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A Meta-Analysis of Interventions to Improve Social Competence in Early Childhood

Adam Steven Kennedy

Loyola University Chicago

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LOYOLA UNIVERSITY CHICAGO

A META-ANALYSIS OF INTERVENTIONS TO IMPROVE
SOCIAL COMPETENCE IN EARLY CHILDHOOD

A DISSERTATION SUBMITTED TO
THE FACULTY OF THE GRADUATE SCHOOL
IN CANDIDACY FOR THE DEGREE OF
DOCTOR OF PHILOSOPHY

PROGRAM IN SCHOOL PSYCHOLOGY

BY
ADAM S. KENNEDY
CHICAGO, IL
MAY 2010
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First and foremost, I would like to thank the members of my dissertation committee, since they are most directly responsible for what is to follow in this document. It seems disingenuous in a document of this length to suggest that words could fail to express something, but I still hope to have expressed the sentiments that follow in other ways and at other times. First, I must thank my mentor and guardian angel Terri Pigott for her support, friendship, and maybe most of all for her confidence in me. Certainly, I could not have initiated (let alone completed) this project without her guidance. But Terri has changed my life in innumerable other ways as well. To say that this dissertation would not exist if not for her is stating the obvious; it is more to the point to say that I myself would not exist either (at least not as the person I am today).

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For my trinity: TK, LM, and RK
# TABLE OF CONTENTS

**ACKNOWLEDGEMENTS** iii  
**LIST OF TABLES** viii  
**LIST OF FIGURES** ix  
**ABSTRACT** x  

**CHAPTER ONE: INTRODUCTION** 1  

**CHAPTER TWO: REVIEW OF THE LITERATURE** 7  
- Conceptual and definitional challenges 7  
- Assessment of social competence 10  
- Importance of social skills to development 11  
- Predictors of social competence 14  
- Issues faced by young children with disabilities 18  
- Preschool interventions designed to address social competence 22  
- Outcomes in research so far 25  
  - Environmental approaches 26  
  - Peer-mediated approaches 26  
  - Caregiver-mediated approaches 27  
  - Teacher-mediated approaches 28  
  - Combined approaches 30  
- Moderating variables in social competence intervention studies 30  
- Limitations in published research 31  
- Previous meta-analyses related to this topic 33  

**CHAPTER THREE: METHODOLOGY** 38  
- Criteria for considering studies for review 39  
  - Types of publications and time frame 39  
  - Types of interventions 40  
  - Research designs 40  
  - Participants 41  
  - Intervention types and settings 42  
  - Outcome measures 42  
- Search strategy for identification of studies 43  
- Coding 46  
- Judging study quality 47  
- Interrater reliability 48  
- Calculation of effect size 49  
- Selection of outcome variables 50  
- Publication bias 51  
- Analytic methods/Statistical procedures 51
CHAPTER FOUR: RESULTS
Search results 54
Characteristics of included studies 58
Characteristics of participants in included studies 62
Intervention characteristics in included studies 65
Dependent variables and measures 69
Generalization of treatment effects 70
Effect size calculation and adjustments 71
Publication bias 73
Mean effects of social competence interventions 75
Analysis of moderators 76

CHAPTER FIVE: DISCUSSION
Introduction 89
Features of this literature base 91
Features of included studies 95
Features of social competence interventions 101
Limitations 107
Complex relationships among variables 108
Implications and areas for future research 109

APPENDIX A: META-ANALYSIS DATA CODING INSTRUMENT 114

APPENDIX B: LIST OF FEATURES OF STUDIES INCLUDED IN THE META-ANALYSIS 127

APPENDIX C: META-ANALYSIS RESULTS AND FORRESTM PLOT 132

BIBLIOGRAPHY 134

VITA 145
# LIST OF TABLES

<table>
<thead>
<tr>
<th>Table</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Study characteristics included in coding protocol</td>
<td>47</td>
</tr>
<tr>
<td>2. Interrater reliability for coded categories</td>
<td>48</td>
</tr>
<tr>
<td>3. Results of electronic database search</td>
<td>56</td>
</tr>
<tr>
<td>4. Results of hand search of related publications</td>
<td>57</td>
</tr>
<tr>
<td>5. Number of included studies and effect sizes by time period</td>
<td>59</td>
</tr>
<tr>
<td>6. Included studies by discipline</td>
<td>60</td>
</tr>
<tr>
<td>7. Study and participant representation by geographic area</td>
<td>61</td>
</tr>
<tr>
<td>8. Study and participant representation by educational setting</td>
<td>62</td>
</tr>
<tr>
<td>9. Representation of ethnicities in included studies</td>
<td>63</td>
</tr>
<tr>
<td>10. Representation of disability categories in included studies</td>
<td>64</td>
</tr>
<tr>
<td>11. Features of interventions used in included studies</td>
<td>66</td>
</tr>
<tr>
<td>12. Duration of interventions across included studies</td>
<td>68</td>
</tr>
<tr>
<td>13. Standardized mean differences and descriptive information for included studies</td>
<td>72</td>
</tr>
<tr>
<td>14. Results of moderator analyses examining the effect of interventions on social competence</td>
<td>80</td>
</tr>
<tr>
<td>15. Additional results of moderator analyses examining the effect of interventions on social competence</td>
<td>83</td>
</tr>
<tr>
<td>16. Results of study quality-related moderator analyses</td>
<td>87</td>
</tr>
</tbody>
</table>
# LIST OF FIGURES

<table>
<thead>
<tr>
<th>Figure</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Funnel plot for analysis of publication bias</td>
<td>75</td>
</tr>
<tr>
<td>2</td>
<td>Whitehurst &amp; Lonigan’s (1997) Model of Influences on Social Competence</td>
<td>100</td>
</tr>
<tr>
<td>3</td>
<td>Odom, Brown, &amp; Conroy (2001). Tiered model of social competence interventions</td>
<td>112</td>
</tr>
</tbody>
</table>
ABSTRACT

Early childhood represents a critical period for development of the social behaviors and language that make social competence possible. Demonstrating social competence and positive peer relationships before reaching kindergarten may enhance school functioning and early achievement once children enter the school setting (Costin & Jones, 1992; Gresham & Reschly, 1987; Ladd, 1990). Unfortunately, many children fail to naturally or adequately develop these important skills, heightening risk for future problems due to disability and factors such as poverty, abuse, and engagement with child welfare agencies (Guralnick & Groom, 1987; Fantuzzo et al., 1988; Mueller & Silverman, 1989; Campbell, 1990; Kopp, Baker, & Brown, 1992; Lieber, 1993; Webster-Stratton, 1997). This research is often cited as a justification for an increased focus on improving social competence as early as preschool (Gresham, 1981). The present study was an effort to synthesize published and unpublished research in order to determine whether social competence interventions are effective for young children with special needs. Results indicate that instructionally-based interventions are associated with small-to-moderate treatment effects. Diverse groups of young children have been the primary focus of this research, including those with emotional and behavioral problems and those at risk. Missing data and a failure to address generalization leave significant unanswered questions regarding the meaningful impact of such interventions on young children’s quality of life.

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CHAPTER ONE

INTRODUCTION

Social competence represents a crucial aspect of human development. Early childhood is a critical period for development of the social behaviors and language that make social competence possible. So it may be argued that early childhood is the period during which the foundation is laid for successful interaction with others across the lifespan. It is during these years that young children (particularly those of preschool age) begin to increase the sophistication and frequency of their interactions with peers. Building a solid foundation at this point in development enables individuals to become adaptable social beings who demonstrate appropriate social behavior within and across contexts, while at the same time meeting individual needs and goals (Odom, McConnell, & Brown, 2008). In this sense, critical aspects of our adult lives are closely related to our early ability to form appropriate reciprocal relationships.

The relationship between socially competent behavior and later success (particularly in school) has been well-documented (e.g., Gresham, Sugai, & Horner, 2001). Evidence suggests that possessing basic social competence allows children to participate successfully in a wider range of activities with peers, as well as to develop positive peer relationships over time. Both of these elements are necessary for success in school and beyond (Odom et al., 1999).
Much of what we know about the benefits of social competence stems from research that has documented the negative consequences associated with social competence problems and deficits. Since play is most often the context for the learning of social behavior in early childhood, play has also been the context in which much of this research has taken place. The social problem-solving which occurs during play is most frequently done with peers, and peer-related social competence is essential if preschoolers are to reap the developmental benefits that early friendships provide (Buysse, Goldman, West, & Hollingsworth, 2008). Demonstrating social competence and positive peer relationships before reaching kindergarten may enhance school functioning and early achievement once children enter the school setting (Costin & Jones, 1992; Gresham & Reschly, 1987; Ladd, 1990).

Unfortunately, many children fail to naturally or adequately develop these important skills. Children with disabilities, in particular, are more likely to face peer rejection and miss out on essential social experiences, often as a result of differences between their social and play skills and those of typical children. These differences are observable from a very young age (with some behaviors present by infancy), and include lower rates of social initiation, positive social behavior, and appropriate responses, as well as more disruptive entry to play activities and problematic behavior, poorer turn-taking and leadership skills, and higher rates of peer rejection (Craig-Unkefer & Kaiser, 2002; Guralnick, Connor, Hammond, Gottman, & Kinnish, 1996b; Guralnick, Connor, Hammond, Gottman, & Kinnish, 1996; Kopp, Baker, & Brown, 1992; Lieber, 1993; Odom, Zercher, Li, Marquart, & Sandall, 1998; Odom et al., 2001). These differences
exist in preschool-aged children with a wide array of disabilities (including autism, speech/language problems, cognitive disabilities, and emotional and behavior problems) as well as in children who are at risk for future problems due to factors such as poverty, abuse, and engagement with child welfare agencies (Guralnick & Groom, 1987; Fantuzzo et al., 1988; Mueller & Silverman, 1989; Campbell, 1990; Kopp, Baker, & Brown, 1992; Lieber, 1993; Webster-Stratton, 1997).

While early play and social relationships form the foundation of social development and influence academic achievement, the consequences of disability combined with insufficient or inappropriate social behavior destabilize that foundation. Over time, these differences and deficits are likely to worsen, as evidenced by research linking poor early social competence with negative outcomes such as emotional and behavior problems, disciplinary action, and school dropout (Hinshaw, 1992; Ladd & Coleman, 1997). Some evidence suggests that the social and behavioral problems of children with disabilities may worsen over time in the absence of intervention, and this research is often cited as a justification for an increased focus on improving social competence as early as preschool (Gresham, 1981). In this sense, social competence interventions may be viewed as essential forms of prevention.

Interventions of various types are available to improve fundamental social skills, increase the frequency and quality of social interaction, and enhance social and language development (see Brown & Conroy, 2001; Brown et al., 2001; Lowenthal, 1996; Odom, McConnell, McAvoy, Peterson, Ostrowsky, Chandler, Spicuzza, Skellenger, Creighton, & Favazza, 1999). These include arrangements of the classroom environment to
facilitate social interaction, sometimes referred to as structured play (Odom et al., 1999); peer-mediated and caregiver-mediated approaches in which peers/caregivers are encouraged or trained to engage target children in interactive play (see Bailey & Wolery, 1992; English, Goldstein, Kascmarek, & Shafer, 1996; Wittmer & Peterson 1992); various behavioral strategies that incorporate cues, prompts, and positive reinforcement; instructional techniques (which may or may not involve direct instruction) (Odom & McConnell, 1993; Lowenthal, 1996; Odom et al, 1999); and combined approaches.

The use of social competence interventions with preschool-aged children is well-supported in published research, with a variety of programs showing a positive impact on social skills in both specialized and inclusive settings. Some of the positive outcomes include increased social language and play initiations, decreased maladaptive behavior, and increased overall competence as observed by adults ((Antia et al., 1993; Ferentino, 1991; Fewell & Vadasy, 1989; Jenkins et al, 1989; Koenigs & Oppenheimer, 1985; Odom et al., 1999). But while published research appears to indicate that these interventions have a generally positive relationship with various social skills and other dependent variables associated with social competence, a coherent picture of the effects of social competence intervention in preschool-aged children has yet to emerge. The impact of social competence interventions has been found to vary across variables such as gender, age groups, risk factors, and disabilities (e.g., Odom et al., 1999).

Intervention-related variables have also been found to complicate results. These include program types, of course, but also intervention length and intensity, type of interventionist, treatment integrity, and presence of follow-up. Few of these variables
have been explored sufficiently, and findings are often limited due not only to individual differences, but to limited opportunities for random assignment to treatment groups and small sample size as well (Hartle, 1996).

In summary, early childhood represents a critical period during which early social competence is established. While this typically sets the tone for positive early social relationships, for children with disabilities the picture can be bleak. By the time they reach the end of their third year of life, children with disabilities may have already established a pattern of failure in social initiation, interaction, and problem-solving that requires intervention to break. While social skills interventions have been widely used and studied with school-aged children, they have been less frequently used and studied in preschoolers. Nevertheless, studies examining the effectiveness of social competence interventions with young children have been published over the past four decades. While previous research syntheses have attempted to examine studies focusing on preschool children (e.g., the effects of social skill training, or interventions for children with autism), this research has been complicated by a narrow focus, the diversity of intervention types in small samples of studies, and the lack of a consistent classification system for social competence interventions.

