THE EFFECTIVENESS OF A SOCIAL SKILLS INTERVENTION FOR PREVENTING AGGRESSION IN CHILDREN: AN EVALUATION OF THE *MAKING CHOICES* INTERVENTION

Traci L. Wike

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Approved by:

Chair: Mark W. Fraser, Ph.D.

Sarah E. Bledsoe, Ph.D.

Maeda Galinsky, Ph.D.

Kathleen C. Gallagher, Ph.D.

Shenyang Guo, Ph.D.

ABSTRACT

TRACI L. WIKE: The Effectiveness of a Social Skills Intervention
for Preventing Aggression in Children:
An Evaluation of the *Making Choices* Intervention
(Under the direction of Dr. Mark W. Fraser)

Exhibiting aggressive behavior in childhood places a child at risk for a host of negative outcomes, including peer-rejection and social maladjustment, as well as later problems with substance use, relationship violence, crime and delinquency. As a result, social development researchers emphasize the need to establish prevention interventions in early childhood in order to interrupt a developmental trajectory toward further aggression and violence. Universal, social skills interventions rooted in a social-cognitive framework have shown promise in promoting social competence and decreasing aggressive behaviors in elementary-aged children. This dissertation evaluates the *Making Choices* program, a school-based, social problem-solving intervention that strengthens children's social information processing and emotion regulation skills and in doing so, reduces aggressive behavior and increases positive social behavior.

The study sample consists of 548 children (223 intervention, 325 control) attending nine schools in two school districts in the Southeastern United States. The intervention was implemented over a 2-year period for students in third to fifth grades. Data were collected over 6 time points: fall and spring of third grade (n=548), fall and spring of fourth grade (n=435), and fall and spring of fifth grade (n=373).

Compared with children in the comparison condition, children who received the *Making Choices* lessons scored lower on teacher-rated relational aggression at fourth and fifth grades, and lower on teacher-rated overt aggression at fourth grade. *Making Choices* children were also rated higher on teacher-rated measures of social competence and prosocial behavior at grades 4 and 5. Significant increases in emotion regulation were observed for the intervention group at grade 5. The findings suggest that the *Making Choices* program effectively strengthens children's social-emotional skills, decreases aggressive behavior, and increases children's overall social competencies. This study provides additional evidence that social cognitive interventions show utility in preventing problematic social behaviors and contribute positively to children's healthy social development.

For Mom and Dad

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CHAPTER 1
INTRODUCTION

Aggression and violence committed by youth continues to garner attention as a significant public health problem in the United States. In 2005, 5,686 youth died as a result of violence, making homicide the second leading cause of death for youth ages 10-24 years (Centers for Disease Control and Prevention, 2008a). In 2009, the Youth Risk Behavior Survey (YRBS) found that among a nationally representative sample of youth in grades 9-12, 31.5% reported being in a physical fight in the 12 months preceding the survey, 11.1% reported being in a physical fight on school property 12 months prior to the survey, 7.7% reported being threatened or injured with a weapon on school property one or more times, and 5.6% reported carrying a weapon (gun, knife or club) on one or more days in the 30 days preceding the survey. In addition, 5% of students in grades 9-12 did not attend school because of concerns about their safety (Centers for Disease Control and Prevention, 2008b).

The United States Department of Justice reports that rates of youth violence have decreased since the early 1990s (Devoe, Peter, Noonan, Snyder, & Baum, 2005), and although the years 2005 and 2006 showed an upward climb, rates have declined since 2006 (Centers for Disease Control and Prevention, 2008b). However, examination of various key indicators of violence has produced disparate conclusions regarding this trend. For example, arrest rates since 1993 have decreased, but confidential reports by youth about their own violent behaviors showed no decline between 1993 and 2001 (U.

S. Department of Health and Human Services, 2001). Girls' rates of arrest for aggravated assault increased by 80% compared to an increase of only 4% for males from 1980 to 2008 (Puzzanchera, 2009), suggesting that while overall juvenile arrest rates have declined, perpetration of violence by girls may be increasing.

In addition, bullying violence continues to be a growing problem. Recent reports of youth suicides resulting from repeated bullying and victimization have added to already existing concerns about the effects of bullying. In a national study on bullying prevalence, researchers found that 30% of sixth to tenth graders had experienced bullying at school as either a victim, perpetrator, or both (Nansel et al., 2001). In 2007, 32% of youth ages 12-18 years reported being bullied at some point throughout the school year. Seventy-nine percent of those who had been bullied indicated that they were bullied inside the school and 7% of those victims said they had been bullied almost daily (Robers, Zhang, Truman, & Snyder, 2010). A rise in incidents of electronic aggression or cyber-bullying has increased awareness of newer forms of violence that have developed as a result of society's increasing access and dependence on communication technology (David-Ferdon & Hertz, 2009). Without a doubt, incidents of school and community violence, increases in girls' aggression, and bullying through electronic media reflect trends in youth violence based on our evolving social landscape. Therefore, understanding and addressing the factors that contribute to youth violence remain a pressing societal concern.

Childhood Aggression as a Predictor for Violent Behavior

Research exploring the developmental pathways to violence consistently shows that aggressive behavior in childhood serves as a robust predictor for later antisocial

outcomes in adolescence and adulthood, including perpetration of violence (Coie, Lochman, Terry, & Hyman, 1992; Parker & Asher, 1987a). Children who exhibit aggressive behavior in early childhood, referred to as *early starters,* are at heightened risk for experiencing later problems in childhood and adolescence in areas such as peer relationships, substance use, academic failure, and further violent behavior (Dodge & Pettit, 2003; Moffitt, 1993; Prinstein & La Greca, 2004; Tremblay et al., 2004). Early-start youth are also more likely than their peers to follow a *life-course-persistent* trajectory of problem behaviors that follow them into adolescence and adulthood, such as violent crime, dating and relationship violence, substance abuse, and various forms of delinquency (Brame, Nagine, & Tremblay, 2001; Moffitt, 1993; Moffitt & Caspi, 2001; Tremblay et al., 2004). Displaying aggression in early childhood also elevates a child's risk of conduct disorder or oppositional defiant disorder, which both serve as risk factors for later problem behavior (Williams, Ayers, & Arthur, 1997). Proximal outcomes associated with children exhibiting aggressive behavior in middle and late childhood include having more social difficulties than non-aggressive peers, being rated as less well-liked by peers, experiencing more social rejection than peers, and having lower levels of academic achievement (Nansel et al., 2004; Werner & Crick, 2004). Regardless of the timing of onset, aggressive behavior has consistently proven to be a significant risk factor impacting children's developmental outcomes.

Harmful consequences also exist for children who serve as targets for aggression. In a study of bullying and victimization, Nansel et al. (2004) found that victims of bullying reported greater difficulty with social and emotional adjustment, poorer relationships with classmates, greater health problems, and more internalizing problems,

such as depression and anxiety. In addition, victimization by peers has been reported as an important risk factor in the development of aggression and antisocial behavior, as it can increase a child's risk of becoming a perpetrator of bullying behavior as well as a victim of bullying behavior (Dodge et al., 2003; Miller-Johnson, Coie, Maumary-Gremaud, Bierman, & Group, 2002). Bullies who are also peer-victimized have reported greater difficulties with classmate relationships, alcohol use, and weapon carrying (Nansel et al., 2004).

Although aggressive behavior can stem from a variety of factors, studies show that peer relationships can influence the development and/or maintenance of aggression in children (Bagwell, 2004; Dodge et al., 2003; Parker & Asher, 1987b). Early relationships with peers offer children opportunities to learn social norms and develop relationship skills that provide the foundation for positive relationships in adolescence and adulthood. Children who display socially inappropriate behaviors with their peers are at greater risk for peer rejection and isolation, and thus, may miss out on opportunities to develop social competencies important to their social development (Dodge et al., 2003; Garner & Lemerise, 2007).

Consistent with the developmental literature, intervention research has shown that universal, school-based programs targeting social and emotional skills-building have been successful in decreasing aggressive behaviors and increasing children's social competence with peers (Durlak, Weissberg, Dymnicki, Taylor, & Schellinger, 2011; Wilson & Lipsey, 2007). The focus of this dissertation research is to evaluate the effectiveness of a classroom-based, social skills intervention aimed at reducing physical and relational aggression by increasing social competence. The *Making Choices* (MC)

program is a universal, prevention intervention that is delivered in the form of a classroom curriculum rooted in the Reformulated Social Information Processing Model (SIP). The research reported here uses within-grade change hierarchical linear modeling (HLM) to assess intervention effects of the *Making Choices* program in decreasing aggressive behaviors and increasing social competence for elementary-aged children. Key scientific aims address whether the *Making Choices* intervention reduces overt and relational aggression and increases social competency for participants over time and whether the intervention varies in impact for subgroups of children based on theoretical moderators. Three specific research questions related to intervention effectiveness are examined:

> Question 1: Do intervention participants show a reduction in overt aggressive behavior over the study period?
>
> Question 2: Do intervention participants show a reduction in relationally aggressive behavior over the study period?
>
> Question 3: Are observed intervention effects moderated by gender, race/ethnicity, or poverty status?

Dissertation Overview

This dissertation is organized into seven chapters. Chapter two presents a review of the literature to date on the etiology and consequences of aggression for children's social development, including definitions of different types of aggression, specific risk and protective factors for aggression, and differential impacts of aggressive strategies. Chapter three provides a theoretical context for examining the mechanisms by which peer relationships influence children's aggression using the Reformulated Social Information Processing Model (Crick & Dodge, 1994). The basic tenets of the theory are provided followed by a discussion of its applicability as the framework for intervention. Chapter

four reviews relevant universal prevention intervention strategies that purport to interrupt developmental trajectories leading to aggressive behavior in childhood, including a comprehensive review of the literature supporting the intervention that serves as the focus of this dissertation, *Making Choices*. Chapter five describes the research design, sample, and analytic methods used to conduct this study. Chapter six presents an overview of the study findings. Chapter seven concludes the paper by discussing implications of the findings for social work practice, policy, and research, including future directions for intervention research.

CHAPTER 2
BACKGROUND AND SIGNIFICANCE

Defining Aggression

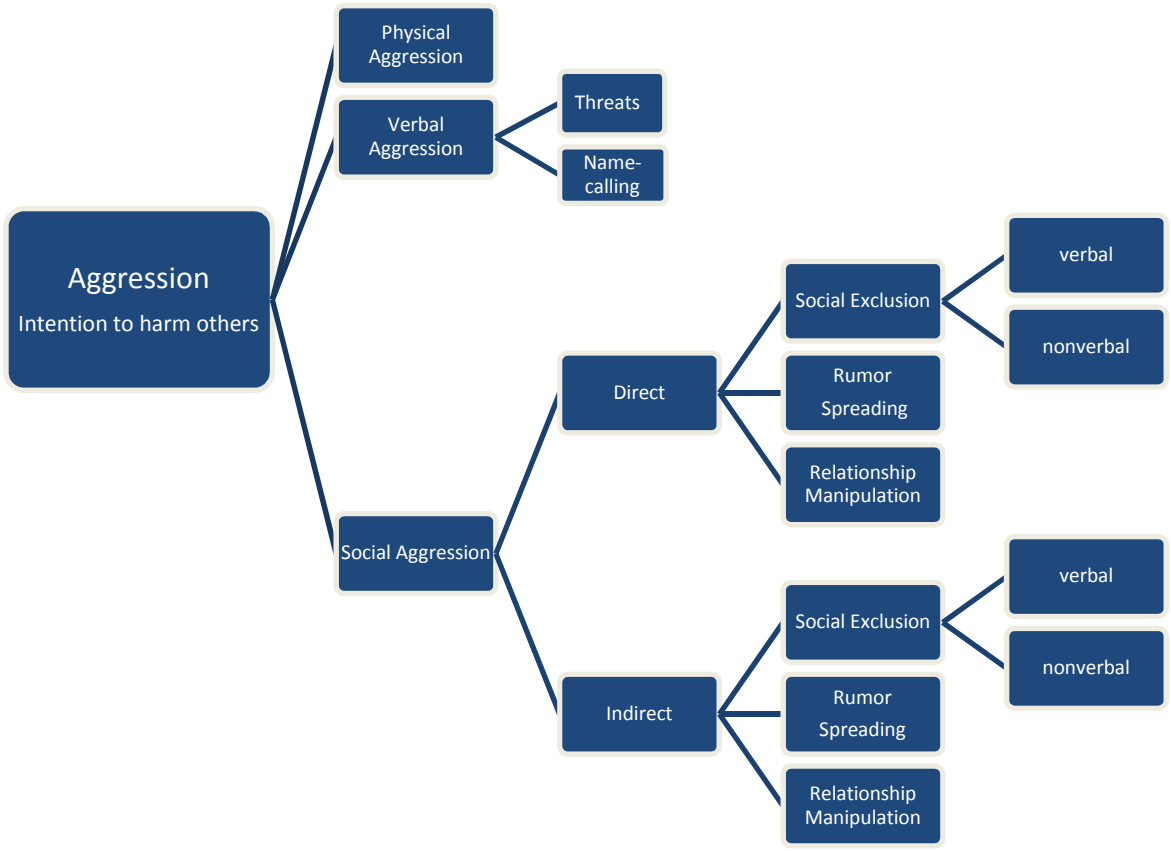
Historically, aggression has been defined as overt, physical manifestations of behavior, also referred to as direct, physical, or overt aggression. Behaviors associated with overt aggression include hitting, kicking, teasing, name-calling, and shoving others. Verbal aggression, such as yelling and making threatening remarks often co-occurs with physical aggression and has commonly been included in research on overt aggression. Overt aggression involves the use of direct, confrontational behaviors with the intention of inflicting physical harm to another person. Overt aggression is often associated with bullying behavior, but an important distinction is that bullies seek to exert power and control over others using aggression, whereas exhibiting aggressive behavior in itself does not make one a bully (Williford, Brisson, Bender, Jenson, & Forrest-Bank, 2010).

Recent studies have examined more covert forms of aggression, termed social, relational, or indirect aggression. Although subtle distinctions exist for each of these terms, and the behaviors are not always indirect, the terms are often used interchangeably to represent aggressive behaviors that attempt to harm another person's social relationships and/or self-esteem (Card, Stucky, Sawalani, & Little, 2008). Social aggression refers to manipulating group acceptance by excluding or attacking the character of another person (Cairns, Cairns, Neckerman, Ferguson, & Gariepy, 1989).

Relational aggression describes behaviors aimed at harming others by damaging their peer relationships (Crick & Grotpeter, 1995). Finally, indirect aggression refers to behaviors, such as gossiping and excluding others, that are not directly confrontational (Lagerspetz, Bjoerkqvist, & Peltonen, 1988). Some studies focused specifically on these behaviors distinguish them as directly confrontational or non-confrontational. However, because these types of behaviors are socially-motivated and often covert, they represent a different form of aggression from the overt behaviors described previously. The literature on these subtypes of aggressive behavior, and the specific term and set of behaviors examined, has been very researcher- and discipline-specific (Underwood, 2003). Some effort is being made to combine terms and behaviors in order to make the research literature more cohesive. However, this process is ongoing, and it is common to find studies that use similar terms to describe behaviors that are conceptualized slightly differently. Although no formal typology currently exists, Figure 1 serves as a graphic representation for forms of aggression, including physical, verbal and social in an effort to conceptualize aggression categories and their relationships to one another (Underwood, 2003). In the figure, social aggression is broken down into both direct and indirect forms of aggressive behavior. Relational aggression is represented as a specific subgroup of social aggression called relationship manipulation and can be direct or indirect. For a more comprehensive review of these subtypes, see Underwood, 2003.

Although most of the research on childhood aggression has focused on overt aggression as a risk factor for a variety of social problems, findings from studies on

Figure 1. Forms of Aggressive Behavior



indirect aggression show that socially aggressive children are also at risk for difficulties with social adjustment and negative outcomes, such as depression, loneliness, social isolation, and Disruptive Behavior Disorder (Crick & Grotpeter, 1995; Mathieson & Crick, 2010; Murray-Close, Ostrov, & Crick, 2007; Prinstein, Boergers, & Vernberg, 2001). In a longitudinal study following the trajectories of relational aggression among 385 children in fourth and fifth grades, Murray-Close et al. (2007) found that an increase in peer-reported relational aggression from fourth to fifth grade was positively associated with an increase in teacher-reported internalizing symptoms (i.e., anxious/depressed, withdrawn, and somatic complaints). These results were not moderated by gender.

Somewhat controversially, direct aggression has traditionally been more associated with male behavior and indirect aggression with female behavior (Crick & Grotpeter, 1995; Owens, Shute, & Slee, 2000; Xie, Cairns, & Cairns, 2002). Some researchers taking this perspective argue that physical aggression is less socially acceptable for girls than for boys, leading girls to express their aggression in more indirect ways (Underwood, 2003). However, findings that indirect aggression is more prevalent in females have been inconsistent (Archer & Coyne, 2005; Card et al., 2008; Galen & Underwood, 1997).

Although girls may use proportionally more relationally aggressive strategies than physically aggressive strategies (Crick & Grotpeter, 1995; Loukas, Paulos, & Robinson, 2005), evidence indicates that both boys and girls report relational aggression to be a normative behavior (Crick, Bigbee, & Howe, 1996). During preadolescence, physically aggressive behaviors may become more socially awkward and less adaptive, with relational aggression becoming more accepted (Hawley, 1999, 2003). Among an inner-city, school-based sample of African-American children (N=489), Xie, Farmer, and Cairns (2003) found no gender differences in direct relational aggression. However, the study did find significantly higher instances of social aggression for female-female conflicts versus male-male conflicts in fourth grade (Xie, Farmer, & Cairns, 2003). In addition, a meta-analysis reviewing 148 studies on child and adolescent aggression found that direct and indirect aggression are highly correlated (r =.76), suggesting that children do not use one strategy to the exclusion of the other (Card et al., 2008), further convoluting conclusions that can be made about each type of aggression. However, evidence exists that as children develop more sophisticated social strategies, physical

aggression decreases, and for some, social aggression increases when children move from early childhood to middle and late childhood (Cote, Vaillancourt, Barker, Nagin, & Tremblay, 2007; Murray-Close et al., 2007; Xie et al., 2003). For example, Cote et al. (2007) used a person-oriented approach to determine developmental trajectories of physical and indirect aggression for 1183 Canadian children from ages 2 to 8. The results showed that for most children (80.1%), physical aggression declined over time, but for one-third (32%), indirect aggression increased. The study also found significant gender differences for children exhibiting declining use of physical aggression and increased use of indirect aggression such that more girls than boys followed this trajectory (Cote et al., 2007).

A majority of interventions focused on reducing aggressive behavior in elementary-aged children target both physical and social aggression by building children´s social and emotional skills in an effort to increase prosocial behavior and positive peer relationships. A note of interest is that the Card et al. (2008) study found that overt aggression was related to higher levels of externalizing problems (i.e., conduct problems), poor peer relations, and low prosocial behavior, while indirect aggression was more associated with internalizing problems (i.e., depression and/or anxiety) and *higher* prosocial behavior. In contrast, a longitudinal study conducted by Crick, Ostrov, and Werner (2006) found that relational aggression uniquely contributed to later problems with social-psychological adjustment, including aggression and delinquent behavior in a sample of children from third to fourth grade. Thus, overt, physical forms of aggression and covert, social forms of aggression predict potential problems with peers and represent relevant targets for violence prevention programs.

Individual, Family, School, and Community-level Risk

From an ecological perspective, children develop as a result of their interactions and relationships across settings (Bronfenbrenner, 1986). Development of behaviors and cognitions occur in concordance with a child's perception of her contextual experiences (Bronfenbrenner, 1986). Evidence suggests that certain individual characteristics, such as personality traits, sex, temperament, or cognitive ability may biologically predispose some children to aggressive or antisocial behavior (Baker, Raine, Liu, & Jacobson, 2008; Moffitt, 1993; Moffitt & Caspi, 2001). However, it is the presence of environmental factors, such as family, school, and peers interacting with a possible genetic predisposition that determines what type of aggressive outcomes a child may experience (Brendgen et al., 2008; Rhee & Waldman, 2002; van Lier et al., 2007). Understanding how a child develops necessitates considering the child-in-context as determined by the interaction of the individual characteristics of the child and her environment (Bronfenbrenner, 1986).

Considerable research evidence indicates the impact that social context can have on the behavioral outcomes of children. For example, Patterson's Coercion Theory states that parents may inadvertently reinforce aggression in their children by modeling behaviors, such as yelling, nagging, or threatening. As the child learns and uses these strategies during conflicts with the parent, parents typically become exhausted with the conflictual exchange and give in to the child's demands, thus reinforcing the child's use of aggression to obtain a desired goal (Eddy, Leve, & Fagot, 2001; Patterson, 2002). Children may experience risk for aggression in multiple social domains. Family-level risk factors include harsh or authoritarian parenting (Chang, Schwartz, Dodge, & McBride-

Chang, 2003; Knutson, DeGarmo, Koeppl, & Reid, 2005), exposure to family violence (Evans, Davies, & DiLillo, 2008; Johnson et al., 2002; Litrownik, Newton, Hunter, English, & Everson, 2003), and child maltreatment (Johnson et al., 2002; Kotch et al., 2008). School, and community-level risks for aggression include exposure to neighborhood violence (Guerra, Huesmann, & Spindler, 2003), low-involvement with school (Harachi et al., 2006), difficulties with peers (Dodge et al., 2003) and academic problems (Schwartz, Gorman, Nakamoto, & McKay, 2006). Children may experience one or many of these types of environmental risks. Placing the development of children's aggression within a social-environmental domain has utility for understanding how and why aggressive behaviors develop for some children by considering the multiple levels of influence that contribute to a child's experiences.

