or emotional discomfort as students will be participating together in a small group. Students will be informed prior to the intervention beginning what will take place during each session. Students will also have the opportunity during the first two sessions to practice a new skill, have it modeled by the facilitator, or practice at home to increase the likelihood of proficiency. Students will also

be involved in the choosing of the target behavior and in the scenarios to obtain the positive behavior on video. Students will take turns being the “director” as well as the “star” and “co-star” of the different clips. This involvement in the planning and leading of the videos lessens the likelihood of embarrassment and increases the enjoyment in the process. In the past, students have greatly enjoyed the making their “movie” in which they are the star. Should feelings of embarrassment or emotional discomfort surface, participants have the right to stop participating at any time. A referral list of area mental health professionals is provided with this form.

If parents choose not to participate, there will be no negative effects on the student’s standing in the class and an alternative learning activity will be provided for the student by the instructional staff. Students will be informed of the project through a discussion in their classroom by the primary researcher. All participants and parents have the right to ask questions at any time during the project.

The researchers will try to prevent any problem that could happen because of this research. You should let the researchers know at once if there is a problem and they will help you. However, TWU does not provide medical services or financial assistance for injuries that might happen because you are taking part in this research. Please contact the primary investigator, Wendi Johnson Ph.D., at (940) 898-2329 or email at [wjohnson4@twu.edu](mailto:wjohnson4@twu.edu) should you have any questions or concerns.

### **Participation and Benefits**

Your student’s involvement in this study is completely voluntary and you may withdraw from the study at any time. Participants will have the opportunity to take part in the video self-modeling intervention free of charge. Given the engaging nature of the intervention with the participants being the “star” of a movie made just for them, the intervention is typically enjoyable to participants. Parents will also receive a DVD copy of their child’s movie engaging in the desired behavior if they choose so. Also, potentially participants will see an improvement in a behavior or skill that has previously impacted their educational growth.

### **Questions Regarding the Study**

You will be given a copy of this signed and dated consent form to keep. If you have any questions about the research study you should ask the researchers; their phone numbers are at the top of this form. If you have questions about your child’s rights as a participant in this research or the way this study has been conducted, you may contact the Texas Woman’s University Office of Research and Sponsored Programs at 940-898-3378 or via e-mail at [IRB@twu.edu](mailto:IRB@twu.edu)

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Signature of Teacher

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Date

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Email

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School Phone Number

## **APPENDIX H**

**Parent/Guardian Consent Form and Student Assent**

**TEXAS WOMAN'S UNIVERSITY**  
**CONSENT TO PARTICIPATE IN RESEARCH**  
*Parent/Guardian Consent Form and Student Assent*

**Title: The Efficacy and Utility of Video Self-Modeling Interventions**

Principal Investigator: Wendi L. Johnson, PhD.....wjohnson4@twu.edu  
940/898-2329

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**Explanation and Purpose of the Research**

You and your child or adolescent are being asked to participate in a research study examining the use of video self-modeling (VSM) as an intervention for social, behavioral, or functional skill deficits. The purpose of this research is to determine the effectiveness of VSM with students of various ages and differing areas of need.

**Description of Procedures**

Video self-modeling (VSM) is an intervention method where a positive behavior is captured on video through the use of supports such as peer modeling, direct teaching of the skill, or role-play situations (acting out based on a script). The video is then edited where the supports are removed and the final product is a 2-3 minute “movie” where the child views him/herself engaging in only the positive, desired behavior. Previous research in this area demonstrates that the child is more likely to engage in the desired behavior after viewing his/her behavioral success on video.

The project will begin with the “pre-intervention phase” where a behavior or skill will be identified through interviews with the parent, teacher and student, and possibly classroom or community observations with direct assessments and the completion of screening instruments and/or standardized rating scales. Next during the intervention phase, your student will participate in individual or small group sessions that work on specific skill development through educational games or activities, role plays, or direct teaching of the behavior or skill which will be captured on video through imitation or role playing. Children often enjoy having the opportunity to be the “star” in their own movie. The researchers will then edit the footage and splice together a 2-3 minute movie of your child engaging in the desired positive behavior or skill. Lastly, during the “post-intervention” phase, the skill or behavior that was worked on will be monitored to determine if the child has mastered the skill and is able to display it in various settings.