At this point in time, a systematic review of social competence intervention research with preschool children is warranted in order to determine the overall effects of these interventions, as well as the individual, subject, and study-related variables that moderate those effects. As a result, the present study was designed to review available evidence on these interventions by incorporating published studies (and other forms of
research) that examine either groups of preschoolers or individuals. Intervention effects are examined in relation to the overall body of research, as well as in relation to relevant variables and methodological differences across the studies themselves.
CHAPTER TWO
REVIEW OF THE LITERATURE

Social skills are often viewed as part of a larger constellation of cognitive and personality characteristics that increase the likelihood of social and academic success. These include motivation, self-regulation, self-awareness, and empathy (Goldstein, 1987). Appropriate social skills increase one’s access to social interaction, as well as the sophistication of that interaction, with benefits that are not limited solely to school settings. In fact, these social behaviors are prerequisite for typical child development (Odom, McConnell, & McEvoy, 1992). In a broad sense, a basic set of socially competent behaviors may be a prerequisite for the acceptance of adults and peers in the form of invitations into the kinds of interactive play that will, in turn, reinforce and expand social competence across settings.

Conceptual and definitional challenges

Social competence is a broad term referring to a combination of behaviors that increase both the likelihood and quality of social interaction. Additionally, it may refer to one’s general level of success in context-based social interaction, to the frequency of various social behaviors, or it may represent a one’s ‘social temperament’ and ability to form satisfying relationships (Missall & Hojnoski, 2008). Perhaps as a result of these broad applications of the term, a single, clear definition with wide acceptance remains elusive.
Historically, the terms *social skills* and *social competence* have often been used interchangeably. It has been more recently argued, however, that the terms are not synonymous. For example, Asher, Renshaw, & Hymel (1982) suggest that social competence involves three distinct yet interrelated skills: initiating interaction, sustaining, and maintaining these interactions, and resolving interpersonal conflicts. Each of these components might involve one or more discrete social skills. This particular conceptualization applies directly to peer interaction, but it must be adapted when considering classroom settings in which a certain degree of compliance with adult directives is expected. So, while social skills refer to the discrete behaviors that make up or contribute to one’s social competence, some of these social skills are context-specific, while others are appropriate in a wide range of settings. These varied skills include the use of social language, the reading of social cues, and positive initiations and responses, as well as more complex interactive skills such as sharing, negotiating play roles, responding to aggression, and exchanging play ideas (Rubin, Bokowski, & Parker, 1998). Some categorize social skills according to their use in peer-related vs. learning-related interactions, with both categories necessary for school success (Missall & Hojnoski, 2008). The types of social skills that apply to classroom contexts include following classroom rules, displaying helpful behaviors and being cooperative (Coie, Dodge, & Kupersmidt, 1990). Broader ones include those mentioned previously when applied to peer interactions.

If social competence is a personal characteristic with its own developmental trajectory and a transactional relationship with the environment and other domains of
development, then a definition must be both general and distinct from those of other domains (Bost, Vaughn, Newell Washington, Cielinski, & Bradford, 1998). In a general sense, competence may be defined as the ability to achieve one’s own social objectives without interfering with our own potential to achieve later goals (e.g., by interfering with others’ attempts to achieve their social goals, we undermine our own future in ways we cannot yet see) (Waters & Sroufe, 1983; Bost et al., 1998). While competence is often conceptualized as an overall level of success with initiating and maintaining interactions, and responding to others’ initiations, alternative approaches have been developed.

While it remains the case that research in social skills and social competence is complicated by these definitional challenges and inconsistencies, many researchers have attempted to describe and/or positively influence the social behavior of children. One obvious reason for the focus on social competence in early childhood is that many of these skills are learned and refined during that stage of development, and a number of important social skills emerge during this period (Denham et al., 2002). Signs of social interest are already observable in the first months of life and play a role in the development of healthy attachment with caregivers. Throughout infancy and toddlerhood, young children expand their repertoire of imitation/initiation of social behavior, and responses to adults and peers, and these building blocks open the door for sustained and interactive play across a canvas of developing language skills (Carta, Greenwood, Luze, Cline, & Kunts, 2004). Reciprocal interactions with peers provide opportunities for learning and practicing complex interactions, perspective-taking, empathetic behavior, and emotional regulation, all within the context of games and social
play (McElwain & Volling, 2005). It is hardly surprising, then, that the impact of risk factors and disabilities on social interaction may already be observed during the preschool years (and regardless of whether children are attending preschool), indicating that interventions focusing on school-aged children may either arrive too late or miss valuable early preventative opportunities.

Assessment of social competence

Although there is agreement about the importance of social competence as a domain, a process, and an outcome, a clear definition nevertheless remains elusive. Given the importance of social competence to development, accurate assessment of both social competence and skills is crucial, but without definitions there can be no measurement. In one sense, it is only through reliable assessment that children who are at risk for later problems may be identified and monitored. Issues of competence are not necessarily related to developmental disabilities or disabilities themselves, so assessment of competence is very likely to occur (and therefore needed) outside the realm of traditional eligibility evaluations for special services. Assessment that is embedded in preventative or school/center-wide approaches must be brief, relatively easy to implement and use, and reliable in order to serve the goal of preventing referrals for special education (Kiely Gouley, K., Miller Brotman, L., & Huang, K, 2008). The same is true for assessment embedded in targeted interventions at the classroom level. This is frequently done by assessing behavioral frequencies and through the use of teacher rating scales.
Few valid instruments for measuring social competence are available. Comprehensive assessment of social competence would include information gathered across contexts, using a variety of methods. Because these approaches are time-consuming and potentially costly, social competence assessment instruments often rely on teacher and parent report. In some cases this information is gathered based upon the adults’ recent interactions with a child. In other cases, teachers and/or parents respond based upon an observation of the child at play. In these cases, interrater reliability must be carefully considered, and discrepancies or contradictions among the findings should ideally be explainable.

In reality, caregivers and teachers often present discrepant information about competence when formal measures are used; as a result, interrater reliability coefficients tend to be problematic or low in relation to those reported for internal consistency or test-retest reliability (Elliot, Busse, & Gresham, 1993).

Importance of social skills to development.

While the impact of social skill deficits is often examined by researchers in the school setting, this impact obviously reaches far beyond school. The preschool years represent an important foundational period, setting the stage for children’s early school experiences and kindergarten functioning. During early childhood a gradual increase in social competence occurs as children become more cognitively and emotionally mature and able to self-regulate. This increase in competence is matched by a decrease in aggressive behavior, including tantrums (Lafreniere et al., 2002).
Measurement issues aside, the reciprocal interaction between social competence and academic performance seems to suggest that it is not enough that young children enter kindergarten with basic academic skills, but that they must also have well-developed social skills (Missall & Hojnoski, 2008). Children who reach the elementary grades with social skill deficits are at risk for future behavior problems, disciplinary action, and academic failure as well as school dropout (Entwisle & Alexander, 1999; Raver, 2002).

Behavioral and academic difficulties are identifiable by preschool age. These difficulties are not always indicative of the onset of more serious learning or emotional disorders; in fact, they may reflect age-related developmental stages within the range of typical behavior (Emond, Ormel, Veenstra, & Oldenhinkel, 2007). However, children who consistently exhibit these behavior patterns may suffer both immediate and long-term consequences. Problematic early peer interaction is typically conflict-ridden and aggressive and can lead to a destructive reciprocal pattern of aggressive coercion that serves to reinforce and worsen such behaviors (McElwain & Volling). These difficulties are often likely to continue, and to lead to academic and social difficulties over time (Hinshaw, 1992; Ladd & Coleman, 1997). In fact, the likelihood of later behavioral problems and social maladjustment increases when social deficits result in a failure on the part of young children to develop these appropriate early peer relationships (Parker & Asher, 1987).

Nevertheless, conflict does not represent the only category of behavior considered to be socially incompetent. Some researchers have examined non-interactive play as a
potential predictor of social competence problems. Non-interactive play is another broad term that includes a wide range of solitary behaviors. Onlooking and an unoccupied state might both be considered non-interactive. Parallel play, another example of non-interactive or solitary play, is defined as engagement with a task in close proximity to others (who are engaged with similar tasks) without direct interaction (Luckey & Fabes, 2005).

While some have suggested that such play may predict lower social competence, parallel play behaviors falls on a continuum of constructive (purposeful, exploratory, and/or creative) to non-constructive (involving repetitive muscle movements without a discernible purpose). While non-constructive play (particularly when it is the result of anxiety, shyness, and/or withdrawal) may be a either predictor or undesired result of peer rejection, constructive nonsocial play can provide a context for independent exploratory learning. So not only does parallel/solitary play fall within the range of typical play behaviors, but children who engage in such independent, reflective, and exploratory play may reap benefits related to self-regulation, self-control, and reflection (Luckey & Fabes, 2005). For example, children who are introverted might attain a state of regulatory balance by removing themselves from play situations and spending some time playing on their own (Eisenberg & Fabes, 1992).

Non-constructive solitary play represents more of a threat to development when it occurs in combination with other indicators of extreme shyness. In other words, children who display a pattern of highly cautious and socially avoidant behavior are more likely to continue to behave this way into elementary school (Kagan, Reznick, & Snidman, 1988).
Example of this type of behavior might include anxious onlooking combined with a reluctance to engage even in parallel play (Coplin, R., Rubin, K., Fox, N., Calkins, S., & Stewart, S., 1994).

Predictors of social competence

Social competence is transactional in nature and therefore a product of multiple influences operating across the contexts within which it is known to develop (Brophy-Herb et al., 2007). Young children typically spend the majority of their time at home and at school, and key experiences and relationships in those settings serve to either nurture or inhibit competence development. As a result, the focus of past research has often been on family and instructional environments in studies that endorse an ecological perspective, viewing development as the result of interaction.

The family environment (both physical and affective) may provide the context within which social competence is most directly influenced (Garner, Jones, & Miller, 1994). While family conflict has been examined as a potential predictor of social competence problems, some argue that family members influence children in varying specific ways rather than directly enhancing or reducing general competence. For example, family conflict may actually expose children to models for dealing with negative emotions and conflict, while family situations that lead to unresolved distress (e.g., maternal anger toward a child or a pattern of suppression of negative emotions) may interfere with the acquisition of emotional knowledge and eventually reduce competence (Garner, Jones, & Miller, 1994).
Social competence has been examined across common variables such as gender and age, but its relationship to these variables has proven to be complicated. For example, while some researchers have found that gender is related to competence, results have varied. Teachers have rated girls as more socially competent than boys in some studies, while in others these differences fail to appear (Brophy-Herb et al., 2007). These differences might, for instance, disappear in classrooms where boys are, on average, slightly older than girls. Alternatively, factors such as the classroom environment might reduce these differences by positively influencing the social behavior of all children. In these cases, boys might respond positively to changes in teacher behavior, or perhaps even small increases in boys’ positive behaviors lead teachers to rate their competence much more highly.

Studies examining competence across racial/cultural groups have also yielded mixed results. Much of this research looks at ethnicity through the lens of poverty and in many cases reinforces what has been suggested about social competence in disadvantaged groups rather than identifying true cultural differences. For example, Koblinsky, Kuvalanka, & Randolph, (2006) examined social skills and behavior problems in urban, African-American preschoolers living in poverty, and found that nurturing, involved parenting, participation in family routines, and less family conflict were all associated with greater child social competence and fewer externalizing behavior problems. This and other studies have also examined the psychological well-being of the mothers of young children. Maternal depressive symptoms have been found to predict child behavior problems in African-American populations (Harden et al., 2000; Jackson
et al., 1998). However, this association may weaken when these children live with two adults or have other close relationships with adults (Koblinsky, Kuvalanka, & Randolph, 2006).

Clearly, gaps in this research base persist. Typically, focus has mainly been placed on isolated conditions and relationships in key settings as potential predictors of the social skills and competence over the long term, rather than accounting for multiple simultaneous layers or lines of influence.

Classroom research contains multiple gaps as well. While social skills have been extensively researched in older school-aged students, what is known about preschoolers is limited. Classroom research has often focused on generic variables over which educators themselves have little control (e.g., class size) or which are too difficult to influence given a short window of time (e.g., teacher education level). More recently, a need has been identified for research into teacher behaviors, classroom climate, and other variables that are potentially responsive to targeted intervention (Brophy-Herb et al., 2007).

Despite these limitations, risk factors associated with lower levels of social competence have nevertheless been identified. Much of this research has focused on school-aged children or examined early risk factors and later adjustment; as a result, few definitive statements about the interactions and results of these influences during the preschool years can be made. This is due in part to the complex and varying relationships among risk and protective factors and an overemphasis on risk in research that aims to address these equations (Koblinsky et al., 2006).
Family SES has been studied relative to children’s social competence, just as it has with so many other areas of child development. While some have found that externalizing behavior problems are displayed more frequently in children of lower income families, the relationship of poverty to other developmental risk factors clouds this picture (Bradley & Corwyn, 2002). Factors such as family and parenting stress have also been examined. Early stressors (e.g., family relationships, marital problems, loss of income) are associated with externalizing behavior problems in school, and it is possible that the effects of other early risk factors (such as single parenthood and lack of financial resources) are mediated by stress that they create or increase.