Impact of Peer Relationships on Aggressive Behavior

Among those multiple levels of influence, the peer realm represents an important environmental context for children. Social development researchers emphasize the powerful role that peer relationships play in influencing a child's developmental trajectory. Maladaptive peer relationships and peer rejection can exacerbate the tendency toward aggression, leading to growth in aggressive behavior and fewer opportunities to develop social competency (Dodge et al., 2003; Werner & Crick, 2004). Research consistently indicates the importance of children acquiring adequate social skills and social competencies in order to establish healthy peer relationships and reduce the risk of social maladjustment (Dodge et al., 2003; Garner & Lemerise, 2007). As children reach school-age, developing appropriate interpersonal skills and strategies with peers increases in importance. This is especially illustrated in the literature on peer-rejection and

aggressive behavior. Many studies have shown that children who are rejected by their peers are at higher risk for problems with self esteem, poor self concept, externalizing and internalizing problems, academic difficulties, loneliness, substance use, and violent behavior (Dodge et al., 2003; Laird, Jordan, Dodge, Pettit, & Bates, 2001; Morrow, Hubbard, McAuliffe, Rubin, & Dearing, 2006; Parker & Asher, 1993; Putallaz et al., 2007).

Peer rejection. Employing a prospective, longitudinal design, Hoglund, La Londe, and Leadbeater (2008) demonstrated that peer rejection increased risks for behavioral and emotional problems (i.e., aggression, hyperactivity, inattentiveness, anxiety, shyness, sadness, and withdrawal) for a sample of 114 children from grade two to grade three. These findings held after controlling for stability of these problems. The study also found that the results were consistent across time and across behavioral and emotional problems (Hoglund, La Londe, & Leadbeater, 2008). Similarly, Ladd (2006) investigated peer rejection as an additive risk factor in predicting externalizing and/or internalizing problems for 399 children followed from kindergarten through sixth grade. An analysis employing structural equation modeling indicated that in addition to aggression, peer group rejection contributed additively to externalizing problems. In addition to withdrawn behavior, peer group rejection contributed additively to internalizing problems (Ladd, 2006).

However, as children are unique individuals, the contribution of peer rejection to children's social adjustment varies depending on a variety of individual and social factors (Dodge et al., 2003; Sandstrom & Zakriski, 2004). Child development studies have identified two subtypes of rejected children based on their social-behavioral responses to

peer rejection and the corresponding differences in the outcomes each subgroup experiences: withdrawn-rejected children and aggressive-rejected children. Withdrawn-rejected children are characterized by their tendency to socially withdraw in response to rejection and to sustain little social interaction with their peers. Withdrawn-rejected children report more social isolation, higher rates of depressive symptoms, lower self esteem, and more loneliness than their peers, including those that are withdrawn, but not rejected (Hecht, Inderbitzen, & Bukowski, 1998; Ladd, 2006; K. H. Rubin, Coplan, & Bowker, 2009). In a study of 754 first graders, Farmer, Bierman, & the Conduct Problems Prevention Research Group (2002) found that withdrawn-aggressive children demonstrated poorer peer relations and poorer academic performance in later grades than either withdrawn-only, aggressive-only, or non-problem children.

In contrast to withdrawn-aggressive children who cope with rejection by withdrawing from peers, aggressive-rejected children react to rejection by interacting aggressively with their peers. Although aggressive-rejected children also experience higher rates of internalizing problems than their non-rejected peers (Ladd & Burgess, 1999), being aggressive-rejected is associated with higher rates of externalizing behavior (Ladd, 2006). Because aggressive-rejected children tend to employ aggressive strategies to cope with rejection, their risk increases for future peer rejection and reliance on aggression as a social coping mechanism (Dodge & Pettit, 2003; Nansel et al., 2004; Prinstein & La Greca, 2004; Werner & Crick, 2004). In 1999, Ladd and Burgess followed two cohorts of children (N=399) from kindergarten through second grade, examining specific behavioral characteristics that predicted social maladjustment. They found that aggressive children were peer-rated as higher in social rejection than withdrawn children.

Children who were withdrawn and aggressive experienced the most social difficulties of any group and also had more conflict in relationships with teachers (Ladd & Burgess, 1999). Other studies have found that aggressive-rejected children are less likely to accurately perceive that they are disliked by their peers than aggressive-withdrawn children (Zakriski & Coie, 1996). From a resiliency perspective, this may suggest that not accurately perceiving a peer's dislike acts as a buffer against some of the negative effects of peer rejection. However, it could also indicate a higher risk that these children will become increasingly rejected due to their inability to take cues from their peers on how to interact in a more socially accepted manner.

Proactive and reactive aggression. In addition to describing types of aggression, studies have also distinguished between the forms and functions of aggressive behavior and their impacts on children's peer relationships. Similar observed forms of aggression (hitting, verbal threats, and excluding others) may actually serve different functions for aggressors (Crick & Dodge, 1996; Little, Brauner, Jones, Nock, & Hawley, 2003; Polman, Orobio de Castro, Thomaes, & van Aken, 2009). For example, children who use aggression in reaction to certain social situations may experience different outcomes as a result of their aggressive behavior than children who use aggression to achieve instrumental goals or social status with peers. Two types of aggressive strategies have been studied based on this distinction, termed reactive aggression and proactive aggression. Reactive aggression refers to behavior that is born out of frustration and anger in response to perceived offenses. Proactive aggression refers to behavior enacted with the purpose of achieving a desired goal.

Reactively aggressive children exhibit more problems with emotion regulation, peer victimization, and hostile attribution to peer provocations, which heighten their risk for social maladjustment and use of aggression as a social coping strategy (Dodge, Lochman, Harnish, Bates, & Pettit, 1997; Gifford-Smith & Rabiner, 2004; Orobio de Castro, Welmoet, Koops, Veerman, & Bosch, 2005; Polman et al., 2009). Conversely, proactively aggressive children are more socially adept than those who are reactive and are more likely to use aggression as a means to achieve a desired goal (Crick & Dodge, 1996). Proactive aggression is associated with poor goal setting, choice of aggressive goals, greater self-efficacy in enacting aggression and beliefs in aggression as an acceptable response to conflict (Crick & Dodge, 1996; Dodge et al., 1997; Orobio de Castro et al., 2005; Polman et al., 2009; Werner & Crick, 2004; Werner & Nixon, 2005).

A meta-analysis by Card and Little (2006) representing 49 independent studies examining proactive and reactive aggression and psychosocial adjustment found that reactive aggression was independently and significantly related to eight indices of psychosocial problems: internalizing, ED/ADHD-type symptoms, delinquency, low prosocial behavior, low social preference and low peer acceptance, higher peer rejection, and peer victimization. In contrast, this study found that after controlling for reactive aggression, proactive aggression was independently and significantly related to only two of the eight indices of psychosocial adjustment: delinquency and peer rejection and was related to lower levels of victimization (Card & Little, 2006). Thus, it appears that children displaying reactive aggressive responses rather than proactive ones are at greater risk for experiencing problems with psychosocial adjustment than proactively aggressive children.

Although aggressive behavior serves as a risk factor for later problem behaviors for children, it may also serve a variety of adaptive functions, such as manipulation of resources, norm setting, and protection of social status (Farmer, Farmer, Estell, & Hutchins, 2007; Fraser et al., 2005; Hawley, Little, & Pasupathi, 2002). As children move from early to late childhood, they experience a decrease in their use of physical aggression as a response to conflict (Coie & Dodge, 1998; Moffitt, Caspi, Rutter, & Silva, 2002). Theoretically, this change is due to increases in cognitive maturity, impulse control, and the development of social skills that enable children to employ more sophisticated social strategies with peers (Coie & Dodge, 1998; Underwood, 2003; Werner & Crick, 2004). Use of aggression allows some children to obtain a level of peer social status that elevates their standing with peers (Farmer et al., 2007; Rodkin, Farmer, Pearl, & Van Acker, 2006), meaning that they may not experience the same form of peer victimization as other aggressive children (Estell, Farmer, & Cairns, 2007; Rodkin et al., 2006). For these children, aggression represents a strategy to achieve instrumental, proactive goals and is related to beliefs that aggressive is an acceptable response to conflict, rather than a reactionary response to perceived hostile intent or peer rejection (Dodge, 1991; Vitaro, Brendgen, & Tremblay, 2002). Reinforcement of the beliefs that aggression results in goal attainment can become problematic as children grow into adulthood and face increasingly difficult social situations.

The role of emotions, emotion regulation, and effortful control. Developmental scientists exploring the role of emotion and its impact on cognitive development have sought to expand the explanatory power of cognitive models by integrating emotion regulation processes with cognitive decision-making processes. The logic behind this

idea is that “peer entry and provocation situations…(e.g., being excluded from play or being teased) are especially likely to be emotionally arousing for children” (Lemerise & Arsenio, 2000). Although it is difficult to disentangle cognitive processes from emotion regulation processes, research demonstrates that social interaction with others involves emotions and necessitates skills in regulating those emotions (Crick & Dodge, 1994; Eisenberg et al., 2005; Orobio de Castro et al., 2005).

Attention to the role of emotions and emotional regulation offers insight into the reasons why some children are more successful at refraining from acting out aggressively than others. Children who have difficulty regulating their emotions may display more intense emotional affect than their peers (Eisenberg et al., 2005) and experience peer victimization and rejection as a result (Hubbard, Dodge, Cillessen, Coie, & Schwartz, 2001; Schwartz et al., 1998). Problems with processing emotions may more often lead children to view others as angry or mean and to react in a hostile way in social situations. This puts these children at risk for being rated as aggressive by teachers (Schultz, Izard, & Ackerman, 2000; Schultz, Izard, & Bear, 2004). Studying emotion processes in a clinical sample of boys, Orobio de Castro et al. (2005) found that aggressive boys self-reported maladaptive emotion regulation, hostile attribution, anger, and less negative evaluations of aggressive responses based on a series of vignettes more often than the comparison group. Aggressive children also display lower levels of empathy for others’ emotions than non-aggressive children (Kaukiainen et al., 1999).

In addition, skills in emotion regulation may explain the differences in physical aggression displayed by boys and girls. As children develop, evidence suggests that due to gender differences in developmental processes, girls mature faster than boys in various

domains of functioning, such as language acquisition and emotional development (Keenan & Shaw, 1997). This results in girls becoming adept at recognizing and regulating their emotions in response to social cues more quickly than boys. Therefore, they show less reactive, physical aggression in response to these cues due to a higher level of the developmental skills needed to control aggression and impulsivity (Crick & Dodge, 1996; Olson, Sameroff, Kerr, Lopez, & Wellman, 2005).

Recently, studies investigating the role of effortful control on children's externalizing behaviors have contributed much to our understanding of the impact of temperament and cognitive functioning on the development of aggression in children. Temperament has been associated with the development of personality, including individual differences in emotion regulation and reactivity (Rothbart, Ahadi, & Evans, 2000). Effortful control, a temperament trait, refers to the ability to inhibit a dominant response in order to exhibit a sub-dominant response (Rothbart & Bates, 1998). For example, a child who has difficulty sublimating an impulsive response to a developmentally appropriate task in order to achieve a still-desired, but less immediate goal may be considered low in effortful control. Effortful control begins to emerge in infancy, but rapidly develops in early to middle childhood (Rothbart & Bates, 1998), the same period that children begin to develop social relationships with peers.

Research examining the relationship between effortful control and externalizing problems in young children indicates that effortful control is negatively correlated with externalizing problems as reported by parents and teachers (Eisenberg et al., 2007; Eisenberg et al., 2005; Olson et al., 2005). Children exhibiting externalizing problems have also been found to be higher in impulsivity and reactivity (Eisenberg et al., 2005;

Olson et al., 2005), a risk factor for experiencing problems with peers (Hubbard et al., 2001; Schwartz et al., 1998). From a developmental standpoint, deficits in certain social-cognitive skills provide some explanation for individual behaviors, but this is usually considered within the context of other influential social risk factors, such as parenting style (Olson et al., 2005). However, Olson et al. (2005) found that the association between effortful control and externalizing problems remained significant after controlling for other risk factors, specifically, cognitive maturity, parenting behaviors, and destructive marital conflict, providing evidence for the importance of acquiring appropriate skills in effortful control in order to establish healthy cognitive and social development. Thus, improving children's abilities to regulate their emotions, especially in peer interactions, can promote increased social competencies. Building children's skills in recognizing and controlling their emotions may in itself act as a powerful protective factor to prevent the risk of peer rejection and aggressive behavior.

Peer-rejection serves as a key risk factor for the development of aggressive behavior in children. The use of aggression with peers may set children on a path for further problems with social adjustment in adolescence and adulthood. Thus, reducing children's use of aggression and decreasing their experiences of peer rejection serve as important targets for violence and/or delinquency intervention programs. In other words, increasing the ability to problem-solve social situations without resorting to aggression builds children's social skills, reduces risk for peer rejection, and prevents social difficulties that can lead to later aggression and violence.

Chapter Summary

This chapter provided a review of the etiology and consequences of childhood aggressive behavior. Both physical, overt forms of aggression and social, covert forms of aggression are associated with problematic relationships with peers, social maladjustment, internalizing behaviors, and later aggressive and violent behaviors in adolescence and adulthood. Peer rejection serves as a strong predictor of aggressive behavior, and vice versa, although not all children who act out aggressively experience rejection by their peers. Evidence indicates differences in the forms and functions of aggression for children, either defensive, reactive aggression or instrumental, proactive aggression. In addition, children's ability to regulate their emotions and show restraint in managing impulses may play an important role in whether or not they act out aggressively. The next chapter provides a theoretical framework for explaining the development of aggressive behavior using the Social Information Processing Model. It provides an overview of the model and its applicability to interventions for prevention of aggressive behavior.

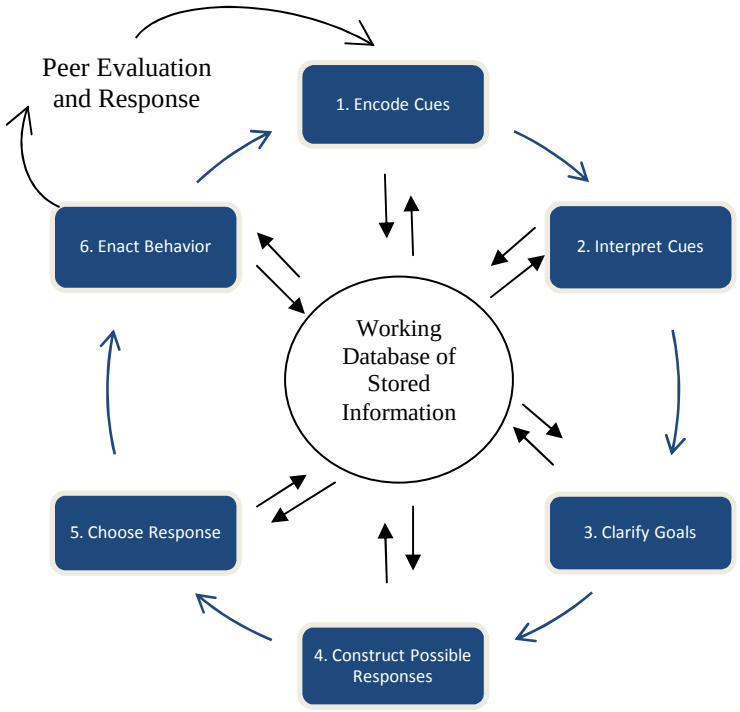
CHAPTER THREE
SOCIAL INFORMATION PROCESSING

Social-cognitive approaches have demonstrated great utility in deepening our understanding of why and how some children experience social difficulties. The social-cognitive perspective gained prominence among child development researchers following several influential studies that established the reformulated social information processing model as a viable explanatory theory for the development of aggression in children (Crick & Dodge, 1994; Dodge et al., 2003; Fraser et al., 2005; Lemerise & Arsenio, 2000). Social information processing refers to a series of on-line cognitive processes that provide a child with information about a given social situation and influence the child's behavioral responses to that situation. The model includes six steps of processing: a) encoding; b) interpretation and mental representation; c) clarification or selection of a goal; d) response access or construction; e) response decision; and f) behavioral enactment (Crick & Dodge, 1994). Figure 2 illustrates the steps of the reformulated model.

According to the Reformulated Social Information Processing Model, a child encodes social cues from the environment based on a set of scripts and schemata that exist from past experiences (encoding). Scripts and schema refer to knowledge structures and beliefs that inform a child about a particular situation based on memories from prior interactions (Huesmann & Guerra, 1997). For example, a child may access information from past interactions with parents, siblings, and/or other peers. Encoding of external and

internal cues entails the child being able to attend to contextual cues as well as social cues from others. Based on the encoded information, the child then interprets and forms a mental representation of those cues guided by stored information from past memory (interpretation). It is during this second step than an attribution of intention forms (hostile, non-hostile, or ambiguous).

Figure 2. Reformulated Social Information Processing Model



Next, the child moves into the process of goal clarification and selection based on the available information (goal clarification). This process is shaped by cultural norms, the child's past experiences, socialization, modeling, and emotional stability. Then, keeping the identified goal in mind, the child identifies multiple potential responses and chooses a response based on two critical factors: degree of confidence that he is able to enact the response and the likelihood that the response will be effective in achieving the desired

goal (response access). Finally, the child enacts the behavioral response. During each step of this process, the child accesses the database of working knowledge to inform the next step, creating multiple feedback loops that are illustrated by the cyclical nature of the processing model.

Social Information Processing and Aggressive Behavior

Considerable evidence supports the reformulated social information processing model as an explanatory theory for aggressive behavior. Compared to non-aggressive children, aggressive children are more likely to experience difficulty in encoding social cues, to generate aggressive responses to ambiguous situations, and to use aggression to obtain desired goals (Crick & Dodge, 1996; Dodge, 1980; Gifford-Smith & Rabiner, 2004). Aggressive-rejected children tend to be less adept at encoding social cues and attribute hostile intent to ambiguous situations (Dodge et al., 1997; Gifford-Smith & Rabiner, 2004; Schwartz et al., 1998). Proactive aggression, the use of aggression to obtain a desired goal, is associated with formulation of instrumental goals, higher self-efficacy in enacting aggressive behavior, and belief that aggression is effective in gaining a desired outcome (Crick & Dodge, 1996; Dodge et al., 1997; Schwartz et al., 1998). Werner and Nixon (2005) investigated the role of normative beliefs about aggression within a social information processing framework. From a social-cognitive perspective, normative beliefs represent latent knowledge structures that act as mental representations of past experiences. Children process social information through these scripts and that, in turn, influences their social behaviors (Huesmann & Guerra, 1997). The Werner and Nixon study found that beliefs about relational aggression were uniquely associated with self-reported relationally aggressive behavior while beliefs about physical aggression

were uniquely associated with self-reported physically aggressive behavior, providing evidence for the influence of knowledge structures on social information processing patterns regulating aggressive behavior (Werner & Nixon, 2005). In a study following 259 children from grades one to three, Dodge et al. (2003) determined that social information processing patterns partially mediated the effect of early peer rejection on later aggressive outcomes, providing support for the influence of social-cognitive processes on children's behavior affecting overall social development.

The SIP Model as a Framework for Intervention

SIP lends itself particularly well to intervention research because the specific cognitive processes are broken down into individual components that can be easily observed and measured by researchers. In addition, these processes can be addressed as separate components, each with its own intervention, or as a group of processes that is treated with one comprehensive intervention. As a result, SIP serves as the foundational framework for a variety of prevention interventions that address social skill building and reduction of aggressive behavior in children (Fraser et al., 2005; Frey, Nolen, Edstrom, & Hirschstein, 2005; Wilson & Lipsey, 2007). Fraser et al (2005) applied the model to overt and indirect aggressive behaviors in the *Making Choices* intervention with elementary school children and found improved social skills and reduced physical and social aggression. In a systematic review of 47 school-based, social information processing interventions, Wilson and Lipsey (2006) found that participants in the intervention groups had significantly lower aggressive and disruptive behavior than those in the comparison groups with an overall random effects mean of .26 ($p<.001$). A more comprehensive

review of the evidence supporting *Making Choices* and two additional school-based prevention interventions rooted in the SIP model is provided in the following chapter.

Chapter Summary

The Reformulated Social Information Processing Model (SIP) offers an evidence-based and testable theoretical perspective for informing interventions to prevent aggressive behavior in children. The model emphasizes the importance of social cues and how past experiences influence the interpretation of those cues, resulting in enacting aggressive responses. The model also offers an explanation of the individual cognitive processes leading to aggression, and additionally considers the influence of the child's environment, for example, through accessing past experiences stored in memory. Because SIP represents a social-cognitive model, the importance of attending to the issue of maturation is a basic model concept. As children develop, their cognitive abilities increase, resulting in greater skill in responding to certain cues and behaviors. And, as children mature, they accumulate more experiences that continue to influence their behavior. The model's emphasis on social experience and how it influences cognitive processes offers an interesting and promising perspective on children's social development and adjustment.

The next chapter offers a comprehensive review of three prominent interventions based in the social information processing model framework. First, the school as an intervention setting is discussed, followed by a description and review of three universal, evidence-based interventions for building children's social skills. *Making Choices*, the third and final program presented, serves as the focus for this dissertation.

CHAPTER 4
REVIEW OF SIP-BASED INTERVENTIONS

Schools as Intervention Settings

The school environment represents a principal setting that fosters academic, psychological, and social development in childhood. As children reach school-age, their social interactions quickly expand beyond the immediate family context to include peers and the formation of peer relationships. When children experience difficulties in their relationships with peers, they may react in socially aversive ways that impact their ability to develop the appropriate social skills needed to foster future social development (Dodge & Pettit, 2003; Nansel et al., 2004; Prinstein & La Greca, 2004; Werner & Crick, 2004). Because peer rejection acts as a strong predictor of future problems with peers (Dodge et al., 2003; Morrow et al., 2006; Putallaz et al., 2007), a need exists to intervene at a point in development when problem behaviors have the potential to develop and manifest negatively into the social life of the child.