**Potential Risks**

A potential risk for involvement in this project may be loss of educational time if the project is being completed through your child’s school. The estimated time that your child will need to participate will be 30 minutes, one time per week for a six week period for the skills training and video-taping time. Additionally, approximately 15 minutes will

be utilized in the beginning to gain assent from the child, describe the project, and discuss the behavior or skill that will be worked on in the intervention. Approximately 45 minutes before and after the intervention will be utilized to obtain a direct assessment of working memory and other types of skills. After the movie is completed, the child will watch their movie one time a day (5 minutes) for ten school days. The estimated total time for involvement for your child is approximately five hours over the school year, with the majority of time involvement occurring in the middle of the school year. The goal is to target a behavior or skill that may be impeding your child's educational progress so by intervening in this area, your child's overall educational progress may improve.

Another potential risk is the loss of confidentiality. Your child's privacy will be protected at all times. Only those individuals directly involved in the project (e.g., instructional staff, research team) will have access to the video footage. During the study, the video footage will be maintained by the researcher. Once each child's movie is put together, it will be provided to the classroom teacher (if being completed in a classroom setting) on a DVD. Each classroom teacher will also be required to sign a consent form stating an understanding of maintaining the confidentiality of the participants. Each participant will be given a code number at the initiation of the project. This code number will be used on all rating scales, observation forms, and interview forms. The master list with the code number and corresponding participant's name will be stored separately from the other identifiable data. There is a potential risk of loss of confidentiality in all email, downloading, and internet transactions. Parents are also given the option of what will be done with the videos upon the conclusion of the study. Parents can choose to have all videos destroyed, obtain a copy of the video on DVD and destroy all other footage, or obtain a copy on DVD and the primary investigator maintains a copy for educational and training purposes. The interviews will be held over the phone or in a private location. A code number, not your child's real name, will be used on all identifiable information. All paper documents will be stored in the researcher's locked office. The videos will be saved on a computer in a locked room. The paper documents will be shredded within 5 years after the study is finished. The results of the study may be reported in scientific magazines or journals but your child's name or any other identifying information will not be included.

There is also the potential loss of anonymity. As instructional staff and the other students in the classroom will know who is participating, there is no guarantee of anonymity. Instructional staff and students will be informed of the nature of the study and assent will be obtained from the students for their participation. Parents and students have the right to withdrawal from the project at any time.

Potentially there may be some feelings of embarrassment or emotional discomfort as students will be participating together in a small group. Students will be informed prior to the intervention beginning what will take place during each session. Students will also have the opportunity during the first two sessions to practice a new skill, have it modeled by the

facilitator, or practice at home to increase the likelihood of proficiency. Students will also be involved in the choosing of the target behavior and in the scenarios to obtain the positive behavior on video. Students will take turns being the “director” as well as the “star” and “co-star” of the different clips. This involvement in the planning and leading of the videos lessens the likelihood of embarrassment and increases the enjoyment in the process. In the past, students have greatly enjoyed the making their “movie” in which they are the star. Should feelings of embarrassment or emotional discomfort surface, participants have the right to stop participating at any time. A referral list of area mental health professionals is provided with this form.

If parents choose not to participate in the school component, there will be no negative effects on the student’s standing in the class and an alternative learning activity will be provided for the student by the instructional staff. Students will be informed of the project through a discussion in their classroom by the primary researcher. All participants and parents have the right to ask questions at any time during the project.

The researchers will try to prevent any problem that could happen because of this research. You should let the researchers know at once if there is a problem and they will help you. However, TWU does not provide medical services or financial assistance for injuries that might happen because you are taking part in this research. Please contact the primary investigator, Wendi Johnson Ph.D., at (940) 898-2329 or email at [wjohnson4@twu.edu](mailto:wjohnson4@twu.edu) should you have any questions or concerns.