The classroom has also been examined - specifically, the relationship between teacher behaviors and child outcomes. Many of the teacher behaviors and child-care classroom factors that are positively associated with social competence are also indicators of developmentally appropriate practice. For example, when teachers follow children’s interests (rather than directing children’s play and learning activities), and display emotional warmth, later competence has been found to be higher (e.g., Peisner-Feinberg et al., 2001; Votruba-Drzal, E. et al., 2004). The same has been found to be true in classrooms where teachers enter children’s interactive play and serve as facilitators who model and reinforce social problem-solving. Conversely (and not surprisingly), settings with poorer classroom management, where children are dependent upon teachers to solve problems and resolve conflict, are associated with higher levels of behavior problems (Hamre & Pianta, 2001).
More recently, some authors have recommended the examination of previously ignored classroom climate variables as predictors of preschool social competence. These variables (including shared leadership among teachers and children, developmentally appropriate communication skills, and indicators of recognition/respect for children’s autonomy) are reflective of an approach emphasizing prevention and early intervention in addition to the amelioration of problematic symptoms associated with disability or disadvantage.

Issues faced by young children with disabilities

While social competence is influenced by a variety of factors, and children may experience social conflict for a variety of reasons, a developmental delay or disability is recognized as a particularly disruptive force. Preschool aged children with disabilities have been well documented to have a variety of difficulties related to learning social skills and applying them to social interaction (see Guralnick 1990, Odom & Brown, 1993). While many other children enter school lacking appropriate social skills due to limited social interaction in early childhood (including children who enter school at a younger age), children with disabilities are at greater risk of continued social isolation and the exacerbation of behavioral issues that have a negative impact on the success of education in less restrictive environments. Inclusion presents opportunities for positive modeling of social behavior (as well as many other pre-academic, cognitive, and communicative behaviors), but the effect of such opportunities may be undermined in a climate of social rejection (Odom et al., 2006). The risks faced by children with disabilities are discussed in the section to follow.
While studies of social acceptance of young children with disabilities are rare, nearly every type of developmental disability and early risk factor (such as a history of abuse) has in some way been associated with lower childhood social competence. Relevant findings have identified problems that may undermine these children in multiple ways and at several points in the process of initiating and continuing social play. In the most general sense, young children with disabilities have been shown to display fewer overall rates of social interaction in the classroom, less social play, and poor maintenance of social skills over time (Kopp, Baker, & Brown, 1992; Guralnick & Weinhouse, 1994). This appears to indicate that the opportunities for engaging in the types of activities that naturally reinforce and refine social skills may occur less frequently than for typical children. Clearly this represents a potentially serious risk factor if the assumption holds true that these children actually require a greater number of opportunities to achieve the same social-emotional developmental milestones as typical peers their age.

While some researchers have found that the majority of play initiations by children with disabilities are successful ones, these children are still less likely to initiate and more likely to be rejected by peers (Guralnick, Connor, Hammond, Gottman, & Kinnish, 1996). As an example, children with language disorders (who represent a large portion of the population of preschoolers with special needs) have consistently demonstrated an area of overall weakness that is thought to undermine social competence – namely, that they engage in fewer conversations with peers than typical children (Stanton-Chapman, Justice, Skibbe, & Grant, 2007). Children with specific language impairment have also been found to both ignore other’s play requests and to have their
own play requests ignored at a higher rate than typical children (Gertner, Rice, & Hadley, Guralnick, Connor, Hammond, Gottman, & Kinnish, 1996; Tur-Kaspa & Bryan, 1995). Children with Down syndrome have also been studied during play. Findings suggesting that they tend to exhibit more diffuse attention and lower rates of joint attention, as well as spending a greater proportion of their play time in non-interactive states.

While the general outcome is often similar, the pathways through which children with disabilities begin to diverge from typical peers may also vary according to the nature of their particular disability. For example, while children with visual impairments benefit from active play with peers, they still may explore their environment, less, exhibit more frequent perseverative behavior, reject others’ play invitations, and lack the age-appropriate imitative and symbolic play skills that are necessary for interactive play (Skellenger, Rosenblum, & Jager, 1997). Some of these behavior patterns are shared by children with other disabilities, but whether this overlap is sufficient to justify only one type of intervention is unclear.

Additional findings suggest that children with disabilities engage in lower quality play interactions. For example, they are more likely to enter interactive play disruptively and display less positive affect than typical peers (Kopp, Baker, & Brown, 1992; Lieber, 1993). Furthermore, when they are engaged in play, young children are less likely to take the lead in interactions than typical peers (Guralnick, Connor, Hammond, Gottman, & Kinnish, 1996b). They may also have poor imitation skills, limited turn-taking ability, lack of response to social stimuli, or a lack of conflict resolution skills (Craig-Unkefer & Kaiser, 2002). Perhaps as a result of these types of differences, preschoolers with
disabilities seem to develop fewer friendships. In fact, Odom, Zercher, Li, Marquart, & Sandall (1998) estimated that up to 30% of children with disabilities were not only socially rejected, but also lacked the necessary social skills to interact successfully with peers. This alone places them at much greater risk for low competence and even maladaptive behavior.

While these deficits alone are problematic, some evidence suggests that the social landscape is particularly bleak for these children. One of the most alarming research studies regarding children with disabilities suggests that, in many cases, they fail to develop social skills spontaneously (Gresham, 1981). Rather than abating, these self-defeating behavior patterns and maladaptive relationships continue to worsen in the absence of intervention as children reach school age (Del’Homme, Kasari, Forness, & Bagley, 1996; Wehby, Dodge, Velente, & Conduct Disorders Prevention group, 1993).

Furthermore, some evidence suggests that not only are social competence interventions underutilized by classroom teachers, but they may frequently be missing entirely from the individualized education programs of young children with disabilities. It has been suggested that a primary reason for this underutilization is that many approaches to addressing social competence in the classroom are viewed by teachers impractical or overly time-consuming (Kohler et al, 2001; Strain, McGee, & Kohler, 2001). In a study of naturalistic social competence interventions, Kohler, Anthony, Steighner, & Hoyson (2001) found that teachers required ongoing technical support in order to persist with social competence interventions. Despite the use of naturalistic techniques, the teachers found them difficult to learn and were initially met with failure.
Without ongoing support, it is questionable whether they would have continued with interventions that eventually proved successful. For reasons such as these, some efforts have been aimed at addressing social skills in young children with disabilities in order to better prepare young children to function successfully in school, and to highlight the potential for such interventions in the early childhood setting so that teachers will use them more consistently and successfully.

Preschool interventions designed to address social competence

Studies over the past 20 years have utilized a variety of approaches to attempt to influence social competence in children by facilitating skill development, remediating problem behaviors, and improving the quality of caregiver-child relationships. Many techniques for developing social competence exist, but those often used with older children (such as social problem-solving and social information processing approaches) may lie developmentally beyond the cognitive and social understanding of children of preschool age or below. For this reason, a variety of more developmentally appropriate methods have instead been developed to teach social skills and increase socially competent behavior in younger children. Programs with younger children are often based in the teaching of specific social skills, rather than other approaches requiring more sophisticated social awareness (Mize and Ladd, 1990). The roles of more competent ‘others’ varies across age groups as well. In the case of infants and toddlers, approaches involving extensive caregiver participation are preferred. For preschool children, the ongoing support and encouragement of teachers and peers are often a focus.
Numerous studies have supported the use of a variety of social competence interventions in the preschool setting, and authors have previously attempted to categorize the types of interventions represented in these published studies (including Brown & Conroy, 2001; Brown et al., 2001; Lowenthal, 1996; Odom, McConnell, McAvoy, Peterson, Ostrowsky, Chandler, Spicuzza, Skellenger, Creighton, & Favazza, 1999). These methods will be summarized in two ways. First, the role of facilitators or mediators will be outlined. Next, the types of intervention models will be described. Social competence interventions may be delivered by/through a variety of individuals, either alone or in combination. These include the following types:

1) *teacher-mediated approaches* in which social behaviors are incorporated and/or instructed directly (Lowenthal, 1996; Odom et al, 1999);

2) *peer-mediated interventions*, through which young children with disabilities have been observed to learn a substantial number of social behaviors by interacting with competent peers (see Bailey & Wolery, 1992; English, Goldstein, Kasmarek, & Shafer, 1996; Wittmer & Peterson 1992);

3) *caregiver-mediated approaches*, in which various approaches to training caregivers in eliciting and maintaining social interaction and play with children are utilized (Webster-Stratton & Hammond, 1997);

4) *combined approaches*, which involve multiple mediators and/or program components.

Regardless of the adult mediator, these interventions tend to align with one or more of the following delivery methods:
1) systematic arrangement of the classroom environment, sometimes referred to as *environmental* arrangements (Odom et al., 1999) or structured play, as a means of more effectively facilitating social interaction;

2) *behavioral strategies* using cues, prompts, and positive reinforcement to increase interactive social and play behaviors. This also includes correspondence training (Lowenthal, 1996), in which preschoolers are positively reinforced for following through on stated plans for social play that include choosing target children as playmates;

3) *instructional approaches* including any intervention involving the direct instruction of children in specific skills such as sharing, helping others, and initiating social interaction (such as Odon & McConnell, 1993);

4) *combined approaches*, which involve the merging of multiple interventions, such as behavioral and environmental approaches (see Hodgens & McCoy, 1990; Odom, Ostrowskl, & Keetz, 1992).

While the approaches summarized above represent a variety of intervention types, consistent and agreed-upon guidelines for exactly how these interventions should be delivered still do not exist. Brown, Odom, & Conroy (2001) have proposed a model for delivering social competence interventions to young children in an effort to place these diverse strategies in the context of a more structured system. This model emphasizes universal, individualized, and intensive interventions in a sequence much like that of positive behavior support and tiered interventions for older students. According to this model, universal classroom-wide interventions are those delivered first to all students in
general education settings (Brown, Odom, McConnell, & Rathel, 2008). These interventions include developmentally appropriate practice, but a precise explanation of what is meant by this (beyond promoting social engagement and interaction through, for example, the use of learning centers) is absent. Affective interventions, which are designed to increase awareness of and sensitivity toward individuals with disabilities, are included in this tier, as well as an inclusive model and social competence curricula. When young children require more intensive approaches, individualized naturalistic interventions (such as friendship activities and incidental teaching) are integrated into their programming, but it is only when children require more structured and intensive individualized interventions that explicit social skills training and more complex social integration activities are planned.

While this intervention hierarchy is aligned with current best practice, some of the included interventions have not been adequately validated for use with preschoolers. Furthermore, the model itself has not been widely used in intervention studies. Rather, published studies typically examine the effects of individual interventions or combined approaches.

Outcomes in research so far

Published research on social competence intervention suggests that both formal and informal programs tend to have a positive impact. Initially, several sets of findings suggest that inclusive environments are indeed a highly appropriate environment in which to address social competence needs. For example, some researchers have found that social skills interventions that are incorporated into everyday classroom activities are
associated with positive outcomes (Antia et al., 1993; Ferentino, 1991; Fewell & Vadasy, 1989; Jenkins et al, 1989; Koenigs & Oppenheimer, 1985). This is supported by additional findings which suggest that interventions (of various types) that provide opportunities for children with disabilities to interact socially with typical peers are beneficial (Jenkins et al., 1989). These benefits extend to young children with a wide variety of disabilities, including behavior disorders.

*Environmental approaches*

Environmental approaches represent the least directive of the intervention types, and involve alterations to the classroom environment that increase the likelihood of desired social behaviors. For example, adults might prevent access to certain toys, centers or materials or place popular materials out of reach as a way of setting the stage for verbal requests (Haring, Neetz, Lovinger, Peck, & Semmel (1987). Alternatively, unfamiliar materials might be added as a way to influence children to seek adults in an effort to understand whether or how to use them. In many cases, the studies in which environmental approaches have been used combine them with peer-mediated approaches. However, studies utilizing only environmental approaches are represented in the literature on school-aged children and may be present in studies including preschool-aged children as well.

*Peer-mediated approaches*

Observational studies suggest that young children’s social responsiveness is enhanced by the imitation of peer models (Farver & Branstetter, 1994). It follows, then, that an advantage of peer-mediated interventions is that they create additional
opportunities from which children have already been shown to benefit. In this sense, carefully designed peer-mediated interventions may be among the most naturalistic.

The use of peer-mediated interventions has been supported by studies examining the effects of programs such as peer buddies. These have been used in inclusive classrooms to improve not only competence in children with disabilities, but sociometric ratings by their peers as well (English et al., 1997). Odom et al. (1999) found that peer-mediated interventions involving the training of typically developing kindergartners to initiate interactions with peers with disabilities resulted in increased social competence on the part of the children with disabilities.

Caregiver-mediated approaches

Interventions that involve the training of caregivers can be particularly effective with young children (See Webster-Stratton & Taylor, 2001). Often, these approaches include training in effective behavior management at home and increasing parent involvement in school and school-related activities. Such interventions have shown promise in addressing social skills and reducing problem behavior in young children who are at risk due to low socioeconomic status (Webster-Stratton & Reid, 2008). Other caregiver-mediated approaches include coaching in parent-child play interaction (e.g., Webster-Stratton, 1990), which has been effective in reducing problem behaviors and increasing social competence in children from age 2 to 7. At this time, it is unclear to what extent caregiver-mediated interventions are feasible to employ in child care and Head Start environments where young children with disabilities are often likely to be served.
Teacher-mediated approaches

Currently, best practice in universal prevention of social and behavioral problems in both preschool and elementary school students includes direct instruction of school-wide expectations, with an emphasis on positive social skills (Gresham, 1997; Mathur, Kavale, Quinn, Forness, & Rutherford, 1998; Walker, Shwarz, Nippold, Irvin, & Noell, 1994).