The elementary school years provide an important intervention opportunity for preventing the development of problematic social behaviors because entry into elementary school marks a transition in the routine of children's daily lives. Although children are increasingly exposed to greater numbers of peers beginning in preschool, the structure of elementary school provides an environment where children spend the majority of the day, every day, with peers in a classroom setting. As a result, many

interventions specifically addressing aggressive behavior have taken a school-based, preventative approach targeting children's social skill development via their regular classroom settings and with their natural classroom peer set. Schools provide a natural context for intervening in behavior that is peer-driven and socially influenced. Schools are also places where aggressive behavior is a relatively common occurrence (Nansel et al., 2001). Some evidence shows that aggressive behavior and vicitimization can increase during a child's transition from elementary school to middle school (Pelligrini & Long, 2002; Salmivalli, 2002), suggesting that intervening with aggressive behavior in late childhood may reduce the likelihood for displays of aggression in the middle school transition. In addition, the contained and close nature of the school setting makes providing an intervention logistically feasible by utilizing a dedicated physical, intellectual, and social space that is already incorporated into children's daily lives.

Generally, two types of prevention intervention approaches have been implemented to this end, universal prevention approaches and selective prevention approaches (Wilson & Lipsey, 2007). Universal prevention programs are designed to be delivered, often in the form of a curriculum, to all children in a particular setting, such as a classroom or school, regardless of their level of risk. In contrast, selective prevention programs intervene only with children identified as at-risk of one or more of the outcomes that the intervention seeks to affect and are delivered either as part of the regular classroom or outside the classroom (individually or in groups). School-based interventions addressing aggressive behavior and social competence often adopt a universal prevention approach for delivering classroom-based curricula because: a) implementation does not require disruption of the regular classroom schedule to

administer the program to separate groups of children, and b) the potential for iatrogenic effects that may occur when children are placed into groups based on their behavior is greatly reduced (Dishion, McCord, & Poulin, 1999).

School-based intervention programs have been developed under many auspices, such as violence prevention, social and character development, social skills development, bullying prevention, academic achievement, and substance use and delinquency prevention. Prevention intervention curricula subtly vary based on the specific outcomes programs target and the theoretical base for change underlying the intervention design. However, these programs share a focus on targeting outcomes that involve correlated risk and protective factors for problematic behaviors.

Multi-element programs adopt a comprehensive approach and combine multiple intervention elements often focused on several of these correlated risk factors. For example, a program may administer a universal prevention, classroom-based character education curriculum for all children, provide additional individual sessions for at-risk children, and offer a behavior management component for parents. Multi-element programs, like *Seattle Social Development Project (SSDP)*, *Fast Track*, the *Multisite Violence Prevention Project*, and *Positive Action* have shown effectiveness in improving various outcomes in children and adolescents (Beets et al., 2009; Conduct Problems Prevention Research Group, 1999; Hawkins, Kosterman, Catalano, Hill, & Abbott, 2005; The Multisite Violence Prevention Project, 2009). However, multi-component programs can also be expensive to implement, evaluate, and maintain.

Single-element programs involve one primary intervention strategy (e.g., classroom-based curriculum) that usually focuses on one key risk factor, instead of many.

Often, single-element programs target the development of social competency, social skills, and/or social-cognitive factors like social information processing skills to impact a specific outcome (i.e., aggressive behavior). In a meta-analysis exploring the effectiveness of school-based interventions focused on reducing aggressive and disruptive behavior, Wilson and Lipsey (2007) found that the most effective programs primarily employed cognitively-oriented and social skills modalities to prevent aggression in children. Because they are brief and focused on fewer domains, single-element programs are often economical choices, especially in school settings where they can be integrated into a regular school curriculum.

This chapter details three single-element universal prevention programs with demonstrated effectiveness in improving child social competence and decreasing aggressive behavior: *Promoting Alternative Thinking Strategies (PATHS), Second Step,* and *Making Choices.* These interventions were chosen for review because of their foci on addressing the social-cognitive mechanisms that impact behavior and children's subsequent social development. They all identify aggression and peer relationships as risk factors for later negative outcomes, and each has a substantial amount of research evidence indicating its effectiveness in building children's social problem-solving skills. Each program also emphasizes the importance of emotions and emotion regulation in strengthening social competence. In addition, each program uses a manualized, classroom-based curriculum that is built upon theoretical tenets of social information processing and its influence on behavior.

Promoting Alternative Thinking Strategies (PATHS). As part of the multi-component FastTrack intervention, the *PATHS* program consists of a curriculum

implemented in elementary-school classrooms, targeting young children at high risk for long-term antisocial behavior (kindergarten children identified as behaviorally disruptive using a screening procedure). Built upon the ABCD (Affective-Behavioral-Cognitive-Dynamic) model of child development (Greenberg, Kusche, Cook, & Quamma, 1995), the program contains a series of classroom lessons implemented weekly that are intended to build skills in social-emotional competence, self-regulation, and social problem-solving. The curriculum consists of units focused on self-control, emotions, and problem-solving (Kam, Greenberg, & Kusche, 2004).

Most recently, the effectiveness of *PATHS* on children's social competence and aggressive behavior was evaluated via a clustered randomized trial of 14 elementary schools as part of the federally initiated Social and Character Development Project (Crean & Johnson, 2009). Teacher, parent, and child self-report measures were collected for children in grades three through five on aggressive behavior, conduct problems, acting out behavior problems, and social information processing (i.e., normative beliefs about aggression, aggressive social problem-solving, hostile attribution, and aggressive reactions to neutral provocations). Three-level growth curve models conducted in HLM (using two-tailed tests of significance) revealed significant associations with the *PATHS* intervention and decreases in teacher-rated conduct problems (b= -.108, t= -3.057, p= .024) with trends toward significance for aggression (b= -.136, t= -1.848, p= .113) and acting out behavior problems (b= -.051, t= -1.657, p= .149). No significant effects were found for parent-rated aggression and conduct problems or for child self-reported aggression, delinquency, or victimization at school. However, significant effects were found for the social information processing variables: aggressive social problem solving

(*b*= -.019, *t*= -2.138, p= .075), hostile attribution bias (*b*= -.036, *t*= -2.478, p= .047), and aggressive reactions to neutral provocations (*b*= -.035, *t*= -2.646, p= .038). A trend towards significance was found for normative beliefs about aggression (*b*= -.055, *t*= -1.677, p= .144) (Crean & Johnson, 2009).

PATHS has also shown significant prevention effects on inhibitory control and verbal fluency for a sample of second and third grade students within four Seattle elementary schools randomly assigned to intervention or control conditions (Riggs, Greenberg, Kusche, & Pentz, 2006). Regression analyses showed significant intervention effects for both externalizing (*t*= -3.26, *p*<.01) and internalizing (*t*= -2.23, *p*<.05) problems at 1-year follow-up and for inhibitory control and verbal fluency (*t*= 2.80, *p*<.01; *t*= 2.79, *p*<.01) at post-test. Tests of mediation indicated that children exhibiting higher inhibitory control as a result of the intervention (*t*=2.80, *p*<.01) also showed less externalizing (*z*= -1.98, *p*<.05) and internalizing behaviors (*z*= -1.98, *p*<.05), demonstrating a mediation effect of inhibitory control between the intervention and behavior (Riggs et al., 2006).

The *PATHS* program has been tested with a variety of child populations, including children in special education (Kam et al., 2004), special needs children (Greenberg & Kusche, 1998), and preschool-aged children (Domitrovich, Cortes, & Greenberg, 2007). Participation in the *PATHS* program decreased the rate of growth of both teacher-rated externalizing (*T* ratio = 2.029, *p*<.05, Cohen's *d*=.18) and internalizing problems (*T* ratio = 2.479, *p*<.05, Cohen's *d*=.22) and student-rated depression scores (*T* ratio = 3.134, *p*<.05, Cohen's *d*=.49) among a sample of special education students in grades 1 through 3. This study randomized 18 special education classrooms to

intervention or control and assessed intervention effects using growth curve analysis. No significant effects were found for social competence (Kam et al., 2004).

For a sample of profoundly deaf children, *PATHS* led to significant improvement in social problem-solving skills, emotional recognition skills, and social competence (Greenberg & Kusche, 1998). Fifty-seven hearing impaired children enrolled in self contained classrooms from grades 1 through 6 participated in this waitlist control design study. Eleven classrooms were randomized to the intervention or control condition. Participants' emotional and behavioral functioning were assessed using parent and teacher reports at pre-test and post-test in the first year and at 1 year follow-ups for years 2 and 3. Results from the ANCOVA analyses showed that children receiving the *PATHS* intervention scored higher on parent-rated social competence [$F(1,41)= 4.5$, $p< .05$] and teacher-rated emotional adjustment [$F(1,53)= 5.1$, $p< .05$] and behavioral impulsivity [$F(1,49)= 6.8$, $p< .01$]. Younger children showed improvements in self image [$F(1,53)= 3.8$, $p< .05$], and ego strength [$F(1,49)= 4.5$, $p< .05$] as a result of the intervention. Analyses at two-year follow-up indicated sustained effects for the intervention group with the exception of teacher-rated emotional adjustment, which showed a decline at the one year follow-up, followed by an increase at the two-year follow-up (Greenberg & Kusche, 1998).

In an experimental trial of the effectiveness of PATHS with a population of pre-school children participating in Head Start, 20 classrooms were randomly assigned to receive the intervention or participate as part of a control group. Over the three-year study period, data from teacher and parent reports were collected on children's emotion knowledge, inhibitory control, attention, interpersonal problem solving, social skills,

social competence, and behavior. Data were analyzed using ANCOVA and showed that children participating in *PATHS* scored higher on two measures of emotion knowledge than the comparison group: emotion vocabulary [$F(8,166)= 8.86$, $p< .01$, $\delta=.36$] and emotion expression knowledge [$F(8,163)= 5.59$, $p< .05$, $\delta=.37$]. Teachers rated PATHS children as higher in social skills [$F(7,187)= 17.62$, $p< .001$, $\delta=.48$]. Intervention participants were also rated as higher in social competence by parents [$F(7,181)= 7.82$, $p< .01$, $\delta=.36$] and teachers [$F(7,186)= 16.16$, $p< .001$, $\delta=.46$]. No effects were found for inhibitory control, attention, interpersonal problem solving, or externalizing behavior. Only one effect was found for the intervention group regarding internalizing behavior. PATHS participants showed less social withdrawal than comparison group participants [$F(7,187)= 4.44$, $p< .05$, $\delta=.24$] (Domitrovich et al., 2007).

***Second Step*.** Developed for pre-school through middle school classrooms, the *Second Step* program combines an in-class curriculum (divided into two age groups, preschool through fifth grade and sixth grade through eighth grade) with parent training. The program uses group modeling, anger management, and group discussion with the goal of decreasing aggressive behavior and increasing empathic, socially responsible behavior among participants (Frey et al., 2005). Specific proximal outcomes that the program targets are: social competence, decision-making ability, goal-setting, impulse control, and empathic response. *Second Step* incorporates several theoretical models that inform the development of aggressive behavior, primarily Social Learning Theory and Social Information Processing Models (Holsen, Smith, & Frey, 2008). Lessons consist of interpersonal situations presented to students via photographic images of specific social situations. Students are then engaged in a discussion about the images by a trained

facilitator or teacher and prompted to communicate how they would respond or feel in the given social situation (Holsen et al., 2008).

Grossman et al. (1997) conducted a controlled trial of *Second Step* in 12 urban elementary schools, located in four school districts in Washington State. The evaluation employed a clustered, randomized design with data collected for 790 children in second and third grades over three time points: T0, pre-test; T1, 2 weeks post-test; and T2, 6 months post-test. Parent, teacher, and observational ratings were measured for child aggressive behavior and prosocial behavior. Using the generalized estimating equation (GEE) regression method, the study found no differences between the intervention and control groups for the parent and teacher measures. However, intervention group children were rated as lower in physically negative behavior (-0.46 events per hour, p=.03) and higher on neutral/prosocial behavior (+3.96 events per hour, p=.04) based on net change score differences between T0 and T1 in playground observations by trained observers. At the six month follow-up (T2), net change score differences between T0 and T2 in classroom observations were significantly lower in physical aggression for children in the intervention condition (-0.22 events per hour, p=.03) (Grossman et al., 1997).

A longitudinal study evaluating the effects of the intervention on the social behavior of 1,253 students in fifteen elementary schools randomized to intervention or control was conducted in three cities in Western Washington (Frey et al., 2005). MANCOVA analyses indicated that students who participated in *Second Step* and had high baseline scores on antisocial behavior showed greater decreases in antisocial behavior than their control group counterparts in the first year (E.S.= .25, p< .001). Significant gains in social competence were also observed for the intervention group in

years one (E.S.=.20, p<.001) and two (E.S.= .10, p<.01). Intervention children were also 42% less aggressive and 37% more likely to choose positive social goals as compared to their counterparts in the control group schools. Moreover, *Second Step* participants required 41% less adult intervention in minor conflicts, and showed 78% greater improvement in teacher ratings of social competence (Frey et al., 2005).

Other studies assessing the effectiveness of *Second Step* have found decreases in verbal aggression, disruptive behavior, and physical aggression with urban preschool and kindergarten children (McMahon, Washburn, Felix, Yakin, & Childrey, 2000) and increases in social competence for low-income, rural elementary school children (Taub, 2001). McMahon and colleagues implemented *Second Step* with children in two settings in Chicago. Fifty-six preschool children (ages 3 to 5) and 53 kindergarten children (ages 4 to 7) were assessed on child reports of knowledge and skills regarding empathy, impulse control, problem solving, and anger management in addition to teacher reported social skills and behavioral observations. Significant effects were found for children's knowledge and skills in identifying feelings and facial cues (η^2=.24, p=.001) and on observations of decreases in disruptive (η^2=.17, p=.000), verbal (η^2=.19, p=.000), and physically aggressive (η^2=.05, p=.000) behaviors (McMahon et al., 2000).

In an evaluation of the *Second Step* program among a sample of rural, elementary aged children in grades 3 through 5 (n=54), Taub (2001) used teacher-ratings and classroom observations to measure the effects of the intervention on children's social competence and antisocial behaviors. The study employed a quasi-experimental design and collected data at three time points: pretest (T1), post-intervention (T2), and one year post-implementation (T3). Repeated measures ANOVA models resulted in significant

time x school interactions for teacher-rated social competence and antisocial behavior such that social competence increased [$F(2, 136)=6.62$, $p<.01$] and antisocial behaviors decreased for the intervention group [$F(2, 134)=4.41$, $p<.05$] over the course of the study. Significant effects were also found on the observational measures of behavior, engages appropriately with peers [$F(2, 142)=5.58$, $p<.01$] and follows directions from adults [$F(2, 142)=7.92$, $p<.001$]. However, both of these behaviors were shown to decrease from Time 1 to Time 3 with the intervention groups declining less than the comparison groups.

International replications of *Second Step* have also shown promising effectiveness, but findings for these programs have been mixed compared to U.S. studies (Fraser, Guo et al., 2011). Holsen, Smith, and Frey (2008) employed an age-cohort design to study the effects of a Norwegian adaptation of *Second Step* re-named *Steg for Steg*. The program was delivered to 1,153 fifth and sixth grade students in eleven Norwegian schools. After one year of implementation, a linear mixed model analysis (LMM) showed that the intervention was effective in increasing social competence for all children at grade six (E.S.=.18, $p<.05$) and for girls at grade seven (E.S.=.32, $p<.05$) (Holsen et al., 2008). In addition, boys at grade six reported lower levels of externalizing behavior (E.S.=.27, $p<.01$). No significant effects were observed for self-reported internalizing problems (Holsen et al., 2008).

A randomized controlled trial of the German version of *Second Step* (*Faustlos*) found modest effects on children's social behavior and reports of anxiety and internalizing behaviors (Schick & Cierpka, 2005). Twenty-one schools (14 intervention schools and 7 control schools) were randomly assigned to receive the *Faustlos* intervention or routine school services. Data were collected via parent, teacher, and child-

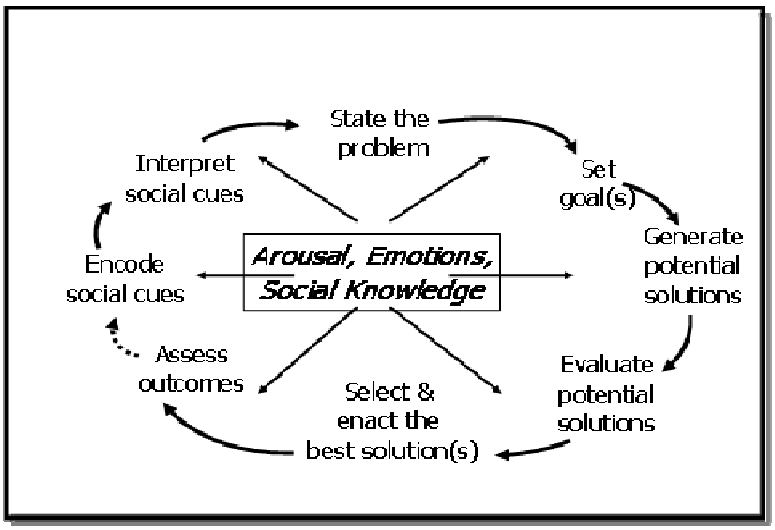
reports on children's social competence, aggressive behavior, and emotions correlated with aggressive behavior. Using repeated measures ANOVA, the study found small effects on children's parent-reported anxiety and internalizing behaviors [$F(1, 230)=7.28$, $p=.007$, $\eta^2=.03$; $F(1, 230)=9.85$, $p=.002$, $\eta^2=.04$]. The study also found a significant reduction in teacher-rated externalizing behaviors for girls who received the intervention [$F(1,125)=22.50$, $p=.000$, $\eta^2=.15$] and a significant improvement for intervention group girls in perspective taking abilities [$F(1,123)=10.81$, $p=.001$, $\eta^2=.08$] and in cooperative behaviors [$F(1, 123)=28.81$, $p=.000$, $\eta^2=.19$].

Making Choices. *Making Choices* is a school-based, social skills intervention that teaches social problem-solving skills to elementary school children (Fraser et al., 2005). As a universal, prevention intervention, *Making Choices* comprises multiple lessons designed for children in Kindergarten through 5th Grade. Though the intervention is focused on improving the skills of children at risk for aggression, it proposes to improve social skills and social problem-solving for all children. The classroom curriculum is additive, meaning that topics in the lessons are linked to the key developmental tasks of each grade level. For example, first and second grade lessons include lessons on recognizing feelings and understanding emotions. Third grade lessons build on the first and second grade lessons by adding in the entire theoretical problem-solving sequence. Emotion regulation is integrated at the fourth grade level and the fifth grade curriculum focuses on instances of social aggression and bullying behaviors. Teachers or social workers implement the curriculum in a traditional school classroom setting.

The *Making Choices* curriculum is firmly rooted in the Social Information Processing model, but also draws on Social Learning Theory. The program integrates

every aspect of the SIP theory and explicitly addresses each one of the SIP component processes in its design. *Making Choices* uses the Reformulated Model of SIP (Crick & Dodge, 1994) that incorporates the role of emotions into its conceptual framework. Figure 3 depicts the role of SIP as the theoretical basis for the *Making Choices* program.

Figure 3. Making Choices Intervention Conceptual Model



The curriculum consists of seven units each corresponding to one of the components of the SIP model. The first unit addresses the emotional processes that affect cognition and focuses on teaching children to recognize feelings and emotions. The second unit (encoding) helps children learn to identify social cues. Unit three deals with making sense of the social cues that are encoded (interpretation). Unit four helps children learn to set social goals (clarification of goal), while unit five deals with determining options to deal with the situation (response access). Finally, unit six addresses the process of making a choice based on the perceived options (response decision) and unit seven focuses on acting on the choices that have been made (behavioral enactment). Therefore, each part of SIP theory can be matched with a component of the intervention. The

program developers assert that a goal of the program is to teach children to recognize their own cognitive and emotional processes instead of focusing only on teaching practitioners to recognize these processes in children (Fraser, Nash, Galinsky, & Darwin, 2001).

An initial pilot evaluation using a convenience sample of 70 sixth-grade students from one school in North Carolina demonstrated that *Making Choices* was effective in increasing students' social-cognitive skills from pre-test to post-test (Nash, Fraser, Galinsky, & Kupper, 2003). Paired t-tests and standardized mean difference scores resulted in significant increases in students' abilities to encode social cues [$t(47) = 4.52$, $p < .01$, E. S.=.78] and distinguish prosocial goals [$t(44) = 3.17$, $p < .01$, E. S.=.70]. After creating four peer status subgroups based on teacher reports of aggressive and rejected status, the study found youth classified as nonaggressive-accepted showed significantly higher skills at posttest for encoding cues [$t(27) = 3.88$, $p < .01$, E. S.=.78] and distinguishing prosocial goals [$t(47) = 4.52$, $p < .01$, E. S.=.78]. Aggressive-accepted youth also had significant increases in encoding cues [$t(7) = 2.71$, $p < .05$, E. S.=1.24] and showed marginal significance in distinguishing prosocial goals [$t(7) = 2.31$, $p < .10$, E. S.=2.65]. Nonaggressive-rejected and aggressive-rejected youth showed no evidence of skill acquisition as a result of the program, and none of the peer status subgroups exhibited significance differences in their abilities to interpret social cues from pre-test to post-test (Nash et al., 2003).

A later study using a randomized design found *Making Choices* effective in increasing social contact and cognitive concentration and decreasing overt aggression in a sample of third grade children (Smokowski, Fraser, Day, Galinsky, & Bacallao, 2004).