### **Participation and Benefits**

Your child’s involvement in this study is completely voluntary and you may withdraw from the study at any time. Participants will have the opportunity to take part in the video self-modeling intervention free of charge. Given the engaging nature of the intervention with the participants being the “star” of a movie made just for them, the intervention is typically enjoyable to participants. Parents will also receive a DVD copy of their child’s movie engaging in the desired behavior if they choose so. Also, potentially participants will see an improvement in a behavior or skill that has previously impacted their educational growth.

### **Questions Regarding the Study**

You will be given a copy of this signed and dated consent form to keep. If you have any questions about the research study you should ask the researchers; their phone numbers are at the top of this form. If you have questions about your child’s rights as a participant in this research or the way this study has been conducted, you may contact the Texas Woman’s University Office of Research and Sponsored Programs at 940-898-3378 or via e-mail at [IRB@twu.edu](mailto:IRB@twu.edu).

### **Outcome of Video Footage**

At the conclusion of this project, you have the right to decide the outcome of the video footage utilized for the VSM intervention. Please mark one of the following options:

- I would like all video footage to be destroyed
- I would like a DVD of my child's VSM intervention movie, and all video footage destroyed
- I would like a DVD of my child's VSM intervention movie, and the video can be used for educational purposes by the primary investigator

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Signature of Parent/Guardian

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Date

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Email

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Phone Number

\*If you would like to know the results of this study tell us where you want them to be sent:

Address:

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**Student Assent**

The video self-modeling project has been explained to me and I have had the opportunity to ask questions.

I agree to participate in the project \_\_\_\_\_ (student signature).

I do not agree to participate in the project due to

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Date assent was obtained: \_\_\_\_\_.

## **APPENDIX I**

### **SMART Goals**

### **SMART Goals**

Participant	SMART Goals
AH	In the classroom environment, given a maximum of one verbal cue, AH, will attend to a non-preferred, small-group activity and/or independent assignment, without protest, and remain on task with no task avoidance (i.e., asking to go to the bathroom, walking around the classroom, etc.) for five minutes, as measured by observations and teacher documentation.
CG	In the classroom environment, CG will utilize positive self-talk and coping strategies to handle stressful situations or work demands in which he manifests aggressive and off-task behavior (i.e., breaking/destroying classroom materials, putting his head down, refusing to complete work, walking around the classroom, etc.), demonstrated by engaging in the activity or situation in a calm and positive manner with no more than one verbal or gestural prompt for redirection on 3 out of 4 occasions, as measured by observations and teacher documentation.
SJ	When presented with a problem (i.e., non-preferred task, frustrating situation, criticism/correction, etc.), SJ will determine the size of the problem (big problem, little problem) and decide the emotional response (i.e., take a break, talk with teacher, take a deep breath, replace frustration with good thoughts, etc.) and return to the task presented in 2 out of 4 occasions, as measured by observations and teacher documentation.
JS	When interacting with peers in less structured environments (i.e., in line, during lunch, during recess), JS will respect the boundaries of his peers by keeping his hands to himself for up to five minutes, as measured by observations and teacher documentation.
LN	When interacting with peers in less structured environments (i.e., in line, during lunch, during recess), LN will respect the boundaries of his peers by keeping his hands to himself for up to five minutes, as measured by observations and teacher documentation.
MJ	When interacting with peers in less structured environments (i.e., in line, during lunch, during recess), MJ will respect the boundaries of his peers by keeping his hands to himself for up to five minutes, and use coping strategies to handle frustrating situations (i.e., not being first in line) on 3 out of 4 occasions, as measured by observations and teacher documentation.

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RK	When interacting with peers in less structured environments (i.e., lunch or recess), RK will demonstrate prosocial means (e.g., helping peers, talking to peers as a means of resolving conflicts rather than yelling at them) of getting a peer's positive attention on 4 out of 5 occasions, as measured by observations and teacher documentation.
SR	When interacting with peers in less structured environments (i.e., lunch or recess), SR will demonstrate prosocial means (i.e., saying hello, asking peers to play on the playground) of getting a peer's positive attention on 4 out of 5 occasions, as measured by observations and teacher documentation.

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