Teacher-mediated competence approaches are examples of these preventative approaches, and have been used to address not only social competence but language and communication skills as well (McClean & Woods-Cripe, 1997). The teacher mediation involved in these approaches ranges from direct instruction to minimal child-centered facilitation during play (Kohler et al, 2001). For example, in direct approaches the teacher might teach play invitation skills, then prompt children to invite others into their play and reinforce them for doing so. In more naturalistic approaches, the teacher might model the desired behavior at an opportune moment during center time, or make the suggestion during child-directed play.

Teacher-mediated approaches do not necessarily involve extensive direct instruction. Although less intensive strategies (such as incidental teaching) do not have as much empirical support, they have been used to improve peer-related social competence (e.g., McGee et al., 1992; Nordquist et al., 1985;). Group affection or friendship activities have been shown to increase the frequency and duration of peer interaction in preschool, particularly for socially isolated children and those with autism (Brown et al., 1988; McEvoy et al., 1988; Twardosz et al, 1983). These interventions
usually involve the incorporation of social activities into stories, circle time activities, and songs.

The use of behavioral approaches during incidental teaching has yielded positive results. In some cases, teachers are trained to prompt and support specific social behaviors (such as verbal play initiations or behaviors that increase the likelihood of conflict resolution). Behavioral social skills interventions have also been extensively used and studied in relation to children with autism spectrum disorder (see Dawson & Galpert, 1990; Strain, 1985, and additional references). In these cases, strict reinforcement schedules, as well as imitation and extensive direct instruction by adults, are often used. The specialized nature of the approaches used with this population require systematic integration into all facets of the educational program, and that they are continued indefinitely and adapted as children grow. This suggests that such models are distinct from other types of targeted social competence interventions.

The use of teacher-mediated approaches has been successful in enhancing social behavior in young children. For example, Hundert & Houghton (1992) utilized classwide social skills instruction that included behavioral strategies, and found that the skill increases in children with special needs were equivalent to those made by typical children. Young children with hearing impairments have also been found to respond to social skills interventions by increasing their linguistic and non-linguistic social interaction (Antia & Kreimeyer, 1992, 1997; Antia et al., 1993; Kreimeyer & Antia, 1988), and children with multiple sensory impairments have been found to improve as a result of interventions that emphasize play skills (Fewell & Vadas, 1989).
Combined approaches

Combined approaches often integrate parent-mediated and classroom-based interventions (Webster-Stratton & Reid, 2008). Like most social competence intervention studies, however, those examining combined approaches have mostly been conducted with school-aged children. However, some studies have indicated that despite practical barriers to parent involvement (such as child care and transportation), combined approaches are as effective with preschool-aged children as they are with older students.

Moderating variables in social competence intervention studies

The impact of social competence interventions tends to vary across key variables. First, outcomes may vary by gender, age group, risk factors/disabilities, and intervention type, but it remains unclear whether conclusions about these variables may be drawn relative to the preschool population. The effects of other intervention-related variables (such as length, intensity, type of interventionist, degree of treatment integrity, and presence of follow-up) have not been explored sufficiently in published research, but some findings suggest that interventions emphasizing peer interaction within a structured intervention model yield better results than interventions using unstructured play (DeKlyen & Odom, 1989). As an illustration, Odom et al. (1999) performed a comparative experimental analysis of environmental, peer-mediated, combined, and behavioral social skills interventions with children experiencing developmental delays. Peer-mediated approaches led to greater increases in social interaction, while both behavioral and peer-mediated approaches led to the greatest increases in teacher ratings of social interaction. However, environmental approaches led to the greatest impact on
peer ratings, so at this point the range of social competence outcome variables remains vast, and the relationship between particular outcome variables and effectiveness remains unclear.

Limitations in published research

Studies examining the effectiveness of social competence interventions have frequently suffered from significant limitations. Confounding variables include selection bias due to the study of existing classrooms and limited opportunities for random assignment of children to treatment conditions. It is also often the case that these studies include samples quite small in size.

As mentioned previously, studies may utilize multiple outcome measures (e.g., the number of both positive and negative social initiation behaviors). The intervention in question may have been effective in influencing one of these variables but not others, or it may be the case that both positive and negative behaviors increased. In some of these cases, researchers suspect that varying perceptions of student behavior are to blame – in other words, observer bias. For example, some studies have found that a low correlation exists between teacher and parent perceptions of behavior change in students (McCabe, 1998; Achenbach, McConaughy, & Howell, 1987; Haager & Vaughn, 1995). Vaughn et al. (2003) point to this issue as a possible explanation for either the lack of significant findings in some studies, or findings which favor control over experimental groups.

Unexpected increases in negative behavior (or a failure to decrease it) are also indicated in some published research (e.g., Odom et al, 1999, in which both behavioral and combined approaches had a negative impact on peer ratings). This is at times viewed
as a possible function of increased social participation by students with disabilities. However, as some have pointed out, it remains unclear as to whether these types of inconsistent outcomes indicate a failure to produce substantive change in children’s social standing or overall functioning as a result of intervention. Utilizing measures of children’s social standing represents one method of clarifying this. When measures of social standing are not used, long-term follow-up or an examination of generalization of learned skills across settings may be more likely to indicate meaningful change in competence. However, relatively few studies have examined these alternative variables, and generalization has thus far not been examined in meta-analyses.

Individual differences in language capabilities, social skill development, early cognitive and personality development, and other contextual factors may also influence how well children respond to these programs. These complex, overlapping, and interrelated factors have not been thoroughly explored or even defined in social competence research. Many intervention studies aim to increase the frequency of social interaction between children with disabilities and their non-disabled peers without sufficiently taking into account the particular reasons for limited interactions. As previously discussed, even for children with disabilities, some nonsocial play may actually be exploratory and purposeful. Engineering situations in which these children are expected to interact may provide social opportunities, but at the expense of this other preferred and beneficial form of play (Luckey & Fabes, 2005).

Finally, intervention and program features (such as length, frequency of contact, duration of lessons or sessions, and length of follow-up) may influence children’s
responsiveness (Hartle, 1996). The type of setting in which the intervention is delivered is relevant as well. For example, an intervention delivered in an inclusive setting may yield stronger effects, since a greater number of natural opportunities are available to practice new skills. Self-contained settings might yield strong initial effects but perhaps poorer generalization (Odom et al., 1999).

Previous meta-analyses related to this topic

Meta-analysis has been used to evaluate the effectiveness of social skills training for various age groups, from preschool through secondary education. Comparison studies, which focused on the effectiveness of this training for typical children vs. children with disabilities, followed. Previous meta-analyses (specifically, Boormann et al., 1994; Schneider, 1992) have examined the findings of twentieth century studies of the effectiveness of social competency interventions in school-age children. Studies which included preschool aged children were included in these analyses; however, the 3 to 5 year-old population is frequently not discussed separately in the results sections of these studies, except to state that social competency interventions appear to have stronger and longer lasting results for older children, particularly when long-term follow-up is tracked. For the most part, preschool-aged children are grouped with school-aged and/or general education students for analysis.

Reviews of the body of research related to improving social skills on children with specific disabilities are numerous, but the vast majority of these have focused on school-aged children as well. These include autism (Schreibman, 1996), behavior
disorders (Kavale, Mathur, Forness, Rutherford, & Quinn, 1997), and learning disabilities (McIntosh, Vaughn, & Zaragoza, 1991).

The need for reviews of research related to younger children with disabilities (particularly single-subject research and case studies, as well as studies of at-risk children) has been noted previously by researchers who have examined aspects of this research base. Vaughn et al. (2003) reviewed the findings of 23 studies (published between 1975 and 1999) in which social skills interventions were used with preschool-aged children with disabilities. Journal articles, dissertations, and technical reports were included if at least 50% of the subjects had an identified disability (at-risk children were excluded). Disabilities represented included the following: emotional/behavior disorders, speech/language/communication disorders, mental retardation/developmental disabilities, sensory impairments, physical impairments, and developmental delay. Single-group and multiple-group studies were both included. Interventions aimed at improving social behavior were required, which led to the exclusion of environmental arrangements or studies focusing only on decreasing negative behavior. The studies were then coded according to participant age and disability, intervention goals and treatment variables, and type of research design. These researchers grouped the resulting studies into ten distinct intervention categories, many of which included a single study. This diversity precluded the use of meta-analysis, but effect sizes (mean differences) were nonetheless calculated where possible.

Outcomes were found to be generally positive, with studies addressing children with emotional/behavior disorders yielding the largest effect sizes (0.53 to 1.22). In
terms of intervention types, large effect sizes were associated with instructional and behavioral approaches (modeling, rehearsal and practice, prompting) and play-based approaches. Finally, this meta-analysis also identified some of the variables associated with the effectiveness of interventions to improve social skills in school-aged children. These include child variables such as age or grade, gender, and type of disability or difficulty.

The purpose of this research synthesis was to address these lingering questions about the effectiveness of social competence interventions for preschool-aged children, particularly those with disabilities and those at risk for later developmental concerns. This was accomplished by examining studies of effectiveness of social competence interventions which were specifically designed for preschool-aged children. This was previously attempted by Vaughn et al. (2003), who focused on experimental and quasi-experimental studies of children with disabilities who received social competence training. Despite challenges in characterizing diverse methodologies, results from that meta-analysis were encouraging and suggested that play-based training (particularly when it includes modeling by adults) can positively impact social functioning in children with autism, developmental delay, and language impairments.

A great deal of single-subject and small group experimental research has been conducted on social skills interventions. In fact, single-subject design research syntheses of social skills intervention studies have previously been attempted. For example, Mathur et al. (1998) even included a number of studies specifically addressing the needs of preschoolers. Reviews such as Mathur’s have utilized percentage of non-overlapping
data (PND) as an indicator of intervention effectiveness. In the case of that particular study, a mean PND of 55 was found for the preschool subset of a total of 64 studies. This suggests that such interventions might be of questionable effectiveness. Because PND scores must be interpreted differently from an effect size, and because of issues with the reliability, sensitivity, and discriminatory power of the PND estimate, an updated examination of that literature is warranted.

The present review focused on social competence interventions used in early childhood settings (including general and special education settings and Head Start centers) that attempt to influence one or more aspects of young children’s social competence. Children with various disabilities (including developmental delay, cognitive disabilities, and language impairment) were included, but studies focusing specifically on children with autism were be excluded due to the nature of the interventions utilized and the fact that meta-analysis has previously been used to study that population.

For the purposes of the present study, social competence is viewed as the result of four interrelated sets of behaviors, including both verbal and non-verbal components:

1) initiating behaviors (such as offering toys or using social language to initiate interaction or play);

2) response behaviors (including socially appropriate responses, such as answering questions from peers, sharing a toy, or accommodating a peer following a play initiation);
3) interactive behaviors, which characterize the quality of social interactions (and include such indicators as the overall amount of social language, or the frequency of positive and negative interactions);

4) social problem-solving (or the degree to which conflicts or disagreements are resolved).

While the components listed above represent only a few of the variables influencing the development and pre-academic progress of young children with disabilities, they represent the rationale behind the intervention studies addressed by the present review.

In summary, the research objectives addressed in this investigation were as follows:

1) To describe the features of studies examining the effects of social competence interventions for young children with special needs; and specifically, to clarify the definition of social competence as operationalized in studies of this population;

2) To characterize the evidence to date on the effects of social competence interventions for preschool-aged children with disabilities/risk factors from 1965 to the present;

3) To identify and, if possible, attempt to explain variation in the effects of these interventions related to intervention type, participant characteristics, and other study characteristics;

4) To identify gaps in this area of research, and generate recommendations for further study.
CHAPTER THREE

METHODOLOGY

The present study was designed to address the following research questions:

1) What are the features of intervention studies designed to address the social competence of preschoolers with special needs? In particular, how is social competence operationalized in these studies?

2) What does existing evidence suggest regarding the effects of social competence interventions?

3) Does variation exist in the effects of these interventions?

4) If variation exists, can it be explained by intervention type, participant characteristics, or other study features?

5) What gaps exist in this area of research?

The following sections outline the process by which empirical research on early childhood social competence interventions was acquired, screened, examined, and combined. A description of the inclusionary and exclusionary criteria for study methodology, setting, intervention type, and participant characteristics is presented, followed by the search strategy. Next, the system for coding studies is presented, along with results of inter-rater reliability. Finally, the procedure for calculating effect sizes and combining studies is discussed.
Criteria for considering studies for review

In order to be selected for inclusion in this review, studies must have included a center-based or classroom-based intervention designed or chosen to address social competence. Studies that consisted primarily of parenting classes or interventions conducted in the home were excluded. Interventions in included studies utilized teacher-mediated (e.g., social skills training), parent-mediated, and peer-mediated approaches. Environmental approaches (e.g., structured play), behavioral strategies, instructional, or combined approaches were all eligible for inclusion. The focus of the intervention or program in included studies was increasing overall social competence or its component skills (i.e., verbal and non-verbal initiation, response, interaction, and problem-solving behaviors).