Four classrooms from one mid-sized elementary school in North Carolina were randomly assigned to an intervention (n=51) or control condition (n=50) with the control condition consisting of routine services. Using a series of stepwise regression models, direct effects were observed for children on social contact (R^2 Change = .059, $F_{1,94} = 9.026$, $p<.01$), cognitive concentration (R^2 Change = .018, $F_{1,94} = 4.290$, $p<.05$), and overt aggression (R^2 Change = .024, $F_{1,94} = 4.569$, $p<.05$). Interaction terms were present between pre-test and intervention scores for social contact (R^2 Change = .046, $F_{1,93} = 7.596$, $p<.01$), social competence (R^2 Change = .029, $F_{1,93} = 6.247$, $p<.05$), cognitive concentration (R^2 Change = .024, $F_{1,93} = 6.086$, $p<.05$), and peer acceptance (R^2 Change = .035, $F_{1,93} = 7.865$, $p<.01$), meaning that children scoring lower on these measures at pre-test showed the most post-test gains from the intervention (Smokowski et al., 2004). No intervention effects were significant between intervention and gender and intervention and minority status.

Fraser, Day, Galinsky, Hodges, & Smokowski (2004) conducted an additional randomized trial of *Making Choices* as part of a multi-component intervention that combined the MC classroom curriculum delivered to children with a parenting skills training program delivered in the home called *Strong Families.* A total of 115 children and their families were randomly assigned to either the Making Choices plus Strong Families intervention (n=62), or a waitlist control group (n=53). Treatment effects were assessed for the following outcomes using multivariate general linear modeling: prosocial behavior, emotion regulation, social contact, cognitive concentration, relational aggression, and authority acceptance. Results indicated significant treatment effects (Cohen, 1988) of the combined intervention for five of the six outcomes: prosocial

behavior (η_p^2=.12), emotion regulation (η_p^2=.06), social contact (η_p^2=.06), cognitive concentration (η_p^2=.11), and relational aggression.

Subsequently, Fraser and colleagues (2005) found significant effects on third graders' encoding of social cues (δ=.82), hostile attributions (δ=-.17), prosocial goal-setting (δ=.28) and prosocial response decisions (δ=.18), leading to the conclusion that the *Making Choices* Program improved children's social skills and abilities to make non-aggressive behavior choices. Using a quasi-experimental, age-cohort design, three successive cohorts of third graders (N=548) participated in the program from two different schools. In the first year of the study, the participants received the regular health education curriculum, the second year, they received the *Making Choices* curriculum in addition to the regular health education curriculum, and in the third year, they received the regular health education curriculum and *Making Choices Plus*, which supplements the *Making Choices* curriculum with parent and teacher enhancements.

The *Making Choices* program produced significant effects (Cohen, 1988) for social competence (δ=.46), cognitive concentration (δ=.27), overt aggression (δ=-.17), social aggression (δ=-.32) and social contact (δ=.67). Children in both intervention conditions displayed increased social competence and decreased aggression, suggesting that the program was effective in targeting the processes that affect social-behavioral outcomes for third grade children (Fraser et al., 2005). An assessment of the program effects at six-month follow-up (N=443) indicated significantly lower levels of overt (δ=-.14), physical (δ=-.09) and social aggression (δ=-.14) for children who had received the *Making Choices* intervention versus those in the comparison condition (Fraser, Lee, Kupper, & Day, 2011) offering evidence for sustained program effects post-intervention.

To date, the largest-scale implementation and evaluation of *Making Choices* occurred over a three-year period (2004-2007) as part of the national Social and Character Development Project (SACD) funded by the Institute of Education Sciences (Fraser et al., 2009). *Making Choices* was chosen as one of seven SACD programs to be implemented and evaluated in various sites across the United States. Employing a clustered, randomized design strategy, ten schools in two North Carolina counties were randomly assigned to receive the *Making Choices* intervention or to receive the routine health education curriculum for children third through fifth grades (n=522). Preliminary analyses indicated promising results on a variety of outcomes: aggressive behavior, cognitive concentration, relational aggression, social competence and its two subscales of prosocial behavior and emotion regulation.

Data analysis was conducted using two methods: optimal full matching with the Hodges-Lehmann rank test (OFM) and within-grade change hierarchical linear modeling analysis methods using propensity score weighting (HLM). Negative treatment effects were initially observed at third grade for internalizing behavior (OFM: E.S.=.25, p=.003; HLM: E.S.=.18, p=.022), relational aggression (OFM: E.S.=.24, p=.077; HLM: E.S.=.17, p=.093), social competence (HLM: E.S.=-.16, p=.019), emotion regulation (HLM: E.S.=-.13, p=060), prosocial behavior (HLM: E.S.=-.15, p=.026), and relational aggression (HLM: E.S.=.17, p=.093). However, the pattern of effects changed for the fourth and fifth grades. Positive treatment effects were observed in the fourth grade for social competence (OFM: E.S.=.16, p=.022 ; HLM: E.S.=.20, p=.003), including prosocial behavior (OFM: E.S.=.17, p=.017 ; HLM: E.S.=.19, p=.005) and emotion regulation (OFM: E.S.=.16, p=.044 ; HLM: E.S.=.19, p= .008), and general aggression (OFM:

E.S.=-.027). This pattern continued in fifth grade for social competence(OFM: E.S.=.23, p=.047 ; HLM: E.S.=.25, p=.001), prosocial behavior (OFM: E.S.=.30, p=.026 ; HLM: E.S.=.27, p=.000), emotion regulation (HLM: E.S.=.17, p=.026), relational aggression (OFM: E.S.=-.22, p=.014 ; HLM: E.S.=-.22, p=.087), and cognitive concentration (HLM: E.S.=.32, p=.000).

Summary of Intervention Review

The three school-based intervention programs reviewed here represent innovative single-element interventions that employ a universal prevention approach. Rooted in prevention science, these interventions address the reduction of aggressive and disruptive behavior from developmental, social cognitive models, emphasizing social information processing. Each of these programs has demonstrated effectiveness in increasing social competence and/or emotion regulation, and in decreasing childhood aggressive-disruptive behavior. The following section summarizes the program effects examined across the seventeen studies included in this review.

Program effects. Across studies, all programs appeared to build children's social skills (Domitrovich et al., 2007; Fraser, Day, Galinsky, Hodges, & Smokowski, 2004; Nash et al., 2003) and increase emotion knowledge (Domitrovich et al., 2007; McMahon et al., 2000), emotional adjustment (Greenberg & Kusche, 1998), and emotion regulation (Fraser et al., 2004; Riggs et al., 2006). Although all the intervention programs were built on a theoretical foundation of social information processing, only two of the three interventions assessed SIP variables in their evaluations, *PATHS* and *Making Choices*. These two programs showed effectiveness in increasing social problem-solving (Crean & Johnson, 2009), appropriately encoding social cues (Nash et al., 2003), improving

cognitive concentration (Fraser et al., 2004; Smokowski et al., 2004), increasing prosocial response decisions (Fraser et al., 2005), increasing prosocial goal formulation (Fraser et al., 2005) and decreasing hostile attributions (Crean & Johnson, 2009). All interventions showed considerable evidence of increasing social competence (Domitrovich et al., 2007; Fraser et al., 2009; Frey et al., 2005; Greenberg & Kusche, 1998; Holsen et al., 2008; Taub, 2001).

In addition, significant effects were found for behavioral outcomes. Overt aggression was the key behavioral outcome for most of these intervention studies. Significant effects were found for decreases in physical aggression (Frey et al., 2005; Grossman et al., 1997; McMahon et al., 2000; Smokowski et al., 2004), verbal aggression (McMahon et al., 2000), and relational aggression (Fraser et al., 2004; Fraser et al., 2009). In general, effects were found for decreases in externalizing behaviors (Holsen et al., 2008; Kam et al., 2004; Riggs et al., 2006; Schick & Cierpka, 2005) and internalizing behaviors including depression and anxiety (Kam et al., 2004; Riggs et al., 2006; Schick & Cierpka, 2005).

Methodological critique. Ideally, intervention studies employ a randomized, experimental design to control for threats to internal validity, such as selection bias and unobserved heterogeneity, and to strengthen results and study implications. Among the seventeen studies reviewed here, eleven used random assignment as their design strategy, with all but one employing a clustered randomized design (Fraser et al., 2004). Among the remaining 10 studies, six used school as the unit of assignment (Crean & Johnson, 2009; Fraser et al., 2009; Frey et al., 2005; Grossman et al., 1997; Riggs et al., 2006; Schick & Cierpka, 2005), and four randomized by classrooms (Domitrovich et al., 2007;

Greenberg & Kusche, 1998; Kam et al., 2004; Smokowski et al., 2004). Three studies not implementing a randomized design used a quasi-experimental age-cohort design (Fraser et al., 2005; Fraser, Lee et al., 2011; Holsen et al., 2008), with the final three studies using observational, pre- and post-test designs (McMahon et al., 2000; Nash et al., 2003; Taub, 2001).

Although randomization offers greater confidence that observed effects are attributable to the intervention and not other unobserved confounding factors (Shadish, Cook, & Campbell, 2002), intervention studies can also benefit from advanced statistical procedures that allow researchers to control for possible threats to internal validity. For example, an important consideration for school-based studies is the nesting effect that occurs when children receive an intervention as part of a classroom or school. Analytical procedures that control for clustering effects when nesting occurs, such as hierarchical linear modeling, can be useful in assessing intervention effects at both the school and individual levels. Only five of the seventeen studies in this review employed a multi-level analytic method to address the issue of clustering for participants in the school and/or classroom (Crean & Johnson, 2009; Fraser et al., 2005; Fraser et al., 2009; Fraser, Lee et al., 2011; Kam et al., 2004; Riggs et al., 2006).

Intervention studies assess program effectiveness by examining the direct effects of the program activities on the proximal and distal dependent variables of interest. However, with the advent of new statistical approaches that test for possible mediating and moderating effects, opportunities exist for a more thorough exploration of the theoretical bases underlying an intervention program. Uncovering mediating and moderating effects can add even more information to what is known about current

interventions geared toward reducing aggressive behavior as well as inform new interventions (Card et al., 2008). Given that all three of the reviewed interventions emphasize social information processing and emotion regulation processes, it is surprising that only one study reported testing a mediating effect on behavioral outcomes (Riggs et al., 2006). However, eleven studies examined the effect of the intervention on theoretical mediators in accordance with social information processing. In addition, few studies reported assessing intervention effects for moderating variables, such as gender, race/ethnicity, and risk status. Testing for moderation is an important factor for intervention research that seeks to find out what types of programs work for whom.

Chapter Summary

This chapter reviewed three, universal, school-based interventions that applied a SIP approach to the problem of aggressive behavior in children. *PATHS, Second Step,* and *Making Choices* represent evidence-based, prevention interventions targeting aggression by building social skills and increasing social competence. All three programs utilized a universal prevention strategy, a theoretical foundation based on the SIP theoretical model, and a manualized curriculum implemented in the classroom. Each of these programs demonstrated main effects of the intervention in reducing aggressive behavior, increasing social competence, increasing emotion regulation skills, and generally, increasing children's social problem-solving skills. Although these studies present promising findings for school-based, social skills interventions, a gap exists in exploring the effects of social skills interventions for specific groups of participants based on potential moderating factors. The following chapter describes the analytic methods for the current dissertation study that explores main effects and potential moderating effects

of the *Making Choices* social skills intervention in an effort to fill this gap and contribute to the existing evidence for social skills interventions and *Making Choices*, specifically.

CHAPTER 5
METHODS

Making Choices was implemented as part of the Social and Character Development Project (SACD), a federally-initiated, large-scale evaluation of seven social and character development programs funded by the Institute of Education Sciences over the three year period from 2004-2006. Each of the seven programs chosen for the SACD project has an established base of research evidence demonstrating its effectiveness over multiple efficacy and effectiveness trials. *Making Choices* represents the classroom curriculum portion of one of the seven SACD programs, the *Competence Support Project* (CSP). The CSP consists of three components: Competence Enhancement Behavior Management (CEBM), Social Dynamics consultation, and the *Making Choices* social skills curriculum.

The current dissertation research focuses specifically on evaluating the effects of the *Making Choices* within the context of the Competence Support Project in reducing aggression and increasing social competence for a sample of third grade children over the three-year study period. The study sample consists of 548 children (223 intervention, 325 control) attending nine schools in two school districts in the Southeastern United States. Using within-grade change hierarchical linear modeling (HLM), this study explores the following research hypotheses related to the effectiveness of the *Making Choices* in building social competence and reducing aggressive behavior for participating children.

Research Hypotheses

Intervention participants were expected to score higher in social competence, emotion regulation, and prosocial behavior and lower in overt aggression and relational aggression at third, fourth, and fifth grades than children in the comparison group. Program effects were also hypothesized to be moderated by gender, such that boys would benefit from the intervention more than girls based on previous evaluations of *Making Choices* (Fraser et al., 2005). Moderating effects of race/ethnicity and family income/poverty ratio were also tested.

Implementation

Making Choices was implemented in a sample of elementary schools located in one state in the Southeastern United States. In addition to the social problem-solving curriculum delivered to children via the classroom, teachers received consultation from the research team on recognizing and addressing social dynamics among children within the classroom as well as managing classroom behavior. Because this study served as an effectiveness trial for the intervention and was being tested in the context of a real-world school setting, teachers maintained primary responsibility for delivering the intervention content. Consultation from the research team was available to teachers as needed. As a universal prevention intervention, all children in selected intervention schools who entered third grade in 2004 received the intervention during their third grade, fourth grade, and fifth grade years. The bulk of the intervention was delivered in third grade (28 lessons), with booster sessions given in fourth and fifth grades (8 lessons each). Children in control schools received the routine health education curriculum.

To ensure fidelity of implementation, teachers recorded the following information after each Making Choices lesson: the degree of lesson completion, the length of the lesson in minutes, and any adaptations to the lesson plan. Minutes for third grade lessons varied from 537 minutes to 1416 minutes, reflecting some differences in implementation. Less variation in minutes was observed for fourth and fifth grade lessons. The average numbers of lessons and minutes children in the intervention schools received *Making Choices* are presented in Table 1.

Table 1

Average Classroom Dosage of Making Choices by Year

	Grade 3		Grade 4		Grade 5	
School	minutes	lessons	minutes	lessons	minutes	lessons
Treatment 1	537	12.3	429	8.0	366	7.3
Treatment 2	830	23.3	318	8.0	409	7.5
Treatment 3	1118	28.3	330	8.0	270	8.0
Treatment 4	1416	26.3	426	8.0	350	8.0
Treatment 5	1120	26.4	327	7.8	†	†
Total	1055	24.9	376	8.0	349	7.7

Note. †Students whose school was re-organized and who could not continue in study.

Intervention Activities

The intervention content consisted of the *Making Choices* social skills curriculum augmented with consultation and training for teachers on classroom behavior management and peer social dynamics. At the beginning of each school year, teachers received two hours of training on how to implement the curriculum in the classroom.

Teachers were provided a manual of lessons on teaching social problem-solving skills to children, lesson plans, and supplementary materials such as books, posters, and activities for classroom learning centers.

Because Making Choices is a social-cognitive intervention and targets children's social information processing skills, the curriculum units were designed to address each of the seven steps of social information processing theory (Crick & Dodge, 1994), including emotion processes. Third grade content included lessons on identifying and regulating emotions and feelings, encoding and interpreting social cues, setting social goals, generating potential behavioral responses, and choosing and enacting prosocial behavioral responses. Lessons provided in fourth and fifth grades focused on building social problem-solving skills in instances of social aggression, bullying, and social exclusion (Fraser et al., 2009).

Research Design

This study employed a clustered, randomized research design. Ten schools were recruited for participation in the study via nominations from two rural county school districts in North Carolina. One county nominated six schools, the other nominated four. Each recruited school was informed about the intervention study, procedures for randomization, the possibility of being assigned to the control versus the intervention condition, and the expectation that intervention schools would implement the *Making Choices* intervention, all ten schools elected to participate. Five within-district school pairs were then created by examining five school-level characteristics for each of the schools: school size, third-grade class size, ethnic composition, math and reading achievement scores, and rate of participation in the federal free and reduced priced lunch

program. The lowest average Mahalanobis distance between all pairs based on these 5 measures was used to identify the best set of pairs among all potential school matches (Fraser et al., 2009). One school in each pair was then randomly assigned to the intervention or control condition.

School Attrition and Compromised Randomization

Following randomization, one comparison school left the study due to the adoption of a competing social and character development program. A replacement school was recruited, but because matching and random assignment of the sample schools had already taken place, the replacement school was not matched with its counterpart on the five school-level characteristics. In the third year of the study, the treatment school from this same pair withdrew from the study due to a restructuring of their entire fifth grade to a new intermediate school and the need for a more advanced-level SACD program (Fraser et al., 2009). No replacement school was recruited at this stage of the study. This resulted in data for nine schools for grades three, four, and five.

Independent samples t-tests comparing schools on pre-treatment characteristics after cluster-randomization showed that the pair matching strategy did not result in baseline equivalence between the treatment and control schools. This imbalance likely resulted from the attrition of two schools and the replacement of one school after matching had occurred. Treatment schools were more likely than control schools to report lower annual yearly progress (AYP), higher percentages of students of color, higher percentages of students receiving free and reduced lunch, and higher student to teacher ratios. At the student level, schools differed significantly on racial/ethnic composition, presence of father in the household and income to poverty ratio. In addition,

significant differences existed on several behavioral outcomes at baseline, further indicating the presence of selection effects. Characteristics of the treatment and control schools and student characteristics at baseline are presented in Appendices A and B.

Sample Description

In fall of 2004, parents of all children enrolled in the third grade at one of the ten study schools received invitations for study participation. Informed consent was sought at the beginning of the study period and at each data collection point throughout the study. *Enterers* who enrolled in a study school at anytime during the study period were also invited to participate. No follow-up data were collected for *leavers*, students who left the study schools. At each grade, data were analyzed for students with valid teacher surveys at both fall and spring collection points. Otherwise, they were listed as "lost to follow up." A diagram showing the flow of participants from Fall 2004 to Spring 2006 for all ten study schools is presented in Appendix C.

Analysis sample.

The current analysis sample included schools with teacher-rated student data for all three years of the study, third through fifth grades (N=9). Data were excluded for students who entered the study following the fall of grade 3 due to a lack of baseline data and because those children were not exposed to the bulk of the intervention implemented in third grade. To prevent contamination effects, students who moved from an intervention school to a control school were also excluded from analysis. Of the remaining students, those who left the study during the study period, and those who were in special education classrooms were not included in this analysis. Table 2 presents the resulting dataset consisting of 548 students (MC=223, control= 325).

Table 2

Analysis Sample Characteristics

	Total Sample (N=548)	Making Choices (n=223)	Comparison (n=325)	p-value
Gender				
Female	51.6	54.2	49.8	.31
Male	48.4	45.8	50.2	
Race/Ethnicity				
African American	27.1	35.4	21.5	.00*
European American	53.2	44.4	59.4	.00*
Latino	11.3	8.1	13.5	.05*
Other	8.4	12.1	5.6	
Father Presence in Home	72.6	70.2	74.2	.32
Caregiver employed full-time	55.4	51.4	58.1	.13
Caregiver education	2.68 (.04)	2.75 (.06)	2.63 (.05)	.12
+Income to poverty ratio	165.3301 (107.94)	162.19 (105.86)	167.48 (109.47)	.58
+Age at third grade	7.92 (.50)	7.91 (.51)	7.93 (.48)	.74

Note. Values in rows marked by a plus sign (+) are means and standard deviations.
* $p \leq .05$

Data Collection Procedures and Measures

Teachers completed assessments on all students in their classrooms for Fall and Spring of each school year during the three years of the study (2004-2007). Fall assessments took place six weeks after the start of the Fall semester. Spring assessments took place after the intervention lessons concluded and at least four weeks before the end-of-year testing began. Teachers received $100 compensation for each semester that assessments were completed. Teachers provided data on children's socio-demographic

characteristics and completed three behavioral assessments, the Carolina Child Checklist—Teacher Form (Macgowan, Nash, & Fraser, 2002), the Interpersonal Competence Scale—Teacher (Cairns, Leung, Gest, & Cairns, 1995), and the Behavior Assessment System for Children—Teacher (Reynolds & Kamphaus, 1992) (see Appendices D, E, and F).

***Overt aggression*.** Overt aggression was measured using the aggression subscale of the *Interpersonal Competence Scale—Teacher (ICST)*. The *ICST* is a 21-item, teacher-report questionnaire that assesses social and behavioral characteristics of children (Cairns et al., 1995). The measure consists of 21 items presented as a unidimensional, 7-point bipolar scale. Teachers rate each child along the continuum from "always" to "never." Information is gathered along six subscales: aggression, academic competence, popularity, affiliative, Olympian, and internalizing. The aggression subscale consists of items that indicate overt physical and verbal aggression (gets into trouble, gets into fights, argues). Cronbach's alpha for the aggression subscale is .82. Test-retest reliability for this measure over a 3-week period is .89.

The *Behavior Assessment System for Children Aggression Subscale--Teacher (BASC)* served as an additional measure for overt aggression (Reynolds & Kamphaus, 1992). The *BASC Aggression Subscale* contains 14 items rated along a 4-point Likert scale of observed behaviors for the last 30 days ("never," "sometimes," "often," "almost always"). Examples of items include in this scale are: "threatens to hurt others," "bullies others," "teases others," "hits other children," and "calls other children names." Internal consistency reliability for the aggression subscale is .95.

Relational aggression. Relational aggression was measured using a subscale of the *Carolina Child Checklist—Teacher Form (CCC)* (Macgowan et al., 2002). The *CCC* is a 35-item, teacher-report questionnaire that assesses children's behavior along a 6-item response scale ("never," "rarely," "sometimes," "often," "very often," and "always"). The *CCC* includes 6 subscales, cognitive concentration, social contact, social competence (prosocial behavior and emotion regulation), and social aggression. The social aggression subscale was used to measure relational aggression for this study. Items include: "can give suggestions without being bossy," "excludes other kids from peer group," "teases classmates," "lies to make peers dislike a student." Cronbach's alpha for the entire CCC measure is .95, with a test-retest reliability of .75 or higher over a three month period. The relational aggression subscale has a Cronbach's alpha of .91.

Social competence. Social competence was measured using two measures: *CCC* social competence and the full *ICST* interpersonal competence. The *CCC* social competence measure is a subscale of the *CCC* and includes the items, "thinks before acting," "can give suggestions and opinions without being bossy," "can calm down when excited or all wound up," "is helpful to others," "controls temper when there is a disagreement," "expresses needs and feelings appropriately," "friendly," "very good at understanding other people's feelings," and "resolves peer problems on his/her own." Cronbach's alpha for the social competence subscale is .92 (Macgowan et al., 2002).

The full *ICST* interpersonal competence scale was used to measure children's overall social competency. Examples of items included on the *ICST* are: "argues", "always smiles," "sad," "friendly," "lots of friends," "bullied by peers," and "bullies

peers." Cronbach's alpha for the scale is .84 with short-term test-retest reliability of .91 (Cairns et al., 1995).

Emotion regulation and prosocial behavior. Emotion regulation and prosocial behavior were each measured using scales from the *CCC*, emotion regulation, which is a subscale of social competence (emotion regulation and prosocial behavior). Examples of items from the emotion regulation subscale include: "thinks before acting," "can calm down when excited or all wound up," "expresses needs and feelings appropriately," and "controls temper when there is a disagreement." Items that make up the prosocial behavior subscale include: "is helpful to others," "friendly," "very good at understanding other people's feelings," and "resolves peer problems on his/her own." Cronbach's alpha for the entire CCC measure is .95, with a test-retest reliability of .75 or higher over a three month period. The social competence subscale (emotional regulation and prosocial behavior) has a Cronbach's alpha of .90.

Data Analysis

Missing data. Missing data were addressed using a Multiple Imputation (MI) procedure conducted in STATA, v.11 (StataCorp, 2009). MI allows for the modeling of missing data when the pattern of missingness on specific variables within a dataset are described as *missing at random* (MAR). Missing data result from a variety of mechanisms, but they can be categorized as *missing completely at random* (MCAR), *missing at random* (MAR), or *not missing at random* (NMAR) (Rose & Fraser, 2008). MCAR refers to the probability that nonresponse on a variable is unrelated to the value of the variable itself and to any other variables in the dataset (Allison, 2002). Conversely, MAR and NMAR refer to systematic patterns of missingness where nonresponse: 1) is

conditional on an observed variable, but not on any unobserved variables (MAR); or 2) is conditional on both observed and unobserved data (NMAR) (Graham, 2009). NMAR missingness results in biased parameter estimates, whereas MCAR or MAR data yield unbiased parameter estimates (when MAR missingness takes the reason for nonresponse into account) (Graham, 2009).

After conducting the Little (1988) MCAR test in SPSS, version 16 to confirm the pattern and distribution of the missing data, it was determined: 1) that the missing data in this study were considered at least missing at random (MAR) and thus, *ignorable* (Allison, 2002; Graham, Olchowski, & Gilreath, 2007); 2) that listwise deletion would result in biased parameter estimates; and 3) that multiple imputation is able to produce unbiased estimates under the MAR assumption (Graham et al., 2007).

For this study, imputation models were developed using all predictor variables, outcome variables and interaction terms present in the proposed analysis model. Auxiliary variables highly correlated with the analysis variables were also included due to their association with the missing values and their potential to provide useful information about the data that are missing (Allison, 2002; Graham, 2009). Variables with Variance Inflation Factors (VIF) close to 10 and condition numbers greater than 30 were removed from the model as this indicates a possible collinearity problem (Rose & Fraser, 2008).

The current study specifically examined the following seven outcomes: 1) *ICST* aggression; 2) *ICST* social competence; 3) *CCC* relational aggression; 4) *CCC* social competence; 5) *BASC* aggression; 6) *CCC* prosocial behavior; and 7) *CCC* emotion regulation. Imputation models included measures for the corresponding dependent

variable for each wave of data collection (i.e., aggression at baseline and waves 4,5,7,8, and 9 represented by difference scores); baseline measures for other outcome variables; school id; age, gender, race/ethnicity; caregiver education, caregiver employment, income to poverty ratio; and presence of father in the home. The models included interaction terms to examine possible interaction effects by race/ethnicity, gender, and income/poverty ratio. Due to high correlation among the baseline values of the dependent variables, separate imputation models for each dependent variable were created, resulting in seven datasets (one for each dependent variable). The imputation models for the dependent variables emotion regulation and prosocial behavior (both are subscales of the variable social competence) were the same as the other models except that they did not include the baseline values of social competence due to their high correlation with the baseline values of both outcome variables (.96). Likewise, the imputation model for ICST aggression did not include the baseline values for ICST interpersonal competence because it serves as a subscale for that measure.

For each of the imputation models created, a Monte-Carlo Markov Chain (MCMC) method was employed to simulate multiple distributions of the missing observations based on the covariance structure of the observed data for each model. Assuming multivariate normality, the MCMC method randomly draws one value from each simulation to replace a missing value until all missing values are filled in, resulting in multiple copies of the dataset. Five variables with skewed distributions were log transformed prior to imputation, the three aggression variables, age, and income/poverty ratio. For this study, ten imputations were completed for each outcome variable resulting in ten datasets per outcome variable. In order to achieve high relative efficiency (> 95%)

and appropriate statistical power to detect a small effect size (.10), with 10% missing information, twenty imputations are recommended (Graham et al., 2007). However, ten imputations resulted in acceptable relative efficiency (≥96% for all variables). Following imputation, each imputed dataset was analyzed using within-grade change Hierarchical Linear Modeling (HLM) conducted with SAS PROCMIXED software, version 9.2. Using the MIANALYZE procedure in SAS version 9.2, analysis results from each dataset were combined to create estimates that account for missing-data uncertainty using Rubin's Rules (D. Rubin, 1987).

***Propensity score estimation*.** To address the issue of selection bias and the resulting threat to internal validity due to failure of the original randomization, a propensity score approach was employed. Propensity score estimation was chosen over routine covariance control methods because with observational data, the correlation between the treatment indicator variable and the error term in the model may not be equal to zero. This violates the assumption of OLS regression and therefore, may produce a biased estimated treatment effect (Guo & Fraser, 2010). Propensity score models provide valuable tools to reduce selection bias present in observational or quasi-experimental studies or when randomization is compromised or not possible. In studies seeking to determine a causal relationship between variables, for example, program evaluation, data from treatment and control groups must be balanced in order to correctly attribute observed effects to the treatment and not an unobserved variable (Guo & Fraser, 2010). When randomization is not possible, or when randomization fails, propensity score models work to reduce the multidimensional nature of the data to a one-dimensional propensity score that represents a participant's probability of being in the treatment or

control condition given the observed covariates (Guo & Fraser, 2010). The propensity score approach is based on the Neyman-Rubin counterfactual framework of causality where the counterfactual represents the potential outcome in the absence of the cause (Neyman, 1923; Rubin, 1974). In other words it addresses how outcomes might differ if the treatment group did not receive the treatment and the control group did receive the treatment. The counterfactual cannot actually be observed in the data and so, the propensity score approach uses known data to impute values for the hypothetical value by calculating the standard estimator for the average treatment effect (ATE), or the difference between two estimated means:

$$\hat{\tau} = E(\hat{y}_1 \mid w = 1) - E(\hat{y}_0 \mid w = 0)$$

In this equation, $\hat{y}_1$ and $\hat{y}_2$ represent the mean outcomes under the treatment and control conditions, respectively, and *w* indicates receipt of treatment (1= treatment, 0=control) (Guo & Fraser, 2010).

Because the cluster randomization procedure used in the study design did not work as intended, the propensity score method was chosen as the appropriate method to obtain balance between the treatment and control groups and to allow for causal assumptions about the effectiveness of the intervention. Participants were randomized at the school level instead of the individual level, indicating that propensity scores should be estimated at the school level. However, the number of schools (n=9) was too low to obtain an adequate conditioning model, so propensity scores were estimated at the individual level. The ultimate goal of the propensity score approach is to achieve data balance and in this case, the use of individual level variables helped accomplish this goal.

A variety of methods for obtaining propensity scores exist as well as multiple ways of using the propensity score to balance the data. This study employed binary logistic regression, the prevailing approach, to estimate propensity scores (Guo & Fraser, 2010). A key consideration in obtaining confidence that the hypothetical values reported by the propensity score method best represent the true propensity scores is to correctly specify the logistic regression model. Model specification should be guided by substantive knowledge of the area under study, choosing variables that are related to both treatment exposure and the outcome (Brookhart et al., 2006), and specifying the functional form of those covariates (Guo & Fraser, 2010). Conditioning variables used in the model for this study were selected based on preliminary analyses of the study data (Fraser et al., 2009). The model included the following variables: child's age, race/ethnicity, gender, presence of father in the household, parent/caregiver full-time employment, income to poverty ratio, and baseline values of the dependent variables. A challenge with the logistic regression approach to estimating propensity scores is that non-linear functional forms are not automatically handled by the model and must be added, if necessary. The model for this study included only linear functions for the covariates. Following balance checks that determined the model adequately balanced the data, addition of non-linear terms in the model was deemed unnecessary.

After estimation, the propensity scores were converted into sampling weights and used to weight the observations in the final outcome analyses. This procedure, propensity score weighting, weights participants in the intervention and control conditions to make them more representative of the population of interest (Guo & Fraser, 2010; McCaffrey, Ridgeway, & Morral, 2004). Different types of weights may be used. However, this study

was interested in obtaining average treatment effects (ATE). Therefore, the following definition was used to create propensity score weights to estimate ATE:

$$\omega(W, x) = \frac{W}{\hat{e}(x)} + \frac{1 - W}{1 - \hat{e}(x)}$$

W =1 indicates a student in the treatment condition. When this is the case, the first part of the equation applies: 1 / $\hat{e}(x)$ and indicates the probability of being selected for the treatment condition. The second part of the equation applies when W=0 (control condition): 1 / 1- $\hat{e}(x)$ and indicates the inverse probability of being selected into the treatment condition.

Limitations of the weighting method are that standard errors may be biased downward (Freedman & Berk, 2008), and inverse probability weights may be sensitive to misspecification (Kang & Schafer, 2007). However, propensity score weighting offers an advantage over traditional matching methods because it utilizes the entire sample without losing cases. Therefore, to avoid reduction of the sample size and a loss of power, propensity score weighting was employed in this study.

Once weights are created, it is necessary to conduct balance checks to determine the procedure's success in balancing the data. With propensity score weighting, balance checks are conducted by estimating a series of separate regressions and logistic regressions (depending on the dependent variable) to test whether the intervention condition predicts the newly weighted covariate to a statistically significant degree. A p-value greater than .05 indicates that the covariate is not significantly associated with treatment assignment and that the weighting method achieved balance for the data on that covariate. In addition, sensitivity analysis, such as the method proposed by Rosenbaum (2002) is highly suggested when applying propensity score methods due to the possibility

of remaining hidden bias (Guo & Fraser, 2010; McCaffrey et al., 2004). Although McCaffrey et al. (2004) applied an adaptation to Rosenbaum's method (McCaffrey et al., 2004) to propensity score weighting, no additional studies using this method have been published, and further development of the algorithm is pending (McCaffrey, personal communication, 2011). Therefore, weight trimming was applied to investigate the performance of the propensity score weighting procedure by using percentile cutpoints to trim high weights downward (Lee, Lessler, & Stuart, 2011).

Beginning with the 99th percentile, all weights that fell above the value for the 99th percentile were set equal to the 99th percentile. Weights that fell below the 1st percentile were also set equal to the 1st percentile (trimmed upwards). This procedure was tested using the 99th and 95th percentiles. Boxplots and confidence intervals were then examined to determine if the trimmed weights improved the common support region estimated by the propensity score weights (Lee et al., 2011). The procedure did not greatly improve the 95% confidence interval coverage. The boxplots did not show improved common support regions. Therefore, the propensity score weights were left untrimmed for the outcomes analysis. Boxplots of the untrimmed estimated propensity scores for treatment and control showed good overlap between the treatment and control groups and a high dispersion of scores for both groups with a range between .2 and .8. The boxplots are presented in Appendix G. Significance tests for the individual-level propensity score weights are shown in Appendix H.

Power analysis. *Optimal Design* software v. 2.0 (Raudenbush, Spybrook, Congdon, Liu, & Martinez, 2011) was used to estimate the statistical power of the study. Power refers to the probability of correctly detecting a treatment effect when one is

present, or to reduce the likelihood of making a Type I error (Shadish et al., 2002; Spybrook, Raudenbush, Congdon, & Martinez, 2011). Assessing power for multilevel data requires additional considerations than for single-level data. The *Optimal Design* program was developed specifically for use with multilevel data and is appropriate for estimating power for cluster-randomized trials (Raudenbush, 1997; Raudenbush et al., 2011). Using the Cluster Randomized Trials option, power was estimated for the main effect of treatment as a function of the cluster size (n), the intraclass correlation (ICC, ρ), a standardized effect size (δ) and the alpha level (α).

This study includes 548 students nested within 9 schools, resulting in a cluster size (n) of 60.89 (548/9). ICC (ρ) values of .01, .05, and .15 were chosen based on the range of ICCs calculated from previous studies of *Making Choices*. Standardized effects sizes based on Cohen's *d* statistic were set at .20 (small effect), .50 (medium effect), and .80 (large effect). Considering that the desired threshold for adequate study power is 80% (Cohen, 1988), results from the analysis indicate that the study has adequate power to detect medium and large effects at all ICC levels and small effects at ICC levels of .01 and .05 (84%-100%). However, the study is not sufficiently powered to detect small effects with an ICC level of .15 (46%).The results are presented below in Table 3.

Table 3

Power Analysis

Program Effects	**ICC = .01**	**ICC= .05**	**ICC=.15**
Small Effect (.20)	98%	84%	46%
Medium Effect (.50)	98%	98%	97%
Large Effect (.80)	100%	100%	100%

Note. Power at α = .05. ICC = intraclass correlation.

Hierarchical Linear Modeling.

Direct and moderating effects were tested using Within-grade change Hierarchical Linear Modeling. HLM is a useful statistical tool for analyzing hierarchical data structures, or nested data (Bauer & Curran, 2007). Units from one level that are sampled from units on a second, higher level may produce data that violate the assumption of independent observations, resulting in autocorrelation. HLM corrects for autocorrelation by estimating unit-specific random effects. Employing a non-HLM method with observations that are highly correlated will result in redundancy in information and creates small standard errors that lead to the possibility of making a Type I error (Raudenbush & Bryk, 2002). HLM is appropriate for this analysis due to its ability to correct for autocorrelation resulting from violation of independent assumptions that can occur with multi-level observations (Raudenbush & Bryk, 2002). HLM is particularly suited to analyzing longitudinal data related to school outcomes because of the hierarchical data structure of time nested within students, and students nested within schools. An additional strength of the method is its ability to test cross-level interactions, allowing examination of the proposed moderation effects.

Because data were collected across three academic school years with different teachers rating the same students at each grade level, the analysis is vulnerable to confounding due to differences between teacher raters rather than differences based on child characteristics (Guo & Hussey, 1999). To control for these rater effects, a within-grade change HLM approach was employed. Within-grade change scores were created for each grade and intervention effects were assessed by analyzing difference scores between the fall and spring of each grade. By using this approach, differences in

behavioral outcomes for children were estimated within-teachers for each grade instead of across teachers for all grades.

Covariates.

Student-level covariates were included to control for gender, race/ethnicity, poverty level, presence of father in the home, and parent/caregiver employed full-time. One school-level covariate, percentage of students receiving free and reduced lunch was included to control for school-level risk (pfred). Two dichotomous variables were created to indicate race/ethnicity: one for African-American (blck) and the other for Latino (hisp). Poverty level was measured using the lower-bound of the ratio of income to poverty level (ipovl). Presence of father in the home and parent/caregiver employed full-time were also indicated by dichotomous variables (fthr, pcemft). Gender was modeled using an indicator for female (fmale). Intervention condition (MC) was included at the school level.

Analytic Model.

Using the SAS PROC MIXED software package, two-level HLM models were analyzed with student characteristics at Level 1 and school characteristics at Level 2. Model specification involves attending to both substantive and statistical considerations and can involve model building upward from level one, extending into level two, or considering level one and level two variables jointly (Snijders & Bosker, 1999). Based on previous evaluations of the *Making Choices* program and substantive knowledge of the research area, the second strategy was employed to determine final model specification.

First, baseline random intercept models were constructed for each dependent variable to assess random effects and to calculate intraclass correlation coefficients

(ICC). ICCs indicate the strength of the nesting structure, or the proportion of variance in the dependent variable due exclusively to differences between schools (Bauer & Curran, 2007). Second, models including all covariates based on theory and previous studies were constructed to examine intervention effects for each dependent variable. To determine the structure of random effects and test for appropriate inclusion of random effects in the final model, likelihood ratio tests were conducted by computing the differences in deviance (-2 log likelihood calculations) between the random effects models and the baseline models. Chi-square tests were then performed to determine best model fit, with $p<.05$ indicating improved fit of the conditional model over the unconditional (Snijders & Bosker, 1999). When analyzing multiply imputed data, -2 log likelihood estimates are provided for each imputation model, but are not combined into a final estimate using Rubin's Rules. Therefore, likelihood ratio tests were conducted by averaging the -2 log likelihood estimates for all ten imputations and then comparing them to determine model fit (Muthen, personal communication, June 2, 2011). Finally, proposed cross-level interactions were included in the models and tested one at a time to determine moderation effects. Based on prior research indicating possible differential effects of the *Making Choices* intervention for gender (Fraser et al., 2005) race/ethnicity and risk status (Smokowski et al., 2004), four covariates were used to create and test possible interactions with the school-level intervention condition: female, African-American, Latino, and income/poverty ratio. The final model with interactions is presented in Figure 4.

Figure 4. Equation to Test Main and Interaction Effects

$$Y_{ij}\ (\text{within-grade change}) = \gamma_{00} + \gamma_{01}(MC)_j + \gamma_{10}(\text{fmale})_{ij} + \gamma_{11}(MC)_j\ (\text{fmale})_{ij} + \gamma_{20}(\text{blck})_{ij} + \gamma_{21}(MC)_j\ (\text{blck})_{ij} + \gamma_{30}(\text{hisp})_{ij} + \gamma_{31}(MC)_j\ (\text{hisp})_{ij} + \gamma_{40}\ (\text{ipovl})_{ij} + \gamma_{41}(MC)_j(\text{ipovl})_{ij} + \gamma_{50}\ (\text{pcemft})_{ij} + \gamma_{60}\ (\text{fthr})_{ij} + \gamma_{70}\ (\text{pfred})_j + u_{0j} + r_{ij}$$

All predictor variables included in the model were grand-mean centered, including the dichotomous variables, to improve model convergence (Raudenbush & Bryk, 2002; Snijders & Bosker, 1999). Hypotheses were tested using a unidirectional, two-tailed test of significance. Although theory-based program evaluations often use directional, one-tailed tests to examine effects (Beets et al., 2009), this study employed a more conservative approach in order to capture effects that may be present in either direction.

Graphs of interaction effects were created by multiplying the parameter estimates for intercept, intervention, moderating covariate, and interaction term by the mean for each grand-mean centered covariate for each of four groups (intervention/girls, intervention/boys, control/girls, control/boys) and then adding them together to create four estimates of average within-grade change for each group. After estimating models, effect sizes for main effects and for moderating effects were calculated by dividing the intervention condition (or intervention*moderator) parameter estimate by the estimated standard deviation ($\delta=\beta/[(\tau^2 + \sigma^2)^{1/2}]$). The estimated standard deviation is the square root of the total variance for the unconditional random intercept model (Spybrook et al., 2011; Snijders & Bosker, 1999). Effects sizes for interaction effects are standardized at the sample standard deviation units. Finally, residual analyses were conducted on both level one and level two variables to determine the tenability of normal distribution assumption using only one random effect, intercept, from the final model.

CHAPTER 6
RESULTS

This chapter presents study findings from the within-grade change HLM analysis. First, intraclass correlations from the unconditional and fully conditional models are presented. Second, main effects from the within-grade change HLM analysis for the three aggression outcomes are presented, followed by main effects for social competence, prosocial behavior, and emotion regulation. Moderation effects resulting from the test of interactions will also be discussed. The chapter concludes with a presentation of the effect sizes for the seven behavioral outcomes for within-grade change at each grade point.

Intraclass Correlations

Table 4 presents estimations of the intraclass correlation coefficients for both the unconditional and conditional models. ICCs for the unconditional model (model without predictors, but including school-level random effect) ranged from .03 (emotion regulation) to .12 (ICST social competence). This indicates that 3% to 12% of the observed variation in the seven behavioral outcomes can be accounted for by differences between schools. After accounting for all predictor variables included in the final explanatory model (excluding interaction terms), ICCs for the fully conditional showed similar results from .02 (2%) for emotion regulation to .12 (12%) for ICST social competence. Thus, 88 -98% of the variability in study outcomes were accounted for at the

individual level. Although the variability in outcomes due to school clustering effects in this study is low, some researchers argue that even small amounts of clustering may impact internal validity and bias tests of program effects (Bloom, 2005; Carvajal, Baumler, Harrist, & Parcel, 2001; Zyzanski, Flocke, & Dickinson, 2004). Therefore, employing HLM to adjust for the ICC values in this study is warranted.