Types of publications and time frame

The present review covered studies published or conducted from 1965 through summer 2009. The date range was established in order to potentially include any study that was conducted following the federal Head Start initiative of 1965. The review was limited to studies conducted in the United States for several reasons. First, peer interaction research has historically been limited almost exclusively to the United States and Western Europe. The number of articles published in other countries is so limited that the likelihood it represents either the literature or the field is weak. Next, while universals do appear to exist in the structure of early social behavior (see LaFreniere et al., 2002), some question exists as to whether certain behavioral assumptions inherent to the application of social competence interventions in Western cultures hold true in other
cultures (e.g., appropriate gender roles, acceptable ways of entering a peer group, and/or sequencing of social behaviors) (Goudena & Vermande, 2002). Furthermore, the role of social competence interventions (relative to other types of interventions) in addressing social-emotional difficulties in early childhood may also vary in relation to culture.

Nevertheless, international studies were sought with a goal in mind of examining them at a later time provided a sufficient number of these studies exist.

Types of interventions

In order to be selected for inclusion in this review, studies used a center-based or classroom-based intervention designed or chosen to address social competence. Studies that consisted primarily of parenting classes or interventions conducted in the home were excluded. Interventions in included studies utilized teacher-mediated (e.g., social skills training), parent-mediated, and peer-mediated approaches. Environmental approaches (e.g., structured play), behavioral strategies, instructional, or combined approaches were all eligible for inclusion. The focus of the intervention or program in included studies was increasing overall social competence or its component skills (i.e., verbal and non-verbal initiation, response, interaction, and problem-solving behaviors).

Research designs

Studies with randomly or non-randomly assigned groups were eligible for inclusion as long as a control group was present. These control groups were required to resemble treatment groups in terms of their makeup. In other words, if a study’s aim was to increase the social competence of hearing-impaired children, the control group had to contain hearing-impaired children as well (as opposed to typical children, as is the case in
some published research). In this sense, control groups served as the indicator of methodological quality in this small research base.

For reasons previously discussed, it was suspected that many published studies (particularly those addressing specific combinations of social skills) would utilize single-subject and small group experimental designs. These studies were sought and set aside for analysis at a later time.

Participants

At least two-thirds of the participants were required to be between the ages of 3 years and 5 years, 11 months. If studies reported that ‘nearly all’ of participating children were between the ages of 3 and 5, they were included. Generally, children were selected for treatment based upon the presence of a disability or risk factor(s) associated with later school or behavior problems. Disability is defined here as any of twelve of the thirteen categories recognized by the Individuals with Disabilities Education Act of 2004: deaf-blindness, deafness, emotional disturbance, hearing impairment, mental retardation, multiple disabilities, orthopedic impairment, other health impairment, specific learning disability, speech or language impairment, traumatic brain injury, or visual impairment. Since several of these categories are unlikely by definition to apply to young children (e.g., traumatic brain injury, specific learning disability), the more appropriate and widely used IDEA eligibility category of developmental delay was also included. As stated previously, the thirteenth IDEA category of ‘autism’ (which includes all Pervasive Developmental Disorders) was excluded since other reviews have examined this population as a distinct group, and previous meta-analyses have already examined the
types of intensive social skills training appropriate for children (of various ages) with autism. Finally, studies of children described as ‘at risk’ for future problems were included, since children living under conditions of risk (e.g. poverty, history of abuse) have been well-documented as exhibiting a higher frequency of social competence problems. These children are eligible for Head Start services, frequently experience developmental delay, and may be served and studied within inclusive classroom environments.

*Intervention types and settings*

Interventions were provided in any school setting, including general education or special education classrooms, alternative schools or settings, Head Start or other early intervention programs. However, interventions primarily offered outside of the classroom/center (i.e., in the home or in residential/hospital settings) were excluded. Examples of interventions in retained studies include environmental arrangements, peer-mediated interventions, caregiver-mediated approaches, behavioral strategies, instructional or teacher-mediated approaches, and combined approaches. No restrictions on intervention frequency or duration were enforced.

*Outcome measures*

Included studies were required to report intervention effects for at least one child outcome variable. These variables represented socially competent behaviors, broadly defined here to include social skills, social or play initiation, social language, communication and interaction skills with peers and teachers (such as turn-taking in play or conversation, management of emotions, and self-control), or overall social
competence. Outcome data were gathered from one or more of several sources. Observational data typically took the form of observed frequencies of behavior during a particular span of time. Examples include verbal or non-verbal play initiations, questions, requests to share, and aggressive (or otherwise negative) verbal or non-verbal behavior (such as grabbing or hitting). These may have been collected via a simple frequency count or through the use of software to mark initiation and duration of interactions.

Teacher and parent ratings include overall ratings of social competence, as well as scores on rating scales. One example, the Emotion Regulation Checklist (Sheilds & Cicchetti, 1997) includes an overall competence rating, scores for internalizing and externalizing negative behaviors, and a rating of social problems, among others. Other measures (such as the California Preschool Social Competence Scale) provide an overall social competence rating based upon teacher responses to a pool items. Any such measures were initially included.

In contrast, peer ratings typically took the form of sociometric ratings. Odom et al. (1999), for example, showed children photos of classmates and trained them to rate the images on a 3-point Likert scale (‘liked a lot’ to ‘not at all’) that featured graphics. Any such peer measure was included.

Search strategy for identification of studies

For this review, an effort was made to include as much of the population of empirical research as possible given the criteria for inclusion and exclusion outlined here. Both published and unpublished research reports were sought. First, a comprehensive
search of the ERIC (Educational Resources Information Center), PsychINFO, ProQuest Education Complete, EBSCO Academic Search Premier, and Digital Dissertations databases was conducted. Government Printing Office publications and PapersFirst databases were included as well in order to search for unpublished papers and government studies.

Three sets of search terms (one for the population of interest, another for interventions, and another for outcome variables/risk factors) were developed:

1. Search terms for the population of interest included the following: pre-K, pre-kindergarten, preschool, preschoolers, early childhood, young.

2. Search terms for interventions included: treatment, evaluations, intervention, early intervention, prevention/preventive, therapy, training, program. The following terms were also included in this set in order to locate additional reviews of relevant research: meta-analysis, quantitative analysis, synthesis.

3. Search terms for outcome variables and risk factors included the following: social/pro-social skills, behavior, play, control, competence, adjustment, attachment, competency, participation, isolation, aggression/aggressive behavior, conflict, peer group, peer relations, peer acceptance, antisocial behavior, hyperactivity, problem children, behavior problems, acting out.

These search terms were combined in each search engine so that any study in which the title or abstract contained at least one word from each of the three categories would be included in the results. The titles and (when warranted) abstracts of the studies
acquired through this process were examined, and they were retained for screening if they were intervention studies appearing to focus on younger children.

In addition to the search of bibliographic databases, a hand search of relevant journals published between 1965 and 2008 was conducted. These included *Journal of Early Intervention, Child Development, Topics in Early Childhood Special Education, Early Child Development and Care*, and *Journal of Applied Developmental Psychology*. These publications were selected based upon their preeminence in early childhood and diversity of focus.

Bibliographies of all of the resulting screened articles were inspected for additional eligible studies. In addition, follow-up searches on first authors of eligible studies were conducted. Full documents for the resulting studies were acquired, at which time they were examined relative to the eligibility criteria. Any study that did not clearly fail the basic eligibility criteria was retained for examination. This strategy captured many articles written by several of the more prolific and well-known authors and experts in this field. Given this and the fact that bibliographic searches were conducted with each of these studies, separate author searches for these individuals were not conducted. However, recently published secondary sources published by these authors on the topic of social competence in early childhood were examined (e.g., Brown, Odom, & McConnell, 2008), and any necessary follow-up was completed on studies cited within. Lastly, previous reviews on this topic (e.g., Vaughn et al., 2003; Denham & Almeida, 1987) and several syntheses focusing on elementary-aged children were examined in an
effort to include any studies that may have been identified by those authors and met 
eligibility criteria here.

Studies were retrieved from the Loyola University Chicago Libraries and through 
the InterLibrary Loan Internet Accessible Database. Secondary sources were purchased 
directly from their publishers. PDF and hard copies of all retained studies (and, 
whenever possible, of screened studies as well) were kept on file. Bibliographic 
information and decisions regarding inclusion were stored using Excel software. 
Coding

A protocol was developed in order to code many relevant study characteristics. 
The complete coding protocol for this research synthesis may be found in Appendix A. 
In addition to bibliographic information, coded study characteristics included extensive 
information about research design, participants, study context and educational setting, 
and any information that would assist in identifying or calculating study effect sizes. 
Table 1 lists the primary coded categories included in the synthesis.
Table 1. Study characteristics included in coding protocol

<table>
<thead>
<tr>
<th>Section</th>
<th>Coded categories</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bibliographic information and inclusion decision</td>
<td>Study ID&lt;br&gt;Coding date&lt;br&gt;Coder&lt;br&gt;Author and study reference&lt;br&gt;Publication type and source&lt;br&gt;Screening categories (country, intervention setting, stated outcome variables)</td>
</tr>
<tr>
<td>Study context</td>
<td>Primary author’s discipline&lt;br&gt;Terminology used to label outcomes&lt;br&gt;Location and degree of inclusiveness of intervention setting</td>
</tr>
<tr>
<td>Study participants</td>
<td>Total sample size&lt;br&gt;Predominant ethnicity&lt;br&gt;Proportions of genders and ethnicities&lt;br&gt;Socioeconomic status&lt;br&gt;Disability categories represented in each group</td>
</tr>
<tr>
<td>Intervention features</td>
<td>Terminology used by authors to describe intervention&lt;br&gt;Interventionists&lt;br&gt;Type of intervention program&lt;br&gt;Duration of intervention&lt;br&gt;Presence of fidelity or follow-up measures</td>
</tr>
<tr>
<td>Methodology</td>
<td>Type of design and method of assignment to groups&lt;br&gt;Presence/outcome of comparison of pre-test differences&lt;br&gt;Attrition&lt;br&gt;Retention decision</td>
</tr>
</tbody>
</table>

Judging study quality

An indicator of the quality of relevant studies was developed in order to examine quality as a potential moderator variable. The following features were coded in all included studies in order to make descriptive statements about their quality: a) information regarding overall attrition; b) method of assignment to groups; c)
identification of sources of non-equivalence of treatment and control groups; d) presence of a measure of treatment fidelity; e) presence of a measure of maintenance and/or generalization of learned behaviors/skills. No studies were rejected based upon these criteria, which are discussed in detail in Chapter Four.

Interrater reliability

Retained studies were coded by the author. In order to establish interrater reliability for the coding protocol used here, a colleague with a Ph.D. in school psychology served as a second rater. Initially, the two raters coded several articles together, referring to the coding manual and discussing in particular any studies containing ambiguous information. Next, the raters coded independently, with each coding 6 studies (25% of the total number included, and 37.5% of the effect sizes included). Interrater reliability was defined as the frequency of agreement on codes divided by the total number of coded categories per section, expressed as a percentage.

Reliability was calculated on the six coding categories listed in Table 2, and was 95% or higher for all of the areas coded, with an overall reliability for all of the codes of 98.1%.

Table 2. Interrater reliability for coded categories

<table>
<thead>
<tr>
<th>Section</th>
<th>Interrater agreement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bibliographic information and inclusion decision</td>
<td>100%</td>
</tr>
<tr>
<td>Study context</td>
<td>100%</td>
</tr>
<tr>
<td>Study participants</td>
<td>97.7%</td>
</tr>
<tr>
<td>Intervention features</td>
<td>95.0%</td>
</tr>
<tr>
<td>Methodology</td>
<td>100%</td>
</tr>
<tr>
<td>Effect size</td>
<td>96.0%</td>
</tr>
<tr>
<td>Overall</td>
<td>98.1%</td>
</tr>
</tbody>
</table>
Calculation of effect sizes

The effect size statistic represents the size and direction of the relationships among variables of interest in a study (Lipsey & Wilson, 2001). By calculating effect size, the outcomes of individual studies may be interpreted in relation to each other. They may also be combined to produce an overall estimate of the relationships among those same variables across a field of study. In the present study, the effect size statistic was utilized to obtain an estimate of the change in social competence as a result of intervention. Effect sizes were calculated for each qualifying study. The process of selecting an appropriate effect size statistic (from the many available options), calculating effects for individual studies, determining the effect size in cases of missing data, and combining studies will be discussed in the section to follow.

In the present review, the outcome analysis involved a experimental and quasi-experimental studies in which the investigators sought to increase treatment group means in relation to those of control groups. The most appropriate statistic for this purpose is represented by a standardized mean difference (ES_{sm}). Provided sufficient information is reported by the authors, ES_{sm} is calculated in the following manner

$$ES = \frac{X_{G1} - X_{G2}}{s_{pooled}}$$

with $X_{G1}$ representing the mean for group 1 (in this case the treatment group) and $X_{G2}$ representing the mean for group 2 (in this case the control group). $s_{pooled}$ represents pooled standard deviation from both studies, and is defined as

$$s_{pooled} = \sqrt{\frac{\frac{s_1^2(n_1 - 1) + s_2^2(n_2 - 1)}{n_1 + n_2 - 2}}}{n_1 + n_2 - 2}$$
with $s_1^2$ representing the variance for the measurement of group 1 (in this case the treatment group) and $s_2^2$ representing the variance for the measure used for group 2 (in this case the control group). The number of subjects in the treatment and control groups are represented by $n_1$ and $n_2$, respectively. In all cases, pre-test score differences between treatment and control groups were subtracted before effect sizes were calculated according to $(\bar{x}_{\text{Post Tx}} - \bar{x}_{\text{Post Ctl}}) - (\bar{x}_{\text{PreTx}} - \bar{x}_{\text{PreCtl}})$ where $\bar{x}_{\text{PreTx}}$ and $\bar{x}_{\text{Post Tx}}$ represent the means of pre and post treatment groups, and $\bar{x}_{\text{PreCtl}}$ and $\bar{x}_{\text{Post Ctl}}$ represent the means of pre and post control groups. When $t$ or $F$ were the only test statistics offered, $ES_{sm}$ was estimated provided sufficient additional information on significance testing was included.