Table 4

Intraclass Correlations

Variable	ICCs for Unconditional Model	Residual ICCs for Fully Conditional Model
Relational Aggression—CCC	.08	.08
Overt Aggression—ICST	.11	.06
Overt Aggression—BASC	.07	.10
Social Competence—ICST	.12	.12
Social Competence—CCC	.06	.06
Prosocial Behavior—CCC	.11	.08
Emotion Regulation—CCC	.03	.02

Aggression Outcomes

Tables 5, 6, and 7 present the results for third, fourth, and fifth grades from the within-grade change HLM analysis. Main effects for aggression outcomes indicated that schools with higher percentages of students receiving free and reduced lunch scored higher on ICST overt aggression in grades 3 and 4 (*B*=2.48, p=.05; B=2.75, p=.017). A trend towards significance was also observed at fifth grade for schools with higher percentages of free and reduced lunch (*B*=5.67, p=.09). Latino children in fourth grade showed lower scores on ICST overt aggression (*B*=-.832, p=.05). African American

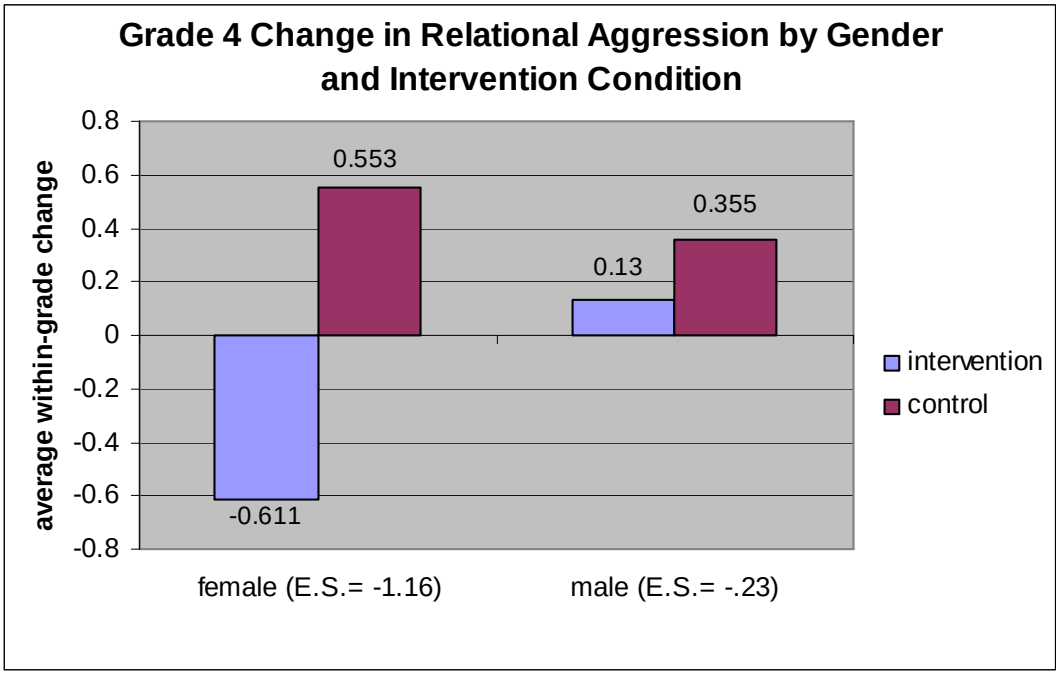
children in fourth grade showed higher scores than their peers on relational aggression (*B*=.448, p=.01). Children whose primary caregiver was employed full-time had lower scores on ICST aggression at grade 3 (*B*=-.551, p=.01).

Overall, the within-grade change HLM analysis showed positive effects of the Making Choices program on overt and relational aggression. At grade three, estimates of intervention effects for BASC overt aggression and relational aggression did not present in the expected direction (*B*=.135, p=.317, δ= .37; *B*=.034, p=.87, δ =.05), unlike ICST overt aggression that showed decreased aggression (*B*=-.350, p=.26, δ = -.24). Positive effects began to emerge in fourth and fifth grades for all types of aggression. Fourth grade intervention participants showed decreases approaching significance for ICST overt aggression (*B*=-.498, p=.10, δ = -.32). Estimates for relational aggression (*B*=.-441, p=.045, δ = -.48) were significantly lower for the Making Choices condition than for the control condition.

In addition, estimates for a moderation effect of race/ethnicity by intervention approached significance for ICST overt aggression at fourth grade, such that African-American children who participated in the intervention showed significantly lower teacher-rated ICST overt aggression than other children who participated in the intervention (*B*=-.955, p=.084, δ = -.622). Race/ethnicity and gender significantly moderated intervention effects for relational aggression at fourth grade. African American children showed significant benefits from the intervention on relational aggression outcomes (*B*= -.877, p =.007, δ =-.947). Gender by intervention interaction effects were also observed with girls showing lower teacher-rated scores on relational aggression than boys as a result of the *Making Choices* program (*B*= -.639, p=.025, δ =-

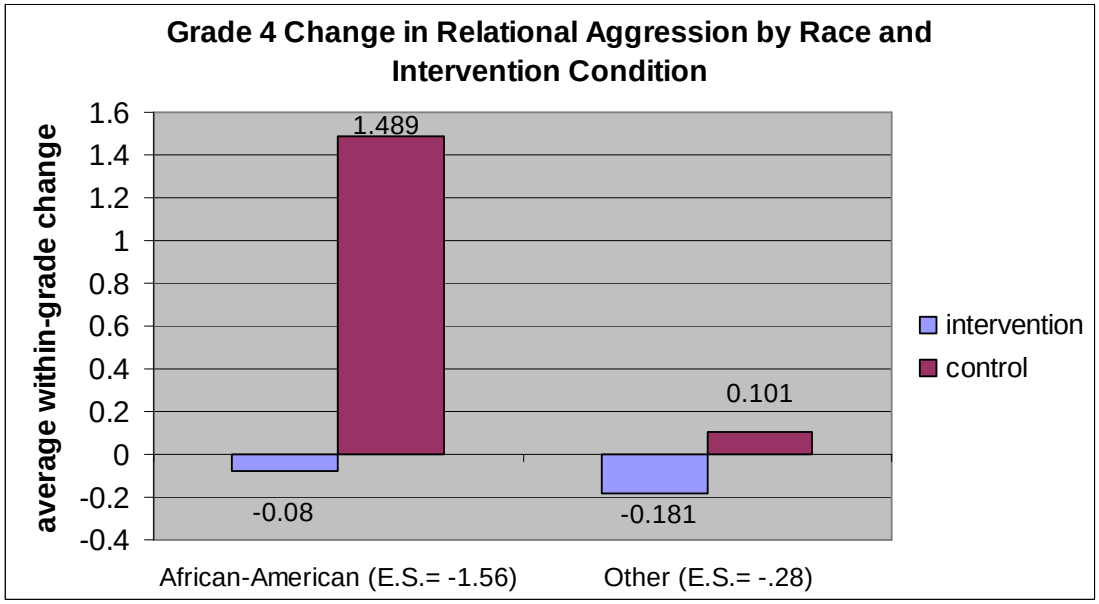
.689). Program by gender and program by race interaction effects for fourth grade relational aggression are presented in Figures 5 and 6. Program by race interaction effects for fourth grade overt aggression are presented in Figure 7. No significant effects were observed for BASC overt aggression at grade four (*B*=-.391, p= .272, δ =-.61).

Figure 5. Program by gender interaction effect for relational aggression



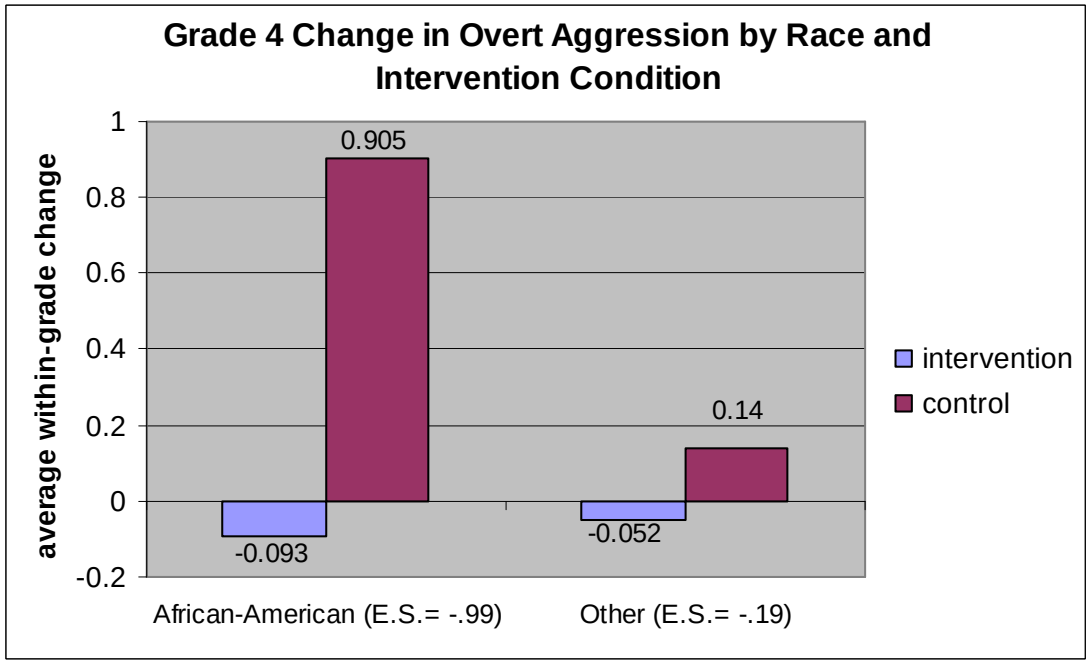
Note. Interaction effects are standardized at sample standard deviation units

Figure 6. Program by race interaction effect for relational aggression



Note. Interaction effects are standardized at sample standard deviation units

Figure 7. Program by race interaction effect for overt aggression



Note. Interaction effects are standardized at sample standard deviation units

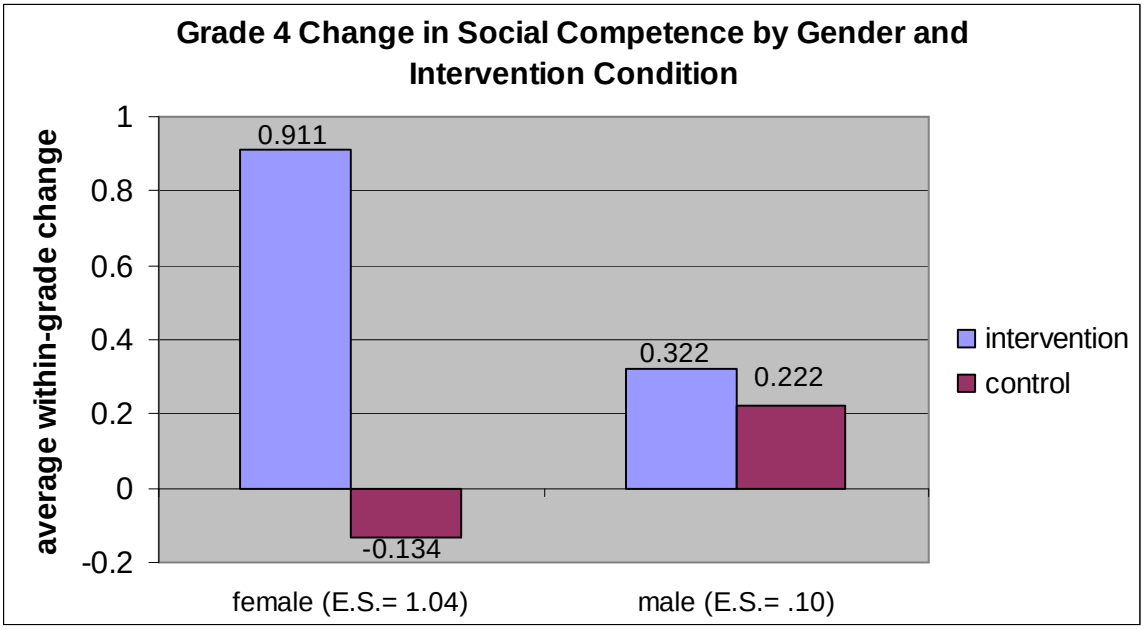
Social Competence Outcomes

Main effects for the social competence outcomes showed a trend increasing significance for schools with high percentage of students receiving free and reduced lunch on CCC social competence at fourth grade (B=-1.04, p=.06). Students whose primary caregiver was employed full-time scored lower than their counterparts on ICST interpersonal competence (B=.061, p=.01). In fifth grade, girls scored higher on CCC social competence (B=.479, p=.05) and ICST interpersonal competence (B=.495, p=.01), with a trend towards significance for prosocial behavior (B=.516, p=.07). Latino students in fifth grade showed a trend towards significance for higher emotion regulation (B=.741, p=.06).

The pattern of positive effects of the intervention continued for the social competence outcomes. As with the outcomes for aggression, intervention participants showed an effect in the negative direction for third grade, but only for the CCC measure of social competence (*B*=-.074, p=.765, δ =-.10). ICST interpersonal competence increased in third grade for intervention children (*B*=.179, p=.513, δ =.21). Making Choices resulted in significant positive effects on CCC social competence for children in both the fourth and fifth grades (*B*=.330, p=.033, δ=.40; *B*=.931, p=.006, δ=1.08). The ICST measure of interpersonal competence did not show significant effects for fourth grade participants, but fifth grade results indicate a trend towards significance for participants (*B*=.616, p=.097, δ =.88) as compared to the control group. Increases in the CCC social competence scale also appears to be moderated by gender for the *Making Choices* group in fourth grade. Girls exhibited significantly higher levels of teacher-rated social competence as a result of the intervention than boys (*B*=.581, p=.024, δ =.70). The

program by gender interaction effect for social competence at fourth grade is shown in Figure 8.

Figure 8. Program by gender interaction effect for social competence



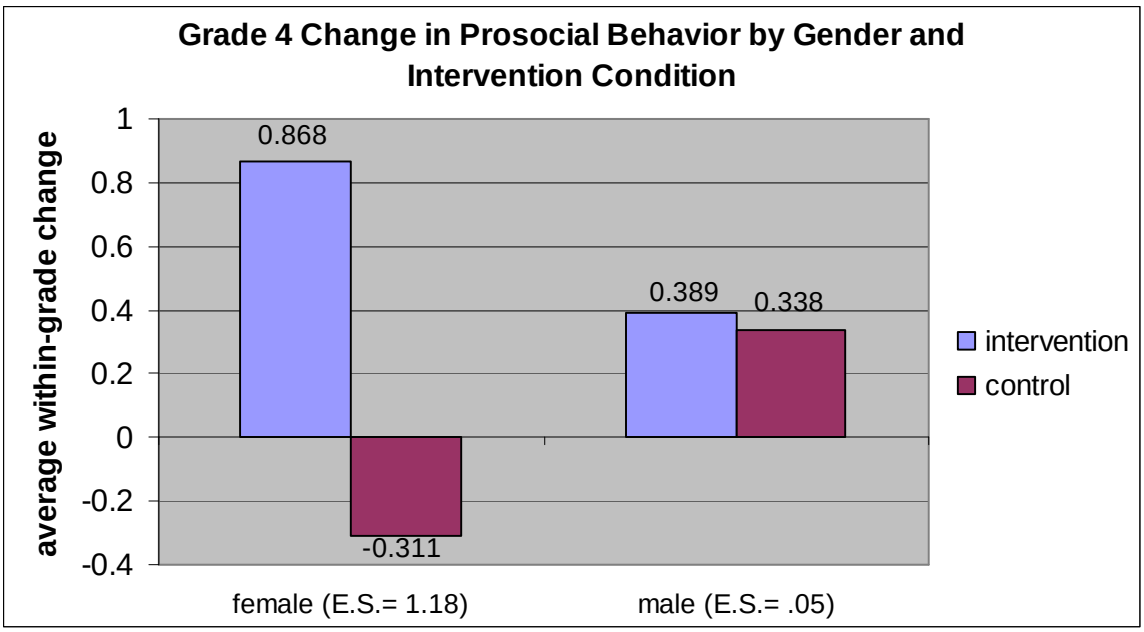
Note. Interaction effects are standardized at sample standard deviation units

Emotion Regulation and Prosocial Behavior Outcomes

For the separate elements of social competence, emotion regulation and prosocial behavior, results continued the trend of negative effects in the third grade for *Making Choices* participants (*B*=-.107, p=.52, δ =-.13; *B*=-.068, p=.83, δ =1.04). Similar to the results of other outcomes reported, these third grade effects were not significant. Gains in emotion regulation skills were observed in fourth and fifth grades, with fifth graders showing significant increases in emotion regulation (*B*=.835, p=.02, δ = .87). Effects were not significant at fourth grade (*B*=.264, p=.12, δ=.29). Teachers did rate *Making Choices* participants significantly higher than comparison group participants for prosocial behavior in both fourth and fifth grades (*B*=.375, p=.03, δ =.43; *B*=1.04, p=.002, δ

=1.04). Presented in Figure 9, the fourth grade intervention effect was moderated by gender (*B*=.740, p=.01, δ =.84), indicating that girls in the Making Choices group (E.S.=-1.18) received more benefit than boys (E.S.= .05) in strengthening prosocial behaviors.

Figure 9. Program by gender interaction effect for prosocial behavior



Note. Interaction effects are standardized at sample standard deviation units

Effect Sizes

Shown in Table 8, effect sizes for relational aggression (δ=-.48), CCC social competence (δ =.40), and prosocial behavior (δ =.43) fell close to Cohen's medium range (δ=.50; Cohen, 1988) at fourth grade. Lower effects sizes were observed for overt aggression outcomes (δ=-.32) at the fourth grade time point. Large effect sizes (δ= .80; Cohen, 1988) were observed at fifth grade for CCC and ICST social competence (δ=1.08; δ=88), emotion regulation (δ=.87) and prosocial behavior (δ=1.04).

Table 5

Estimated Within-Grade Change at Grade 3 (n=548)

Grade 3	ICST aggression		BASC aggression		CCC relational aggression		CCC social competence		ICST interpersonal competence		CCC emotion regulation		CCC prosocial behavior	
Fixed Effects	Est.	SE	Est.	SE	Est.	SE	Est.	SE	Est.	SE	Est.	SE	Est.	SE
Intercept	.303*	.14	.011	.07	.138	.10	.071	.12	-.051	.13	.058	.08	.075	.15
Female	-.185	.20	-.099	.07	-.029	.09	.069	.11	.138	.11	.040	.12	.093	.122
Black	.151	.25	-.035	.09	.023	.12	-.142	.14	-.078	.14	-.126	.15	-.151	.15
Latino	-.194	.37	-.096	.15	-.056	.19	-.141	.21	.388	.21	-.252	.22	-.055	.23
Income-pov	.001	.001	.000	.000	-.0001	.001	-.0001	.0006	-.0005	.0006	-.001	.0006	-.0001	.0007
Father in hh	.122	.12	-.135	.09	-.064	.11	-.038	.13	.322	.11	.011	.14	-.093	.14
Parent Emp FT	-.551**	-.55	.029	.08	.049	.10	-.0002	.116	-.061**	.126	-.031	.12	.032	.13
% free/reduced	2.48*	1.21	-.302	.54	-.155	.87	-.118	.99	-1.64	1.09	-.212	.64	-.061	1.25
Making Choices	-.350	-.35	.135	.13	.034	.21	-.074	.25	.179	.27	-.107	.16	-.068	.31
Random Effects														
School	.121	.12	.014	.02	.036	.03	.037	.03	.088	.06	.014	.02	.057	.04
Student	1.93***	1.9	.122***	.02	.412***	.04	.544***	.05	.624***	.06	.639***	.06	.629***	.06
Deviance	686.12		117.40		425.33		470.19		466.88		490.04		505.35	
AIC	690.12		121.74		429.60		474.19		470.88		494.04		509.35	

*p<.05, **p<.001, ***p<.0001, +P<.10

Table 6

Estimated Within-Grade Change at Grade 4 (n=435)

Grade 4	ICST aggression		BASC aggression		CCC relational aggression		CCC social competence		ICST interpersonal competence		CCC emotion regulation		CCC prosocial behavior	
Fixed Effects	Est.	SE	Est.	SE	Est.	SE	Est.	SE	Est.	SE	Est.	SE	Est.	SE
Intercept	.195	.12	.192	.16	.131	.09	.159*	.06	-.049	.08	.159*	.07	.160*	.07
Female	-.158	.23	-.082	.21	-.163	.13	.056	.12	-.104	.16	.222	.13	-.077	.13
Black	.354	.28	.150	.23	.448**	.17	-.199	.15	-.112	.19	-.077	.17	-.294^{+}	.16
Latino	-.832*	.42	.034	.40	-.017	.25	.233	.22	.515^{+}	.29	.312	.24	.194	.23
Income-poverty	-.0007	.001	.0009	.001	-.0004	.0008	.0007	.0007	.0008	.0009	.001	.0008	.0005	.0007
Father in hh	-.115	.30	-.130	.32	-.001	.18	-.185	.16	.107	.212	-.197	.18	-.192	.19
Parent Emp FT	-.205	.24	-.210	.21	-.102	.14	-.144	.13	.020	.17	-.118	.14	-.168	.13
% free/reduced	2.75**	1.07	1.25	1.28	1.85*	.82	-1.04^{+}	.53	-.519	.69	-.812	.59	-1.24*	.58
Making Choices	-.498^{+}	.29	-.391	.35	-.441*	.21	.330*	.15	.017	.19	.264	.16	.375*	.16
*MC**female					-.639*	.27	.581*	.24					.740**	.25
*MC**Black	-.955^{+}	.53			-.877**	.30								
Random Effects														
School	.014	.08	.174	.15	.048	.06	0		0		0		.002	.02
Student	2.34***	.35	.241**	.07	.810***	.13	.694***	.10	1.19***	6.86	.848***	.12	.767***	.11
Deviance	328.3		59.5		232.67		213.7		265.1		233.4		223.3	
AIC	332.3		63.5		236.67		215.7		267.1		235.4		227.3	

*p<.05, **p<.001, ***p<.0001, +P<.10

Table 7

Estimated Within-Grade Change at Grade 5 (n=373)

Grade 5	ICST aggression		CCC relational aggression		CCC social competence		ICST interpersonal competence		CCC emotion regulation		CCC prosocial behavior	
Fixed Effects	Est.	SE	Est.	SE	Est.	SE	Est.	SE	Est.	SE	Est.	SE
Intercept	.005	.32	.061	.12	.190	.17	-.122	.19	.148	.17	.226	.16
Female	.368	.37	.026	.16	.479*	.24	.495**	.18	.365	.28	.516^{+}	.27
Black	.154	.41	.193	.18	-.374	.26	-.326	.20	-.306	.29	-.470	.30
Latino	.079	.55	-.406	.25	.531	.34	.134	.27	.741^{+}	.38	.336	.40
Income-poverty	.003	.002	.001	.0009	-.0001	.001	.001	.001	.0003	.001	-.0008	.001
Father in hh	.336	.41	.159	.21	-.272	.25	-.566*	.24	-.366	.28	-.142	.30
Parent Emp FT	-.340	.39	-.236	.17	-.071	.24	.247	.19	.097	.27	-.183	.28
% free/reduced	5.67^{+}	3.22	1.62	1.21	-1.38	1.72	-1.77	1.90	-1.62	1.79	-1.19	1.75
Making Choices	-.296	.59	-.274	.22	.931**	.31	.616^{+}	.36	.835*	.32	1.04**	.31
Random Effects												
School	.413	.42	.035	.06	.077	.14	.198	.15	.087	.16	.072	.19
Student	1.68***	.46	.337***	.09	.662**	.18	.297***	.08	.821**	.23	.928**	.27
Deviance	116.4		67.3		85.8		66.2		92.8		95.6	
AIC	120.4		69.3		89.8		70.2		96.8		99.6	

*p<.05, **p<.001, ***p<.0001, +P<.10

Note: BASC aggression measure not collected in fall of grade 5

Table 8

Effect Sizes for Main Effects

Outcome (hypothetical sign)	Grade 3	Grade 4	Grade 5
ICST Aggression (-)	-0.24	-0.32^{+}	-0.20
BASC Aggression (-)	0.37	-0.61	n/a
CCC Relational Aggression (-)	0.05	-0.48*	-0.45
CCC Social Competence (+)	-0.10	0.40*	1.08**
ICST Social Competence (+)	0.21	0.02	0.88^{+}
CCC Emotion Regulation (+)	-0.13	0.29	0.87*
CCC Prosocial Behavior (+)	-0.08	0.43*	1.04**

* $p < .05$, + $p < .10$

Residual analysis

Results from the residual analyses of the random effect associated with the intercept for each model showed that variables at level one appeared to be normally distributed. Histograms and QQ plots showed no outliers and no skewness, indicating that the assumption of normal distribution of level one variables may be tenable. Likewise, the Bayesian estimates for the level two variables showed a normal distribution, indicating that no assumption of normality has been violated by this analysis.