Selection of outcome variables

In all of the coded studies, social competence was reported as a primary outcome variable. However, competence was conceptualized and therefore measured in different ways, with a variety of instruments. In some cases, a single outcome measure representing social competence was used. In other cases, social competence was one of several outcomes. In these cases, the overall measure of social competence was used to calculate effect size. In cases where the authors reported outcomes for multiple subscales of an instrument in addition to an overall score, the following approach to selecting outcome variables was used. If the instrument was a measure of social competence, the global (and most reliable) score was used to calculate the effect size. If the measure examined many behaviors (e.g., Child Behavior Checklist) comprising several subscales with only one addressing social competence, the social competence subscale score was used to calculate effect size. For studies in which no overall competence score was
reported but multiple outcome variables related to competence were measured, effect sizes were calculated for each outcome. The mean of these effect sizes (which included initiation, response, and interaction behaviors) was then used in the subsequent analysis.

Publication bias

For obvious reasons, unpublished studies are more difficult to locate and obtain than studies published in peer-reviewed journals. The comprehensive search strategy utilized in this meta-analysis was designed in part to avoid neglecting studies with statistically nonsignificant or negative results and including a disproportionate number of studies with positive effect sizes and statistical significance. In order to identify evidence of publication bias, a funnel plot was generated and inspected using Comprehensive Meta-Analysis software by Biostat. Funnel plots represent a simple visual tool for detecting publication and other bias in meta-analysis. Estimated treatment effects from individual studies were plotted against study size in order to determine whether publication bias played a role in further interpretation of results.

Analytic Methods/Statistical Procedures

The meta-analysis was also conducted using Comprehensive Meta-Analysis software by Biostat. For all calculations, a fixed-effects model was initially used. Inferences from this analysis may be made only to the limited number of studies identified here, rather than to a larger hypothetical population of studies. As a result, the findings reported would apply to the effects of interventions in the included studies on social competence outcomes. Before proceeding with exploration of the moderating
variables (including time period, intervention type/length and disabilities represented), a heterogeneous distribution of effect sizes must be identified. Comprehensive Meta-

Analysis software was also used for homogeneity analysis in order to determine whether the observed variance across included effect sizes was significantly larger than would be expected from sampling error (and whether a random effects model is more appropriate). The conceptual process here involves a test of the null hypothesis that observed variance in effect sizes is a result of sampling error alone, against the alternative hypothesis that this observed variance is too large to be explained by sampling error (and may actually be interpretable). The homogeneity statistic is given by

$$Q = \sum w_i (ES_i - \overline{ES})^2,$$

where \(w_i = 1/SE_i^2\), the inverse of the variance of the \(ES_i\) for study \(i\), and \(\overline{ES}\) is the weighted mean effect size over all of the included studies.

If the null hypothesis is rejected, several potential moderators will be explored as potential systematic sources of between study differences using procedures developed by Hedges (1982) and outlined by Lipsey and Wilson (2001). These potential moderators include the following: decade of publication, published vs. non-published studies, type and duration of intervention, type of interventionist, disability categories represented, study setting, respondent on dependent measure, and study quality. Using the analog to the ANOVA technique, the homogeneity of effect sizes within each coded category will be tested, as well as the homogeneity amongst these categories. This will provide an indication of whether the categories themselves explain sufficient heterogeneity as to leave only subject-level sampling error, or whether additional unexplained variance
exists. As described by Lipsey and Wilson (2001), the analog to the ANOVA serves the function of partitioning the homogeneity statistic Q into $Q_B$ (the part explained by the moderator) and $Q_W$ (which represents residual pooled within groups variance) according to the following:

$$Q_B = \sum w_j \overline{ES}_j^2 - (\sum w_j \overline{ES}_j)^2 / \sum w_j,$$

and

$$Q_W = \sum w_i (ES_i - \overline{ES}_j)^2,$$

where $Q_B$ and $Q_W$ represent (respectively) the Q between and within groups, $w_i$ and $w_j$ represent (respectively) the weights of individual effect sizes and the sum of weights per category, respectively, and $ES_i$ and $\overline{ES}_j$ represent (respectively) individual effect sizes and those for each group.

Results of the literature search, coding procedures, and effect size calculations, as well as the results of homogeneity testing, an evaluation of publication bias, and subsequent moderator analyses will all be presented in Chapter Four.
CHAPTER FOUR

RESULTS

The results of this meta-analysis will be presented in the following sequence. First, general information about the results of the literature search will be reported. Second, a description of the characteristics of each of the coded variables will be presented. Third, the results of effect size analyses will be described, including analyses of publication bias and homogeneity. Finally, analysis of various independent variables and heir relationship to study outcomes will be explored.

Search results

Article citations were initially generated by searches of electronic databases. These initial searches yielded high numbers of results, which was expected due to the number of search terms and the ways in which they were combined. On one level (and as in any meta-analysis), this wide net was intended to capture as many relevant studies as possible. However, it was suspected that several factors would contribute to difficulty in locating appropriate studies. First, the present study attempted to cover a wider time frame than previous meta-analyses. As a result, the terminology used to refer to both social skills/competence was expected to vary over time and across disciplines. Search terms were therefore expanded in order to potentially account for some of this variability. Next, prior searches of this literature and published studies both suggested that the
number of relevant studies would be small. Therefore, thorough inspection of a larger volume of search results would be necessary in the interest of potentially locating studies that were not unearthed in previous reviews.

Each article title in the search results was read in order to determine whether the study should be screened. If a title bore any topical relationship to the study of social competence or behavior in children, the study was retained so that its abstract could be reviewed. After this review of titles, abstracts were reviewed for each of the remaining studies in order to determine whether the articles appeared to meet the inclusion criteria. Abstracts were eliminated from further consideration when any of the following conditions were met:

1) The study focused exclusively on children from birth to age 2, or grades from kindergarten up;
2) The study focused exclusively on typical children without disabilities or identified risk factors;
3) The study did not employ an intervention;
4) If an intervention was offered, it did not include a school-based or center-based component (e.g., it was offered in a residential setting, hospital, or in the home);
5) The dependent variable(s) under study did not include or relate to social competence;
6) The study was designed primarily to address the needs of children with disabilities on the autism spectrum;
7) The article was a research synthesis (e.g., literature review or meta-analysis);

If question existed regarding any of the preceding conditions, the abstract was kept for full screening. Table 3 displays the number of titles reviewed, the number of abstracts screened, and the number of studies retained for coding.

Table 3. Results of electronic database search

<table>
<thead>
<tr>
<th>Search Engine</th>
<th>Results</th>
<th>Screened</th>
<th>Coded/Included</th>
</tr>
</thead>
<tbody>
<tr>
<td>ERIC</td>
<td>13609</td>
<td>178</td>
<td>11 / 8</td>
</tr>
<tr>
<td>PsychINFO</td>
<td>4583</td>
<td>40</td>
<td>8 / 4</td>
</tr>
<tr>
<td>ProQuest Dissertations &amp; Theses</td>
<td>1721</td>
<td>60</td>
<td>10 / 8</td>
</tr>
<tr>
<td>EBSCO Academic Search Premier</td>
<td>789</td>
<td>80</td>
<td>7 / 3</td>
</tr>
<tr>
<td>ProQuest Education Complete</td>
<td>778</td>
<td>78</td>
<td>5 / 2</td>
</tr>
<tr>
<td>Government Printing Office publications</td>
<td>42</td>
<td>12</td>
<td>1 / 0</td>
</tr>
<tr>
<td>PapersFirst</td>
<td>13</td>
<td>2</td>
<td>2 / 0</td>
</tr>
</tbody>
</table>

The largest proportion of studies retained in the final analysis (16 out of the 25 total) resulted from the initial search of the ERIC database and from ProQuest Digital Dissertations. PsychINFO, EBSCO Academic Search Premier, and ProQuest Education Complete together contributed a smaller proportion (9 out of the 25 total), while the GPO and PapersFirst failed to identify any additional studies that passed the screening process. Hand searches were conducted for the following publications: Journal of Early Intervention, Child Development, Topics in Early Childhood Special Education, Early Child Development and Care, and Journal of Applied Developmental Psychology. These
searches were intended to identify studies in these relevant publications that may have been missed by the initial electronic searches. Results of hand searches are displayed in Table 4.

Table 4. Results of hand search of relevant publications

<table>
<thead>
<tr>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>S</td>
<td>R</td>
<td>S</td>
<td>R</td>
<td>S</td>
</tr>
<tr>
<td>Child Development</td>
<td>4</td>
<td>0</td>
<td>3</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Early Childhood Development and Care</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>First</td>
<td>published</td>
<td>1971</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Journal of Applied Developmental Psychology</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>First</td>
<td>published</td>
<td>1980</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Topics in Early Childhood Special Education</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>First</td>
<td>published</td>
<td>1981</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Early Childhood Research Quarterly</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>First</td>
<td>published</td>
<td>1986</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Early Childhood Research and Practice</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>First</td>
<td>published</td>
<td>1999</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>4</td>
<td>0</td>
<td>3</td>
<td>0</td>
<td>8</td>
</tr>
</tbody>
</table>

While hand searches identified a number of relevant and useful articles, they did not contribute any studies to the meta-analysis, most likely for two reasons. First, electronic searches were quite comprehensive and identified studies from the hand searched journals for inclusion via the reference lists of coded studies, so the hand searches were (from this perspective) redundant. Second, only one of the searched publications (Child Development) was in press for the full duration of the publication period under study,
with the remaining publications beginning primarily in the 1980s. Therefore, the hand searches disproportionately covered the last 29 years of the selected publication period. Articles during that period were more likely to have been identified through other avenues.

This raises the question of whether the search strategies, as employed, were comprehensive enough to identify relevant studies published earlier in this time period. In order to address this limitation, reviews of the literature focusing on social skills and social competence and young children were sought (e.g., Guralnick & Weinhouse, 1984; Odom, McConnell, & Brown, 2008; Peterson & McConnell, 1993). These reviews were read, and their bibliographies were searched along with those of all coded studies. The conclusion reached through careful examination of these studies was that studies earlier in the time period under study tended to focus on the identification of key early social competencies, as well as on the identification of differences between typical children and those with disabilities (primarily those with severe disabilities and/or mental retardation).

Characteristics of included studies

The final group of 25 included studies consisted of 17 journal articles (68%) and 8 dissertations (32%). All of these studies were conducted in the United States. The failure to locate studies earlier in the period under study is also reflected in Table 5, which shows the representation of studies and effect sizes by time period. The largest proportion of studies (42%) was conducted between 1990 and 1999, with a total of 75% of studies originating from 1990 to 2009. A total of six studies (25%) were conducted
between 1970 and 1989, yielding seven effect sizes. All but two of the 25 studies utilized quasi-experimental designs, with the remaining two using randomized clinical trials.

In the majority of the quasi-experimental studies, efforts were made to address the non-equivalence of treatment and control groups. In some cases, randomization was used in the assignment of children to groups within existing centers/classrooms, but in many cases this random assignment was violated due to the need to keep groups of equal size, anticipated attendance issues, and early attrition, all in an effort to in order to avoid separating pairs of siblings (including twins), or for other local reasons. However, the majority of studies included a judgment of group differences. In eight of the 25 included studies, groups were compared across key demographic and developmental variables and judged to be statistically similar. In another five studies, the groups were examined and judged to be similar by the researchers but without the application of any formal comparison. In another five studies, one or more differences between groups (e.g., distribution of gender, ethnicity, and/or type of disability) were noted. In the remaining eight studies, no formal or informal comparison of groups was described.

Table 5. Included studies and effect sizes by time period

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td># of included studies</td>
<td>0</td>
<td>3</td>
<td>3</td>
<td>12</td>
<td>8</td>
<td>25</td>
</tr>
<tr>
<td># of effect sizes</td>
<td>0</td>
<td>3</td>
<td>4</td>
<td>15</td>
<td>10</td>
<td>32</td>
</tr>
<tr>
<td>% of total of effect sizes</td>
<td>0%</td>
<td>9%</td>
<td>13%</td>
<td>47%</td>
<td>31%</td>
<td>100%</td>
</tr>
</tbody>
</table>
The first authors of the included studies (11 out of the 25 total) work in the field of psychology/child development. Nearly one fourth of studies were written by first authors in the field of education, with an additional three from public health/public policy and social work. For five of the included studies, the discipline of the primary author could not be determined either from the study itself or from an electronic search of their names. The representation of professional disciplines in included studies is presented in Table 6 below.