CHAPTER 7
DISCUSSION

This study contributes to a growing body of knowledge that suggests universal, social skills interventions are effective in strengthening children's socio-emotional skills and promoting social competencies related to positive social development. Several important findings emerged from this evaluation of *Making Choices*. First, participation in *Making Choices* resulted in reduced teacher-rated overt and relational aggression for children in fourth grade. This finding is noteworthy in part because it shows that increasing children's social information processing skills results in improved behavioral outcomes and thus, provides support for the social-cognitive theoretical framework that informs the intervention. Although this analysis did not examine proximal effects on SIP skills, this finding is consistent with prior intervention research that programs with social-cognitive foundations work to effectively prevent instances of aggressive behavior in children.

It is also noteworthy that reductions in aggressive behavior were observed for both overt aggression and relational aggression. Research evidence has called attention to the importance of addressing various forms of aggressive behavior. A meta-analysis conducted by Card et al. (2008) on direct and indirect aggression indicates a high correlation between overt and relationally aggressive strategies and suggests that intervention studies consider both forms of aggression and their potential negative effects on social and psychological adjustment. Difficulties in processing social information can

predict relational aggression for children, in addition to overt aggression. The findings from this study provide additional evidence that intervening from a social information processing perspective can promote positive effects on both overt and relational aggression.

Second, the study found moderating effects by gender for fourth grade relational aggression outcomes. Girls participating in *Making Choices* showed greater reductions in relational aggression than boys. In fact, graphs of the interaction effects showed that all groups except intervention girls increased in relationally aggressive behaviors in fourth grade. However, the increase for intervention group boys is very small. Given that behavior change is measured as a change score between Spring and Fall of fourth grade, these results may represent no change for boys in fourth grade rather than a real increase in relational aggression. Although both boys and girls exhibit relationally aggressive behaviors, especially in early to middle childhood, some evidence suggests that girls choose relational aggression over physical aggression more often than boys (Archer & Coyne, 2005). One explanation for the differential impact for girls on relational aggression is that the intervention addressed a specific form of aggression that girls choose preferentially and that often goes unnoticed by teachers due its covert nature. Bringing children's and teachers' awareness to the behaviors may have contributed to the intervention effect. However, the study did not find significant gender main effects for relational aggression at any grade, including fourth grade. It could be that the *Making Choices* curriculum is particularly appropriate for girls in fourth grade who may establish different social rules around friendships and competition than boys.

Another interpretation of the intervention by gender interaction is that relational aggression is often associated more with female behavior than with male behavior. Teachers may have initially rated boys lower than girls on this type of aggression, leaving more room for girls to improve as a result of the intervention. In a previous evaluation of *Making Choices*, (Terzian, 2007) boys exhibited more significant decreases in overt aggression than girls because girls were already rated lower on overt aggression. Perhaps, the same logic holds for the differential impact of the intervention for girls on relational aggression in this study. However, the fact that boys showed a small increase in relational aggression for fourth grade when considering the graphs of the interaction effects points to a different explanation. Regardless, the fact that relational aggression is associated with later psychosocial problems, such as internalizing symptoms, make this finding important for further prevention intervention efforts (Mathieson & Crick, 2010).

Differential impacts experienced by African-American children on both overt and relational aggression outcomes in fourth grade represent another study result worth discussion. It is not clear why African-American children would benefit more from *Making Choices* than children of other races and ethnicities. Perhaps because of the strong relationship between race and poverty, particularly in the Southeast, this finding represents benefits of the intervention based on child level of risk. However, no moderation effects were observed for children based on poverty level, making this finding difficult to interpret. Latino children did not show any differential impacts of the intervention on any outcomes, but it is interesting to note that Latino children were rated by teachers as lower on all measures of aggression for all grades except overt aggression

in fifth grade, suggesting that in terms of aggressive behavior, Latino children do not represent a high risk group for teachers in this sample.

In addition to decreasing aggressive behavior, *Making Choices* targets children's social problem-solving skills to promote increased social competence. In this evaluation, *Making Choices* children were rated higher than control children on CCC social competence for fourth and fifth grades and overall interpersonal competence in fifth grade. Components of the CCC social competence measure, emotion regulation and prosocial behavior also showed positive effects in fifth grade. Effect sizes for these findings fell into the medium to large range, with medium effects emerging in fourth grade and large effects emerging in fifth grade. Although data for this study were analyzed within-grades, children received the intervention in third, fourth, and fifth grades. Because third grade represented the bulk of the intervention, the effects shown at fourth and fifth grades suggest possible cumulative effects of the intervention at each of the three grades.

Although positive effects were observed for intervention children in fourth and fifth grades, third grade results showed estimates that were not in the expected direction, suggesting there might be negative effects of the intervention in third grade. These results were similar to previous analyses of these data (Fraser et al., 2009). Because *Making Choices* is a skills building intervention, it is unlikely that the curriculum would increase problematic behaviors for children, or put children more at risk. However, with any social intervention, it is important to pay attention to negative findings to ensure that an intervention is not harmful. A possible interpretation of these unexpected findings is that the intervention schools remained slightly higher risk than the control schools, even after

propensity score methods to balance the data were conducted. Propensity score methods only reduce the amount of observed bias in the data. They cannot control completely for unobserved bias that occurs in multiple social domains in children's lives.

Perhaps a more interesting interpretation can be found by considering the intervention's theoretical grounding in social information processing. SIP has roots in Piaget's moral domain theory (Dodge & Rabiner, 2004). However, its focus is specifically on how children translate structural knowledge into behavioral responses. Third graders would fall into Piaget's concrete operational stage of development that is characterized by the ability to think concretely and follow a logical series of rules. At age 11, children move into the formal operations stage where they gain skill in abstract thinking and drawing logical conclusions to hypothetical situations (Piaget, 1965). The Making Choices intervention was created keeping children's cognitive development and ability to learn the steps of SIP in mind. However, it may be that children are able to learn the logical steps of SIP in third grade, but it is fourth grade, and entry into more formal operations, that makes the curriculum particularly relevant for children, especially given that the intervention asks children to respond to hypothetical situations using learned SIP skills. In other words, children learn the "rules" associated with *Making Choices* in the third grade, but it is in the fourth and fifth grades that the process of SIP becomes a type of latent mental structure that children access fully and more fluidly due to the movement into the more abstract, formal operations stage. It is important to note, however, that although this analysis did not find positive effects in third grade, previous studies of the *Making Choices* intervention have shown significant decreases in overt aggression (Fraser et al., 2005; Fraser, Lee et al., 2011; Smokowski et al., 2004) and social

aggression (Fraser et al., 2005; Fraser, Lee et al., 2011) and increases in prosocial goal setting and response decisions (Fraser et al., 2005) for third graders. Reinforcement of the curriculum in fourth and fifth grades combined with more specialized content pertaining to bullying behaviors and relationally aggressive behaviors may have also contributed to the effects shown in fourth and fifth grades. The positive findings that emerge at fourth and fifth grades in this study suggest that the unexpected negative findings at third grade do not indicate that the intervention had a detrimental effect on the children in this sample.

A national evaluation of these data conducted by the Institute of Education Sciences found that this intervention, in addition to the six other interventions that participated in the Social and Character Development Research Program did not show effectiveness on a variety of study outcomes (Social and Character Development Research Consortium, 2010) nor did any effects emerge for specific subgroups. One possible reason that this analysis showed different results is that the measures used in this analysis, unlike the national evaluation, are more sensitive to the intervention because they were chosen during the conceptualization of the intervention activities and treatment manual. This makes them more likely to pick up the specific behaviors that the intervention proposes to influence. The current analysis also excluded children who entered into the Competence Support Project study after the third grade when the bulk of the intervention was delivered. The national evaluation did not exclude enterers in their analysis of the Competence Support Project data. However, they did conduct a sensitivity analysis with a restricted set of covariates that excluded enterers for the combined projects data and found no effects (Social and Character Development Research

Consortium, 2010). Although excluding enterers in our analysis of *Making Choices* prevents this study from being an Intent-to-Treat analysis, including children when they did not receive most of the intervention limits the ability to test the effects of implementing the full intervention content. Differences in study findings between this analysis and the national evaluation may have been produced by the type of weights that were employed to control for differences between the treatment and control groups. The national evaluation used sampling weights whereas the current analysis used propensity score weights to handle the issue of selection bias. It is possible that the use of propensity score weights produced a more rigorous experiment than sample weighting.

Study Strengths

This study contains a number of strengths that deserve attention. First, the study employed a rigorous, cluster, randomized design. Because of its real-world application, social intervention research is inherently complicated. Ideally, studies employ a randomized, experimental design to control for threats to internal validity, such as selection bias and unobserved heterogeneity, and to strengthen results and study implications. However, implementing an intervention in an established and controlled school setting adds layers of complexity to an intervention study. As a result, school-based intervention studies often utilize a cluster randomized design as an alternative to combat the problems with traditional experimental designs. Cluster designs offer advantages over individual randomization. Although the randomization in this study did not work as intended, treatment assignment occurred at the school level, reducing the possibility of contamination effects.

A second strength of this study is that it included tests of moderating effects for the outcomes. Most school-based intervention studies assess program effectiveness by examining the direct effects of the program activities on the proximal and distal dependent variables of interest. Uncovering moderating effects can add even more information to what is known about current interventions geared toward reducing aggressive behavior as well as inform new interventions (Card et al., 2008; Durlak et al., 2011). Without gaining a deeper understanding of how a program's theoretical constructs actually affect the outcomes, and for which populations, a great deal of opportunity to affect change through the intervention is lost. Due to its examination of moderating effects, this study found that the Making Choices intervention showed differential effectiveness on aggression outcomes for girls and African-American children and increased benefits for girls on social competence and prosocial behavior at fourth grade.

Third, the use of within-grade change HLM as an analytic strategy offers strength and statistical rigor to this study. HLM corrects for autocorrelation inherent in studies where clustering is present. In this study, students were nested within schools. Without modeling to control for the nesting effect of children within schools, a higher probability of making a Type I error exists. Because this study utilizes HLM, the estimates produced by the analysis more accurately reflect the program effects.

Along with multilevel modeling, the within-grade change approach allowed this analysis to examine the intervention's effects on children's behavior for all three grades of the study without confounding due to rater effects. When children are rated over time by different teachers, scores on important study variables may reflect differences between raters instead of differences in children's actual behavior (Guo & Hussey, 1999). By

employing the within-grade change approach and estimating scores within raters for each grade, this study reduces the likelihood for biased parameter estimates due to rater effects and increases its analytic rigor.

Fourth, the inclusion of measures for both overt and relational aggression strengthens this study. Studies relying on measures for overt aggression only miss a possible opportunity to capture a fuller spectrum of aggressive behavior, especially when considering previous work showing that girls display less physical aggression in childhood than boys and may rely more on expressing their aggression through other, more covert behaviors. It has been recommended by social development researchers that longitudinal studies assess effects of these behaviors over time and developmental age to strengthen intervention research in this area (Card et al., 2008).

Finally, the intervention evaluated in this study is an established social skills prevention intervention with an existing base of evidence, rooted in a strong theoretical framework. Previous implementations and evaluations of *Making Choices* have been conducted resulting in refinement of the curriculum and intervention activities. This current evaluation contributes to the growing evidence base supporting not only *Making Choices*, but also the utility of promoting children's positive development through school-based, social skills prevention interventions.

Study Limitations

Several limitations to this study exist. First, this study used a two-level within-grade change HLM model to examine outcomes for each grade instead of a growth curve model or a cumulative difference piecewise model. Both the three-level growth curve and piecewise models utilize a time variable and account for overall change across grades.

Because a within-grade change model does not include a covariate relating to time, and because sample sizes changed for each grade, this study was unable to assess overall change and account for possible developmental trajectories for both intervention and control groups.

Second, although the study employed a rigorous, cluster randomized research design, the randomization procedure did not work as intended. Studies employing non-randomized designs are vulnerable to confounding due to the increased possibility of selection bias. This means that estimates of program effects from non-randomized studies can be biased and represent a threat to the internal validity of a study. To address this problem, a rigorous, propensity score approach was employed to balance the treatment and control groups and increase the ability to make assumptions about the causal effects of the intervention. However, unlike randomization, the propensity score approach only corrects for selection bias among the observed covariates and cannot guarantee balance for both observed and unobserved covariates. Therefore, hidden selection bias remains a concern for this study.

A third limitation involves the number of schools in the study sample and the estimation of propensity scores. Ten schools originally consented to participate in *Making Choices* over the two year study period. The study sample was detrimentally affected by the loss of two of these original sample schools. One replacement school was found, but the second school left the study after the fourth grade year, making it impossible to replace. As a result, the study sample consisted of only nine schools. When estimating propensity scores to control for the resulting loss of randomization, the number of schools in the study was too low to estimate propensity at the school level, the level of

assignment. Therefore, propensity scores were estimated at the individual level. Although the weighting procedure showed balance between the children in the intervention and control schools, estimating individual-level propensity scores ignores the level of treatment assignment. In addition, some researchers suggest that calculating a normalized difference test, or standardized mean difference, is preferable to using traditional statistical significance to determine confoundedness of a study (Imbens & Wooldridge, 2009). Calculations of normalized differences should vary between 0 and 1. Covariates with a normalized difference over .25 cannot be guaranteed to be unconfounded (Imbens & Wooldridge, 2009). For this study, the balance checks conducted after estimation of propensity score weights used statistical significance as the indicator for covariate balance. Calculating normalized differences for the covariates would confirm the results of the balance checks and add confidence that the procedure adequately balanced the data.

A fourth study limitation is the use of only teacher-rated measures. Research studies assessing child behavioral outcomes are strengthened by using multiple sources of information. Although data from parents, teachers, children, and their peers were collected, this analysis focused only on measures most closely related to the intervention content. With the exception of the BASC measure of aggression, all measures used in this study were chosen and developed during the initial phases of intervention development. Items are based on substantive content in the curriculum to measure change based on the intervention's theoretical framework. Although teacher-rated measures were solely used in this study, teacher-rated measures are considered to accurately measure behavior in childhood. As children move to late childhood and adolescence, teacher measures

become less indicative of behavior because increased independence in the school setting after elementary school does not allow teachers to witness behaviors of the same child over the course of the school day.

Fifth, it is important to mention that during the years of intervention implementation, the state legislature mandated all elementary schools to adopt some type of approved social and character development program. Results of this decision are that the routine health services conditions that served as the control groups for this study received some form of intervention and were not truly control conditions. This implies that any behavioral changes observed for children in the intervention condition may have been diluted due to the influence of content provided in the control conditions. The fact that this study found significant positive intervention effects adds confidence that the effects were due specifically to the *Making Choices* intervention. Theoretical grounding in the social information processing, more than specific intervention activities are likely what best distinguishes the intervention and control schools on intervention outcomes.

An additional consideration for this study is that the Competence Support Project consisted of teacher consultation on classroom behavior management and teacher training on group social dynamics in addition to the *Making Choices* classroom curriculum. Although these components likely influenced aspects of the intervention, no data were collected assessing the number or content of the consultation sessions or practical knowledge gained by teachers from the teacher training on social dynamics. Therefore, this study could not account for the influence of these components in the analysis. Also, using teachers to implement the intervention resulted in variation in the number of minutes that the *Making Choices* curriculum was delivered in intervention school

classrooms. This study did not examine the possible intervention effects based on classroom dosage, although this may have had an impact on the final outcomes.

Finally, this study did not test for meditational effects of the intervention on children's outcomes. A strength of social information processing theory, and this intervention, is that it's testable and can explain the mechanisms through which behavior change takes place as a result of the intervention. Understanding what factors mediate proximal and distal effects illuminates the intervention "black box" and aids in making inferences about an intervention's effectiveness. In other words, theoretical grounding allows researchers to determine that it is the intervention's curriculum and activities that create desired effects and not other aspects of the intervention research design. However, mediational analyses of *Making Choices* have been conducted in previous research. Therefore, this study focused on examining moderating effects of the intervention.

Study Implications

By identifying and targeting key risk factors that influence the development of aggressive behavior, school-based interventions can intervene early in a child's social development to reduce the risk for peer rejection and other potential problematic outcomes. Although much has been learned from prior research, advances in intervention design and statistical analysis strategies have created the potential to further deepen our understanding of aggression and its consequences for children. Implications for future social work practice, policy, and research are discussed below.

Practice

School violence has become a large societal concern, especially in light of several high profile school shooting incidents (Wike & Fraser, 2009). Addressing risk factors for

aggression and putting support systems in place to help students who may be experiencing peer rejection may work to decrease levels of school violence. It is important that school social workers understand the effects that peer rejection may have on those who act out aggressively as well as those who are victimized, as aggressor/victim status can exist within the same individual. Studies of universal interventions like *Making Choices* have shown effectiveness in building children's social skills with peers, decreasing the likelihood that they will experience peer rejection.

In addition, use of the social information processing model as an intervention framework offers the opportunity to intervene at a variety of points in a child's cognitive processing of social information. Difficulties at any step of SIP can be identified and addressed. In a real-world school setting, children enter into social situations with their own unique experiences and perceptions that come from multiple levels of influence. According to the SIP model, these experiences become incorporated into a child's social-cognitive processing as a working database of scripts and schema. Basing violence prevention interventions in the SIP framework provides practitioners many opportunities to support a variety of children with varying social information processing skills. For school social workers, improving children's social skills and relationships with peers through interventions such as *Making Choices*, can reduce not only difficult behavior in the classroom and reduce instances of bullying and victimization, but can lead to improved psychosocial outcomes for children and youth overall.

Better understanding of the different ways that aggressive behavior manifests itself will be useful in reducing negative effects associated with aggression and victimization. For example, learning to recognize and intervene in instances of relational

aggression can uncover the sometimes covert nature of this type of aggression and reduce the social isolation and rejection that many victims experience. The current study shows that specifically addressing relational aggression by offering children alternative strategies for potentially difficult social interactions results in significant decreases in relationally aggressive behavior. Intervening in instances of overt and relational aggression can help interrupt a developmental trajectory toward further social psychological difficulties in adolescence and adulthood.

The findings from this study also suggest that practitioners implementing interventions should attend to what interventions are most effective for which populations. In this study, intervention effects for relational aggression, social competence, and prosocial behavior in fourth grade were moderated by gender. Moderation effects for relational aggression in fourth grade were found for African-American children. These types of findings are useful when considering what subtypes of children may be benefitting differentially as a result of the intervention. Because *Making Choices* works from a social-cognitive foundation, the intervention may be addressing developmental or cultural differences that affect the way children approach challenging interactions in the classroom or with their peers. When considering an intervention's impact on behavioral outcomes, practitioners may need to look beyond the effects for the general population of children to uncover the benefits experienced by other groups of children.

An additional implication for social work practice is the need for more practice-related research from which to draw conclusions about appropriate and effective interventions. With increased attention to the problems of electronic aggression and

bullying, more research related to current practice efforts and policies around these issues could strengthen social workers' abilities to intervene effectively and better serve the needs of children and their families. This type of work is also needed to determine the most effective social development interventions to provide in schools in order to better provide positive social and academic outcomes.