Table 6. Included studies by discipline

<table>
<thead>
<tr>
<th>Discipline</th>
<th># of studies</th>
<th>% of total studies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Psychology/Child development</td>
<td>11</td>
<td>44%</td>
</tr>
<tr>
<td>Education</td>
<td>6</td>
<td>24%</td>
</tr>
<tr>
<td>Unknown</td>
<td>5</td>
<td>20%</td>
</tr>
<tr>
<td>Public health/Public policy</td>
<td>2</td>
<td>8%</td>
</tr>
<tr>
<td>Social work</td>
<td>1</td>
<td>4%</td>
</tr>
<tr>
<td>Total</td>
<td>25</td>
<td>100%</td>
</tr>
</tbody>
</table>

The majority of studies were conducted in either urban contexts (9 studies, including 35% of the 2019 participating children) or large metropolitan areas that included both urban and suburban communities (4 studies, including 30% of the 2019 participating children). Eleven studies failed to report the type of research context, and these accounted for another 30% of participating children. Only one study was reported
to take place in a suburban setting (and included 5% of participating children).

Information on studies and proportions of total participant N is presented in Table 7 below.

Table 7. Study and participant representation by geographic area

<table>
<thead>
<tr>
<th>Discipline</th>
<th># of studies</th>
<th>Participant N</th>
<th>% of total N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urban</td>
<td>9</td>
<td>708</td>
<td>35%</td>
</tr>
<tr>
<td>Metropolitan area</td>
<td>4</td>
<td>606</td>
<td>30%</td>
</tr>
<tr>
<td>Not reported</td>
<td>11</td>
<td>605</td>
<td>30%</td>
</tr>
<tr>
<td>Suburban</td>
<td>1</td>
<td>100</td>
<td>5%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>25</strong></td>
<td><strong>2019</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

Included studies were conducted in any of five types of settings serving preschool-aged children. These are examined in Table 8 below both in terms of number of studies and proportion of total participants, since each yielded a slightly different perspective on the contexts in which these interventions were offered. The majority of studies were done in inclusive preschool classrooms (14 out of the 25 studies). The participants in these studies accounted for 45% of the 2019 participants. Five studies took place in Head Start centers, and the participants there accounted for 38% of the total under study. 11% of participants came from day care centers, with the remaining 6% from public elementary schools and a laboratory school.
Characteristics of participants in included studies

The studies in this meta-analysis included 2019 participants between the ages of 3 years and 5 years, 11 months. 976 of those participants received social competence interventions. Sample sizes ranged from 14 to 356 with a median sample size of 43. Participants in the samples studied were on average 57% male (ranging from 41% to 87.5% across all studies) and 43% female. With respect to socioeconomic status, only eight of the studies (33%) directly reported that participants were from disadvantaged or poor families, and only one study identified participants’ families as middle class. None of the remaining fifteen studies (62.5%) reported the socioeconomic status of participants.

Thirteen of the included studies reported that their samples were ethnically diverse. Eight of these thirteen sets of participants were predominantly African-American. Six studies reported that samples were predominantly Caucasian. Overall, however,
inconsistencies in reporting ethnicity make it impossible to determine the representation of other racial groups. Out of the 2019 participants in these studies, 368 (18%) were identified as Caucasian, 763 (38%) were identified as non-white (and predominantly African-American), and the remaining 888 (44%) are of undetermined ethnicity. These proportions are displayed in Table 9 below.

Table 9. Representation of ethnicities in included studies

<table>
<thead>
<tr>
<th>Ethnicity</th>
<th>Total N</th>
<th>% of total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Caucasian</td>
<td>368</td>
<td>18%</td>
</tr>
<tr>
<td>Non-white, predominantly</td>
<td>763</td>
<td>38%</td>
</tr>
<tr>
<td>African-American</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Undetermined</td>
<td>888</td>
<td>44%</td>
</tr>
<tr>
<td>Total</td>
<td>2019</td>
<td>100%</td>
</tr>
</tbody>
</table>

Children who participated in these intervention studies were identified as facing a variety of developmental challenges. The majority of included studies were conducted with children at risk for developmental delay and social failure as a result of economic disadvantage, the presence of behavioral problems, and/or low rates of interaction with peers. Studies focusing on this population usually identified a combination of the above factors in participating children. Children at risk (N=597) accounted for the majority (61%) of treatment group participants across included studies. Children with identified emotional disorders (including abused children demonstrating social and behavioral problems) accounted for 15% of the treated participants (N=144). Smaller numbers of
children with speech and language disorders (N=83) and hearing impairment (N=33) were also included in studies focusing on a single type of disability.

Diverse groups or classrooms accounted for 12% of the total number of treated children. These groups included children with genetic disorders and other developmental disabilities resulting in significant developmental delay, as well as children with emotional and behavioral problems, sensory impairments, and speech and language delays/disorders. In two studies, at least one child with autism was included in this diverse group. These studies were nevertheless retained because they took place in the kinds of diverse inclusive classrooms of particular interest in the present study.

While studies focusing on social competence interventions for children with visual impairment or physical disabilities were not identified, children with these challenges were included in several of the diverse groups described above.

Table 10. Representation of disability categories in included studies

<table>
<thead>
<tr>
<th>Category</th>
<th>Treated groups</th>
<th>Treated N</th>
<th>% of total treated N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hearing impairment</td>
<td>2</td>
<td>33</td>
<td>3%</td>
</tr>
<tr>
<td>Speech and language disorder</td>
<td>2</td>
<td>83</td>
<td>9%</td>
</tr>
<tr>
<td>Emotional disorder/abused</td>
<td>3</td>
<td>144</td>
<td>15%</td>
</tr>
<tr>
<td>At risk due to social isolation and/or economic disadvantage</td>
<td>15</td>
<td>597</td>
<td>61%</td>
</tr>
<tr>
<td>Diverse, containing a range of disability categories</td>
<td>10</td>
<td>119</td>
<td>12%</td>
</tr>
<tr>
<td>Total</td>
<td>32</td>
<td>976</td>
<td>100%</td>
</tr>
</tbody>
</table>
Intervention characteristics in included studies

A full presentation of the features of included studies may be found in Appendix B. Studies were coded according to the type of intervention utilized (environmental arrangement, instructional, behavioral, or other), as well as the individuals delivering the intervention (peer, teacher, experimenter, caregiver, or a combination of these). In both cases, little variability was found across the included studies. 21 of the 25 included studies utilized social competence interventions that relied upon instructional approaches (e.g., social skills instruction built into existing classroom activities, or a social skills curriculum). An additional three studies utilized behavioral approaches that emphasized reinforcement of socially competent behavior and redirection for instances of inappropriate behavior. The remaining two studies primarily relied upon environmental arrangement, wherein attempts were made to increase social interaction and competence by manipulating the physical environment of the classroom and matching children in the treatment groups with more competent peers in an effort to increase interaction frequency. Table 11 displays the intervention features from the included studies, including the authors’ own descriptive labels for the interventions used.
Table 11. Features of interventions used in included studies

<table>
<thead>
<tr>
<th>Study</th>
<th>Program description and participants</th>
<th>Model</th>
<th>Interventionist/Mediator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antia 1997</td>
<td>Teacher-mediated social skills intervention with preschool, kindergarten, and first grade students aged 2:3 to 6:3</td>
<td>Behavioral</td>
<td>Teacher</td>
</tr>
<tr>
<td>Barkley 2000</td>
<td>One classroom-based intervention and one combination of classroom/parent training for preschool children</td>
<td>Instructional</td>
<td>Teacher and Multiple conditions</td>
</tr>
<tr>
<td>Bierman 2008</td>
<td>Enriched school readiness curriculum with academic and social-emotional components for 4 year-old children in Head Start</td>
<td>Instructional</td>
<td>Teacher</td>
</tr>
<tr>
<td>Bradley 1987</td>
<td>Training in sharing behavior for preschoolers aged 3-5</td>
<td>Instructional</td>
<td>Experimenter</td>
</tr>
<tr>
<td>Carpenter 2002</td>
<td>Curriculum-based training of social-cognitive skills for children in Head Start aged 3:1-5:2</td>
<td>Instructional</td>
<td>Teacher</td>
</tr>
<tr>
<td>Colby Sharp 1981</td>
<td>Interpersonal problem-solving training for preschoolers aged 3:9-4:9</td>
<td>Instructional</td>
<td>Experimenter</td>
</tr>
<tr>
<td>Domitrovich 2007</td>
<td>Randomized clinical trial of teacher-mediated social-emotional curriculum (Preschool PATHS) for 3-4 year-old Head Start children</td>
<td>Instructional</td>
<td>Teacher</td>
</tr>
<tr>
<td>Dougan 1999</td>
<td>Peer-mediated social skills instruction for preschool-aged Head Start children</td>
<td>Environmental Arrangement</td>
<td>Teacher</td>
</tr>
<tr>
<td>Fantuzzo 2005</td>
<td>Peer-mediated, classroom-based intervention preschool-aged Head Start children</td>
<td>Instructional</td>
<td>Peer</td>
</tr>
<tr>
<td>Ferentino 1991</td>
<td>Social skills instruction for preschool-aged children in a special education school</td>
<td>Instructional</td>
<td>Multiple</td>
</tr>
<tr>
<td>Han 2005</td>
<td>Instructional program including teacher consultation for 4-5 year-old preschoolers</td>
<td>Instructional</td>
<td>Multiple</td>
</tr>
<tr>
<td>Jakibchuk 1976</td>
<td>Symbolic modeling via video presentation for preschool children</td>
<td>Instructional</td>
<td>Experimenter</td>
</tr>
<tr>
<td>Study</td>
<td>Program description and participants</td>
<td>Model</td>
<td>Interventionist/ Mediator</td>
</tr>
<tr>
<td>----------------</td>
<td>--------------------------------------------------------------------------------------------------------</td>
<td>------------------</td>
<td>---------------------------</td>
</tr>
<tr>
<td>Johnson 2000</td>
<td>Videotape-based social skills curriculum with behavioral follow-up for 4 year-old preschoolers</td>
<td>Instructional</td>
<td>Teacher</td>
</tr>
<tr>
<td>Keller 1974</td>
<td>Symbolic modeling via video presentation for 3-5 year-old preschoolers</td>
<td>Behavioral</td>
<td>Experimenter</td>
</tr>
<tr>
<td>Kops 1999</td>
<td>Therapeutic playgroups 4-5 year-old preschoolers</td>
<td>Instructional</td>
<td>Teacher</td>
</tr>
<tr>
<td>Lau 2005</td>
<td>Teacher facilitation of social interaction during computer sessions for 3-5:10 year-old preschoolers</td>
<td>Behavioral</td>
<td>Teacher</td>
</tr>
<tr>
<td>Lowe Vandell 1982</td>
<td>Instructional program with peer-mediation focusing on disability awareness and communication for preschool-aged children</td>
<td>Instructional</td>
<td>Instructional</td>
</tr>
<tr>
<td>Matson 1991</td>
<td>Instructional social skills training for preschoolers aged 4-5</td>
<td>Instructional</td>
<td>Teacher</td>
</tr>
<tr>
<td>McCabe 1998</td>
<td>Enhance Social Competence Program for preschool-aged children</td>
<td>Instructional</td>
<td>Teacher</td>
</tr>
<tr>
<td>McKinney 1998</td>
<td>Teacher-/Investigator-delivered social skills curriculum (<em>Taking Part</em>) for children in day care aged 3:3-5:8</td>
<td>Instructional</td>
<td>Teacher</td>
</tr>
<tr>
<td>Mize 1990</td>
<td>Social skills training provided by author for 4-5 year-old children in six day care settings</td>
<td>Instructional</td>
<td>Experimenter</td>
</tr>
<tr>
<td>Odom 1999</td>
<td>Four distinct models of intervention in different settings for preschool children with a variety of disabilities</td>
<td>Environmental Arrangement and Instructional</td>
<td>Peer, Teacher, and Multiple conditions</td>
</tr>
<tr>
<td>Pettigrew 1998</td>
<td>Social stories with scaffolded social competence intervention for children aged 3:3-5:6 in Head Start and preschool special education program</td>
<td>Instructional</td>
<td>Experimenter</td>
</tr>
<tr>
<td>Shure 1979</td>
<td>Interpersonal Cognitive Problem Solving training for children in day care and kindergarten</td>
<td>Instructional</td>
<td>Teacher</td>
</tr>
<tr>
<td>Stafford Stoia 1997</td>
<td>Social and emotional comprehension program for children aged 3:4-6:4 in a therapeutic nursery school</td>
<td>Instructional</td>
<td>Teacher</td>
</tr>
<tr>
<td>Wojtalewicz 2004</td>
<td>Second Step Violence Prevention Program used specifically to address social competence for children in Head Start aged 3-5</td>
<td>Instructional</td>
<td>Teacher</td>
</tr>
</tbody>
</table>
As outlined in Table 12, interventions ranged from brief (one to two weeks) to the majority of school year (seven to nine months) in length. Nearly half of the 976 treated children received interventions that were delivered several times per week of a period of 7 to 9 months (N=467). Another 32% (N=312) received interventions occurring from once to several times weekly over a period of 1 to 3 months. Children who received 4 to 6 months of intervention, several times per week, comprised another 16% of the treated participants (N=312). Only a handful of the treated children were given brief interventions of 1 month or less in duration (N=41 or 4% of all treated participants).