Policy

School-based interventions aimed at preventing aggressive and violent behavior have shown effectiveness in improving outcomes for children. As such, policymakers need to place emphasis on fostering healthy social development for children in the school environment through the implementation of proven interventions. Social workers can play an important role in advocating for programs that meet the needs of children who may exhibit difficulties in relating to peers and/or experience problems with peer victimization. Utilizing social work organizations, such as the National Association for Social Workers (NASW), social workers can influence school-related policies and the programs and services made available to children and families in the context of the school.

The burden of meeting expectations set forth by the No Child Left Behind policy has resulted in teachers and schools becoming solely focused on achieving end-of-grade academic goals with little time and resources left for programs that may indirectly affect children's ability to achieve academically. Many school-based prevention interventions have demonstrated effectiveness in improving academic achievement among children who are at risk for behavior problems. Bringing the positive effects of school-based

prevention interventions to the attention of legislators is another important role for social work practitioners and researchers.

Research

Results from this dissertation research indicate that social skills interventions can be effective in reducing instances of aggressive behavior and increasing social competence. Study findings illuminate specific areas that can inform further research in this area. First, school-based interventions can be complex and difficulties arise in conducting studies that utilize a randomized control trial approach. This study demonstrates that advanced statistical techniques, such as propensity score approaches, can serve as useful remedial tools to address this issue and provide needed methodological rigor to these studies.

In addition, the interesting findings regarding moderation effects of Making Choices for girls offer more evidence that addressing specific forms of aggression and considering differential impacts of aggressive strategies for girls and boys is an important consideration for future research. Especially in light of evidence that relational aggression predicts internalizing behavior problems in adolescence, more attention should be given to distinguishing between overt and relational aggression as well as understanding their strong relationship for children.

Studies are needed that assess potential moderating effects of intervention outcomes. This study showed that both girls and African-American children received greater benefits than others from participating in *Making Choices* based on their aggression and social competence outcomes. This is an important finding when considering that the purpose of intervention research is to discover what interventions

work best and for whom. To date, *Making Choices* has demonstrated effectiveness in improving psychosocial outcomes for children in elementary school (Fraser et al., 2009; 2005; 2004; Smokowski et al., 2004) and in sixth grade (Nash et al., 2003). The current analysis adds further evidence to the effectiveness of *Making Choices* for third, fourth, and fifth grade children on behavioral outcomes.

Only two studies have evaluated the impact of the intervention specifically on children's social information processing skills (Fraser et al., 2005; Terzian, 2007). Because social information processing informs every aspect of the intervention curriculum, incorporating mediation analyses into further evaluations of *Making Choices* may help refine the intervention to address the mechanisms of change for specific subpopulations of children. In addition to mediation analyses examining effects on the various components of social information processing, an evaluation of the *Making Choices* program based on intervention dosage is needed. In this study, children received the bulk of the intervention in third grade and booster sessions in fourth and fifth grades. Also, due to teacher implementation of the curriculum, the number of minutes that *Making Choices* was delivered to intervention classrooms widely varied. Because of this, future evaluations of the program examining the effects of intervention dosage would help to refine the curriculum to be delivered in its most efficient and effective form.

Conclusion

As a profession concerned with improving the mental, physical, and social health of families and children, social work can play a prominent role in informing, creating and evaluating interventions that address this area at multiple levels. Recognizing peer rejection as a keystone risk factor in the development of aggression can help school

practitioners intervene with children who may be at risk. Likewise, understanding the different ways that aggression manifests itself (i.e., physical and/or relational), peer dynamics that influence behavior, and the most efficient ways to achieve and build upon short-term effects of current interventions can further the work being done in this field and increase the possibilities for positive changes resulting from these interventions. Sequences of social development interventions like *Making Choices*, similar to curricula in language arts and math, could boost children's social development learning from year to year and provide a strong foundation of skills throughout elementary and middle school that continue to promote positive developmental outcomes.

Appendix A:

Characteristics of Treatment and Control Schools, 2005-2006

	Student enrollment	Percent White	Percent Black	Percent eligible for free/reduced lunch	3rd to 5th grade students at or above grade level, reading and math
Tx1	559	21.5%	44.5%	71.6%	46.3%
Ct1	372	24.5	59.4	70.4	50.0
Tx2	615	45.2	27.5	68.8	56.5
Ct2	536	50.0	33.8	34.2	66.1
Tx3†	872	64.1	24.4	52.3	67.2
Ct3	771	48.0	39.8	55.1	72.9
Tx4	586	44.9	49.3	46.6	71.9
Ct4	703	69.8	22.0	49.4	77.3
Tx5	676	3.4	93.0	90.4	51.5
Ct5	882	42.4	16.2	65.0	74.8
Tx avg.	662	35.8	47.8	65.9	58.7
Ct avg.	653	46.9	34.3	54.8	68.2
2-tail t-test	ns	ns	ns	ns	ns

ns, not significant; † K-8 school, all others are K-5

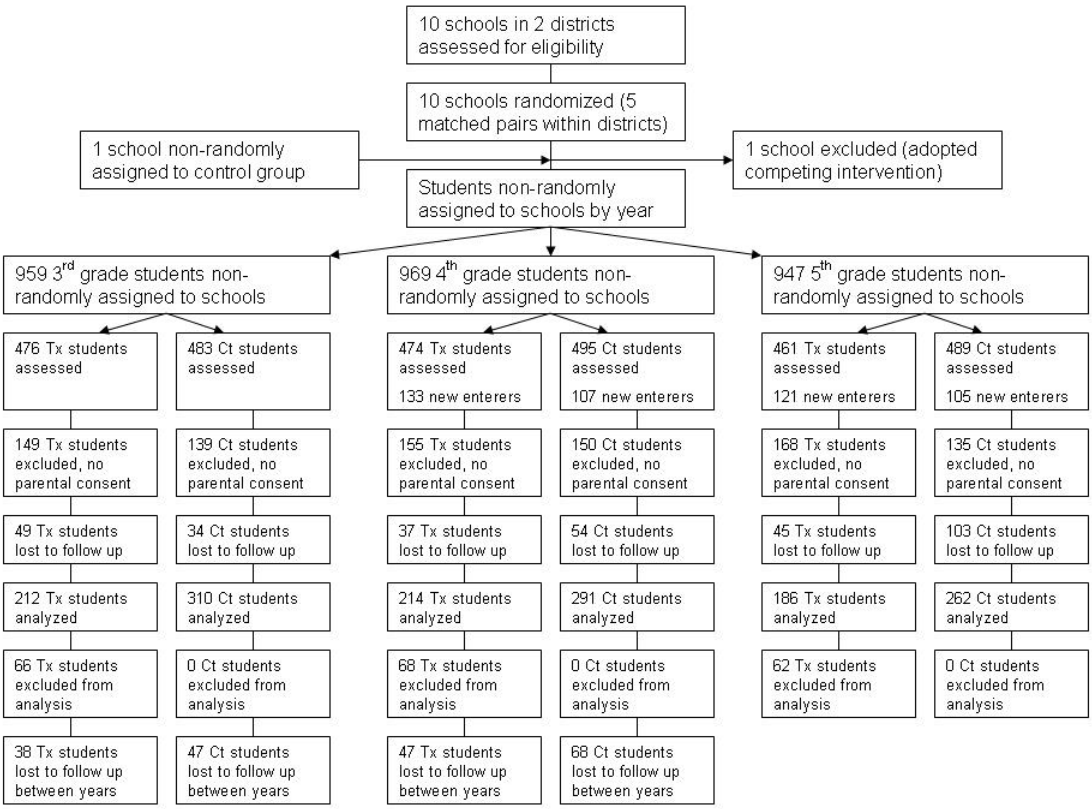
Appendix B:

Original Student Sample Characteristics at Baseline

	N	Treatment	Comparison	p-value
Sex (female)	841	.54	.51	.293
Age	838	8.94	8.95	.714
Ethnicity				
Black	841	.43	.21	.000**
White	841	.31	.54	.000**
Latino	841	.08	.14	.006**
Am Indian	841	.04	.01	.004**
Father, stepfather in HH	685	.66	.75	.005**
HH size	760	4.49	4.51	.820
Primary caregiver educ.	715	5.30	5.20	.534
caregiver employed FT	755	.51	.57	.092+
Income to poverty ratio	740	193.58	217.62	.004*

Appendix C:

CONSORT Diagram Indicating Flow of Participants



Appendix D:

Carolina Child Checklist—Teacher Form (CCC)

CAROLINA CHILD CHECKLIST – TEACHER FORM ***Date:*** _____

Student _____ ***Completed by:*** _____

Below is a list of items that describe students. Please circle the number that best describes the student **within the last month**. Please answer all items as well as you can, even if some do not seem to apply to this student.

	never	rarely	sometimes	often	very often	always
1. Works well alone	0	1	2	3	4	5
2. Thinks before acting	0	1	2	3	4	5
3. Can give suggestions and opinions without being bossy	0	1	2	3	4	5
4. Mind wanders	0	1	2	3	4	5
5. Shows poor effort	0	1	2	3	4	5
6. Excludes other kids from peer group	0	1	2	3	4	5
7. Completes assignments	0	1	2	3	4	5
8. Teases classmates	0	1	2	3	4	5
9. Can calm down when excited or all wound up	0	1	2	3	4	5
10. Is helpful to others	0	1	2	3	4	5
11. Controls temper when there is a disagreement	0	1	2	3	4	5
12. Has social contact with others	0	1	2	3	4	5
13. Stubborn	0	1	2	3	4	5
14. Is liked by classmates	0	1	2	3	4	5
15. Easily distracted	0	1	2	3	4	5
16. Expresses needs and feelings appropriately	0	1	2	3	4	5
17. Friendly	0	1	2	3	4	5
18. Is disliked by classmates	0	1	2	3	4	5
19. Excludes other kids from games or activities	0	1	2	3	4	5
20. Learns up to ability	0	1	2	3	4	5
21. Initiates interactions with others	0	1	2	3	4	5
22. Plays with others	0	1	2	3	4	5
23. Eager to learn	0	1	2	3	4	5
24. Stays on task	0	1	2	3	4	5
25. Avoids social contact	0	1	2	3	4	5
26. Very good at understanding other people's feelings	0	1	2	3	4	5
27. Concentrates	0	1	2	3	4	5
28. Lies to make peers dislike a student	0	1	2	3	4	5
29. Yells at others	0	1	2	3	4	5
30. Resolves peer problems on his/her own	0	1	2	3	4	5
31. Tells peers he or she won't like them unless they do what he or she says	0	1	2	3	4	5
32. Works hard	0	1	2	3	4	5
33. Pays attention	0	1	2	3	4	5
34. Says mean things about others	0	1	2	3	4	5
35. Self reliant	0	1	2	3	4	5

Making Choices Teacher Rating Scales
Carolina Child Checklist

Cognitive concentration

1 Works well alone
4 Mind wanders (Rev)
5 Shows poor effort (Rev)
71 Completes assignments
15 Easily distracted (Rev)
20 Learns up to ability
23 Eager to learn
24 Stays on task
27 Concentrates
32 Works hard
33 Pays attention
35 Self-reliant

Social contact

12 Has social contact with others
21 Initiates interactions with others
22 Plays with others
25 Avoids social contact (Rev)

Social competence

2 Thinks before acting
3 Can give suggestions and opinions without being bossy
9 Can calm down when excited or all wound up
10 Is helpful to others
11 Controls temper when there is a disagreement
16 Expresses needs and feelings appropriately
17 Friendly
26 Very good at understanding other people's feelings
30 Resolves peer problems on his/her own

Social competence subscale:
Prosocial

3 Can give suggestions and opinions without being bossy
10 Is helpful to others
17 Friendly
26 Very good at understanding other people's feelings
30 Resolves peer problems on his/her own

Social competence subscale:
Emotional regulation

2 Thinks before acting
9 Can calm down when excited or all wound up
11 Controls temper when there is a disagreement
16 Expresses needs and feelings appropriately

Social aggression

3 Can give suggestions and opinions without being bossy
6 Excludes other kids from peer group (Rev)
8 Teases classmates (Rev)
13 Stubborn (Rev)
19 Excludes other kids from games or activities (Rev)
28 Lies to make peers dislike a student (Rev)
29 Yells at others (Rev)
31 Tells peers he or she won't like them unless they do what he or she says (Rev)
34 Says mean things about others (Rev)

Adapted from:

Social Health Profile (SHP, Fast Track, 1997)

Teacher Observation of Classroom Adaptation-Revised (TOCA-R, Werthamer-Larsson, Kellam, & Wheeler, 1991).

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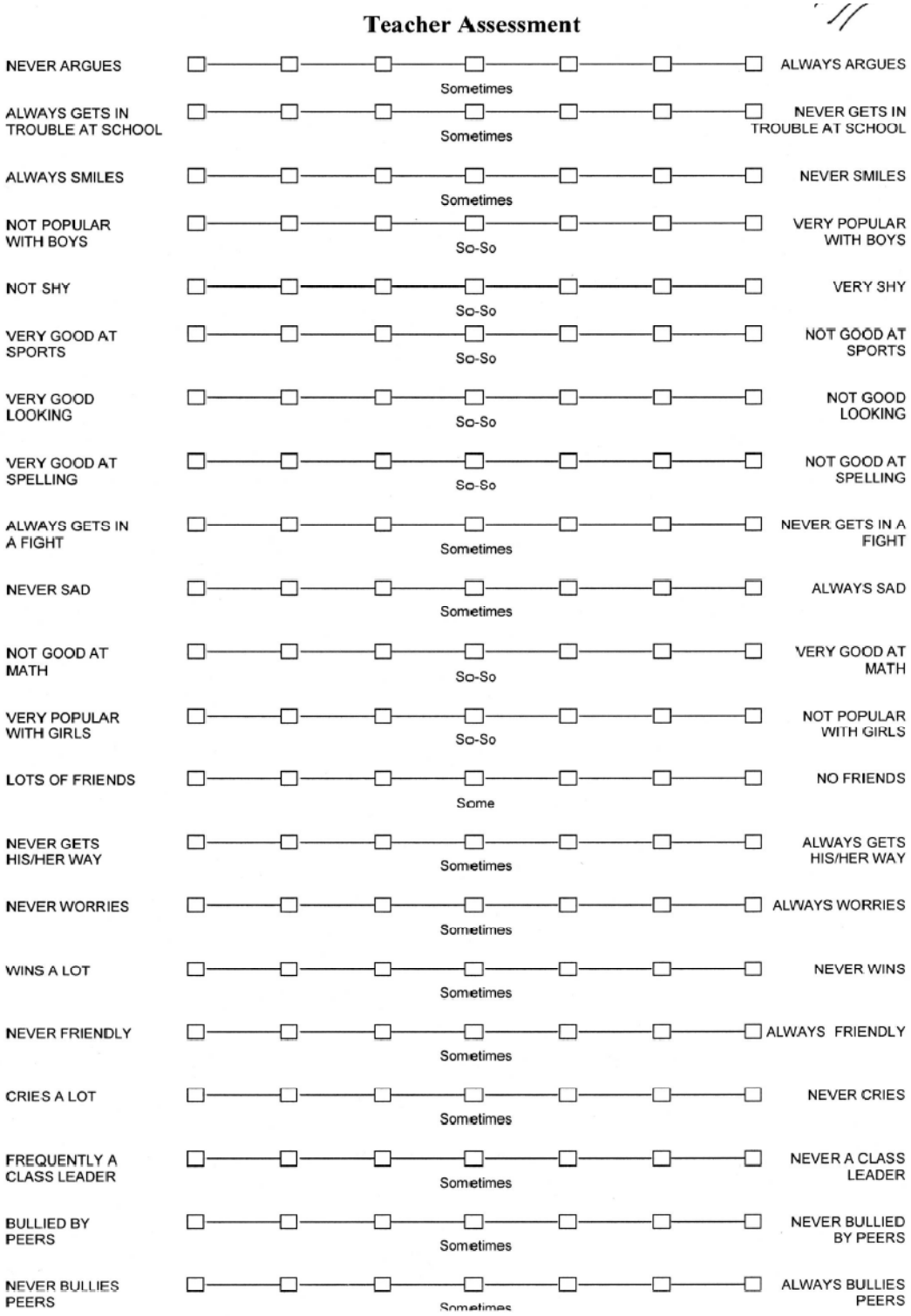
Appendix E:

The Interpersonal Competence Scale—Teacher Report(ICST)



Appendix F:

Behavior Assessment System for Children—Teacher (BASC)

BASC Aggression Subscale

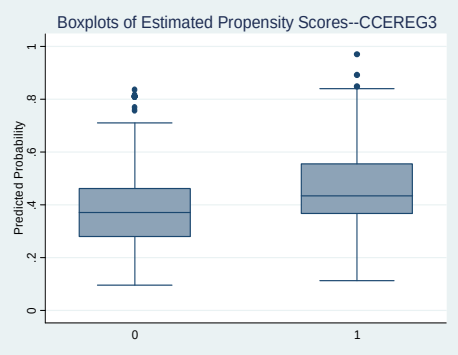
Items:

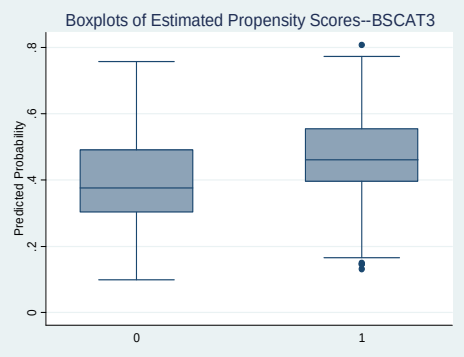
1. Argues when denied own way
2. Threatens to hurt others
3. Blames others
4. Bullies others
5. Breaks other children's things
6. Talks back to teachers
7. Orders others around
8. Is critical of others
9. Calls other children names
10. Shows off
11. Teases others
12. Complains about rules
13. Hits other children
14. Is a "sore loser"

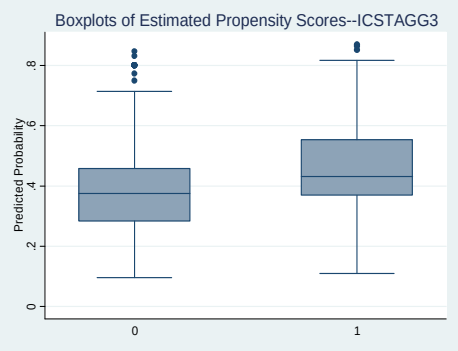
Revisions:
In the SACD Teacher Report on Student, items from this scale are integrated with items from four other scales. The original 4-point scale (*Never, Sometimes, Often, Always*) was based on the student's behavior in the last 6 months; this was slightly reworded to a 4-point scale (*Never, Sometimes, Often, Always*) based on the past 30 days.

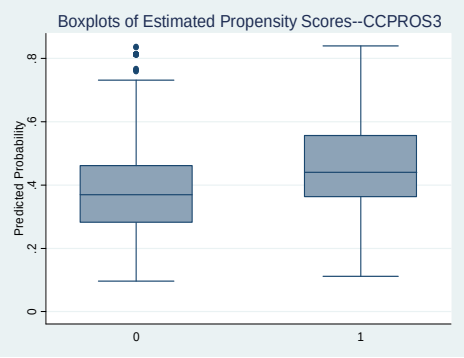
Appendix G:

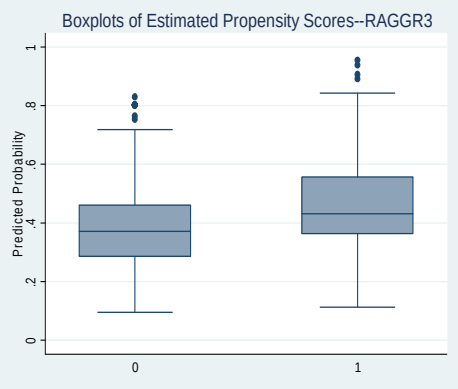
Boxplots of Estimated Propensity Scores by Intervention Condition

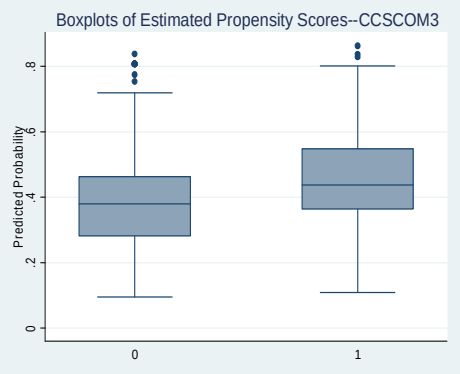


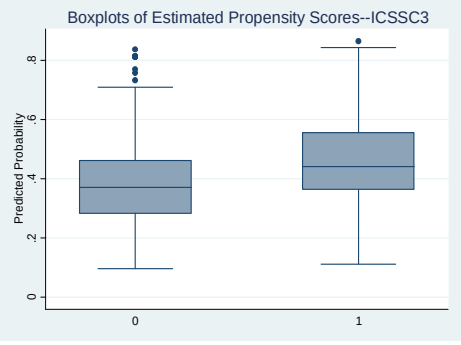












Appendix H:

Significance Tests for Individual Level Propensity Score Weights

	No weight	Weight for Average Treatment Effect (ATE)	Weight for Average Treatment Effect for the Treated (ATT)
Age	.487	.604	.524
African-American	.000	.904	.839
Latino	.000	.809	.279
Gender	.020	.812	.091
Father in HH	.591	.612	.001
Caregiver Ed	.000	.608	.712
Income/Poverty	.232	.850	.174
ICST Aggression	.000	.643	.743
ICST Academic Achievement	.443	.446	.871
Cognitive Concentration	.088	.581	.470
Social Contact	.000	.462	.595
Social Competence	.523	.939	.985
Relational Aggression	.000	.900	.380
BASC Aggression	.000	.555	.894

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