Table 12. Duration of interventions across included studies

<table>
<thead>
<tr>
<th>Duration</th>
<th># of treated groups</th>
<th>Treated N</th>
<th>% of total treated N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to 2 weeks</td>
<td>3</td>
<td>33</td>
<td>3%</td>
</tr>
<tr>
<td>2 weeks to 1 month</td>
<td>1</td>
<td>8</td>
<td>1%</td>
</tr>
<tr>
<td>1 to 3 months</td>
<td>15</td>
<td>312</td>
<td>32%</td>
</tr>
<tr>
<td>4 to 6 months</td>
<td>6</td>
<td>156</td>
<td>16%</td>
</tr>
<tr>
<td>7 to 9 months</td>
<td>5</td>
<td>467</td>
<td>48%</td>
</tr>
<tr>
<td>Total</td>
<td>31</td>
<td>976</td>
<td>100%</td>
</tr>
</tbody>
</table>

Treatment fidelity was assessed via observation in 9 of the included studies. In the remaining 16 studies either no attempt was made to measure fidelity, or a check of fidelity was mentioned without any reporting of results.
Dependent variables and measures

Measurement of social competence in included studies consisted primarily of norm-referenced rating scales completed by the children’s classroom teachers. Commonly used measures included the Social Skills Rating System (Gresham & Elliot, 1990) the Social Skills scale of the Preschool and Kindergarten Behavior Scales (Merrell, 1996), and the California Preschool Social Competence Scale (Levine, Elzey, & Lewis, 1969), together used to measure outcomes for 16 of 32 total treated groups. In 12 groups, the appropriateness of cooperative peer behavior was assessed via observation. In these cases, frequency of cooperative play (relative to solitary or parallel play) or a proportion of positive peer-related behaviors were measured. The remaining 4 treated groups utilized formal measures of interpersonal problem-solving (3 groups) and sociometric ratings (1 group). Additional dependent variables were often measured in these studies (e.g., attention, problem-solving, adaptive behavior, internalizing and externalizing behaviors), but the common thread joining these studies was a measure of peer-related social competence completed in school by teachers or the experimenters. In only a few cases were caregivers used as a source of information about treated children’s social competence. While a comparison of the effects on teacher vs. caregiver perceptions of child social competence would clearly be useful, it is not possible given the scarcity of parent/caregiver measures in included studies.

Social competence was typically defined as interactive behavior, but this interactive behavior was conceptualized and measured somewhat differently across studies. For 17 of the 32 treated groups, social competence was ultimately a more general child
characteristic, assessed by teachers reflecting upon their observations and experience with these children over time in a school or center, and resulting in a standardized global competence score. In another 14 of the treated groups, social competence was represented by a frequency or proportion of interactive, cooperative, and problem-solving behaviors exhibited by children during observed play rather than through reflection on past behavior. In only one study (consisting of a single treatment group) was social competence defined as a frequency of social initiation behaviors.

Generalization of treatment effects

Generalization of treatment effects to other contexts and the maintenance of learned behaviors/skills over time both represent areas of interest to educators and researchers. The ultimate test of an intervention designed to improve social and behavioral skills lies in its potential for and effectiveness in producing sufficiently long-lasting and far-reaching effects on children. Generalization and maintenance, however, can hardly be considered areas of sufficient focus in the studies included here. Only seven of the 32 treated groups were followed over time in order to determine whether treatment effects were sustained over time; in the remaining 27 studies, no follow-up was done. Only one of the 25 included studies included a measure of skill generalization, with no information provided in any of the other 24 studies. These types of measures could serve as an indicator of study quality and intervention effectiveness, but there is evidence of little progress in incorporating them into intervention studies.
Effect size calculation and adjustments

The 25 eligible studies contributed a total of 32 standardized mean difference effect sizes on social competence. These effect sizes provided a measure of the post-treatment differences between comparison/control and treatment groups. The majority of studies contributed a single effect size, but five studies contributed between 2 and 4 independent effect sizes. In some of these cases, a single intervention was used with multiple groups. In one case (Odom 1999), four interventions were utilized in independent studies reported in one published article. In either case, the effect sizes within these studies were independent and treated as such.

In order to generate the independent effect sizes used in the analysis, the following procedure was used. As previously described, studies usually reported results for a variety of dependent variables. In cases where only one of these represented social competence, this variable was used and the others were discarded. Where effects on multiple socially competent behaviors were reported, these effects were averaged to form an overall index of competence. In cases where measures of overall social competence and socially competent behaviors were included, the measure for which the authors presented the highest estimated reliability was used. Because teachers and the experimenters were the most commonly used informants, their reports were used in subsequent analysis.

Effect sizes ranged from -0.652 to 1.392. The 25 included studies and their 32 associated effect sizes are listed in Table 13. Five of these effect sizes were negative, one was equal to 0, and the rest were positive.
Table 13. Standardized mean differences and descriptive information for included studies

<table>
<thead>
<tr>
<th>Author (Date)</th>
<th>Sample size</th>
<th>Effect size</th>
<th>Standard error</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antia 1997</td>
<td>N=43</td>
<td>-0.049</td>
<td>0.306</td>
</tr>
<tr>
<td>Barkley 2000 (2)</td>
<td>1: N=79</td>
<td>0.444</td>
<td>0.226</td>
</tr>
<tr>
<td></td>
<td>2: N=82</td>
<td>0.329</td>
<td>0.220</td>
</tr>
<tr>
<td>Bierman 2008</td>
<td>N=356</td>
<td>0.199</td>
<td>0.103</td>
</tr>
<tr>
<td>Bradley 1987</td>
<td>N=26</td>
<td>0.218</td>
<td>0.381</td>
</tr>
<tr>
<td>Carpenter 2002</td>
<td>N=80</td>
<td>0.166</td>
<td>0.229</td>
</tr>
<tr>
<td>Colby Sharp 1981 (2)</td>
<td>1: N=25</td>
<td>-0.106</td>
<td>0.395</td>
</tr>
<tr>
<td></td>
<td>2: N=12*</td>
<td>4.524*</td>
<td>1.083*</td>
</tr>
<tr>
<td>Domitrovich 2007</td>
<td>N=226</td>
<td>0.466</td>
<td>0.129</td>
</tr>
<tr>
<td>Fantuzzo 2005 (2)</td>
<td>1: N=37</td>
<td>0.458</td>
<td>0.329</td>
</tr>
<tr>
<td></td>
<td>2: N=45</td>
<td>0.253</td>
<td>0.299</td>
</tr>
<tr>
<td>Ferentino 1991</td>
<td>N=100</td>
<td>1.392</td>
<td>0.270</td>
</tr>
<tr>
<td>Keller 1974</td>
<td>N=19</td>
<td>1.120</td>
<td>0.480</td>
</tr>
<tr>
<td>Han 2005</td>
<td>N=149</td>
<td>0.107</td>
<td>0.164</td>
</tr>
<tr>
<td>Jakibchuk 1976</td>
<td>N=22</td>
<td>1.047</td>
<td>0.581</td>
</tr>
<tr>
<td>Johnson 2000</td>
<td>N=96</td>
<td>0.299</td>
<td>0.201</td>
</tr>
<tr>
<td>Keller 1974</td>
<td>N=19</td>
<td>1.120</td>
<td>0.480</td>
</tr>
<tr>
<td>Kops 1999</td>
<td>N=44</td>
<td>0.091</td>
<td>0.296</td>
</tr>
<tr>
<td>Lau 2005</td>
<td>N=36</td>
<td>0.689</td>
<td>0.336</td>
</tr>
<tr>
<td>Lowe Vandell 1982</td>
<td>N=32</td>
<td>-0.640</td>
<td>0.486</td>
</tr>
<tr>
<td>Matson 1991</td>
<td>N=28</td>
<td>0.667</td>
<td>0.378</td>
</tr>
<tr>
<td>McCabe 1998</td>
<td>N=36</td>
<td>-0.652</td>
<td>0.335</td>
</tr>
<tr>
<td>McKinney 1998 (2)</td>
<td>N=12</td>
<td>0.151</td>
<td>0.566</td>
</tr>
<tr>
<td></td>
<td>N=17</td>
<td>0.814</td>
<td>0.502</td>
</tr>
<tr>
<td>Mize 1990</td>
<td>N=33</td>
<td>0.917</td>
<td>0.359</td>
</tr>
<tr>
<td>Odom 1999 (4)</td>
<td>N=34</td>
<td>0.020</td>
<td>0.335</td>
</tr>
<tr>
<td></td>
<td>N=37</td>
<td>0.226</td>
<td>0.323</td>
</tr>
<tr>
<td></td>
<td>N=36</td>
<td>0.763</td>
<td>0.338</td>
</tr>
<tr>
<td></td>
<td>N=39</td>
<td>-0.112</td>
<td>0.315</td>
</tr>
<tr>
<td>Pettigrew 1998</td>
<td>N=55</td>
<td>0.466</td>
<td>0.272</td>
</tr>
<tr>
<td>Shure 1979</td>
<td>N=57</td>
<td>1.376</td>
<td>0.292</td>
</tr>
<tr>
<td>Stafford Stoia 1997</td>
<td>N=28</td>
<td>0.000</td>
<td>0.367</td>
</tr>
</tbody>
</table>

* = outlier removed before meta-analysis was completed

The initial distribution of effect sizes was first studied in order to determine whether the removal (or recoding) of outliers was necessary. Outliers were defined as effect size values more than 2 standard deviations from the mean effect size (Lipsey & Wilson, 2001). Colby Sharp (1981) was the only study to meet this criterion, and given the extreme value of its effect size (4.524), the likelihood of disproportionate influence in
subsequent calculations, and the study’s sample size (N = 12, the smallest of any included study), the decision was made to remove it from the distribution of effect sizes.

For a fixed effects model, the overall unbiased effect size estimate for this group of studies was 0.348 (95% CI 0.257 to 0.440). This mean effect size is significantly different from zero, indicating that the interventions in included studies, on average, produced a positive effect on social competence. A test of homogeneity yielded a Q-value of 70.997 (p>0.001), indicating that the variability among the included effect sizes could not be attributed to chance alone and that the included studies do not appear to represent estimations of a common mean. As a result of this heterogeneous distribution, the decision was made to use a random effects model for all subsequent analyses. Basing this decision on the result of heterogeneity is a common practice in research synthesis (Cooper, 2010). This model assumes other sources of randomly distributed variability, including the possibility that coded variables may account for the heterogeneity, and may be used to partially justify a subsequent analysis of moderators described in chapter three. Despite the variability in effect sizes, it does appear that the interventions produced a positive change in teacher-rated social competence of preschool children in treatment groups.

Publication bias

As the sample sizes of included studies in a meta-analysis increase, so does the precision of the overall estimate of effect size across studies. When studies with small sample sizes are overrepresented in a meta-analysis, the risk of failing to include the full range of effects (distributed evenly around the mean effect size) increases. A funnel plot
was generated using the Comprehensive Meta-Analysis software program in order to provide a canvas for visual inspection of effect sizes vs. sample size and identify a pattern indicative of publication bias. The scatterplot resulting from this function (see Figure 1) displays the estimated treatment effects estimated from individual studies (on the horizontal axis) against the study size (represented by standard error of measurement on the vertical axis). In a general sense, a symmetrical graph indicates a decreased probability that publication is associated with statistically significant study results.

Provided that the results from small studies are distributed across the bottom of the entire graph, and this spread narrows as the studies increase in size toward the top of the graph, then it is less likely that publication bias is a concern. When asymmetry is observed, the likelihood of bias or other issues is greater. While it is often the case that smaller studies in a meta-analysis yield larger treatment effects, and that this set of circumstances would result in an asymmetrical funnel plot (specifically with the lower left-hand portion missing), the reverse is not always true. In other words, while the presence of publication bias will lead to asymmetrical graphs, asymmetrical graphs are not always the result of publication bias. In this sense, a symmetrical funnel plot provides some assurance against, publication bias, while an asymmetrical one may require additional interpretation. The funnel plot in Figure 1 does appear generally symmetrical and does not raise serious alarm regarding the possibility of publication bias.
In this case, the unpublished studies are distributed widely across the range of effect sizes.

Mean effects of social competence interventions

Appendix C includes a visual display of all included study effect sizes (arranged in chronological order) in the form of a forest plot. This diagram also includes the upper and lower limits of the 95% confidence interval for each effect size. Using a random effects model, the recalculated unbiased effect size estimate for all included studies was 0.388 (with a 95% confidence interval of 0.230 to 0.546). Overall, treatment groups scored significantly higher than comparison groups on dependent measures (p > 0.001, α = .05). Again, this is a small to moderate-sized overall effect, but its overall
representativeness of the data set is questionable due to unexplained variance. An analysis of moderators was completed next and is discussed below.

Analysis of moderators

In an attempt to explain between study differences, several moderator variables were examined. The results of an analysis of publication types and time periods, as well as measurement and intervention-related variables will be discussed first. Following these results will be a discussion of indicators of study quality, five of which were selected as potential moderators.

Because the moderators under study here are categorical variables, Hedges’ (1982) analog to the analysis of variance was used for this set of analyses. This process involves several steps. Groups are formed based upon the categories associated with each moderator (these considered independent variables). The analysis tests for the presence of differences between the mean effect size for each category. If the between groups variance is significant, then sampling error can not sufficiently explain their variability (Lipsey & Wilson, 2001), indicating significant differences among these effect sizes. However, this alone cannot sufficiently make the case that a moderator is meaningful. Therefore, the analysis tests homogeneity within each of the levels/categories of that moderator as well. When the variance among effect sizes within a level/category is homogeneous, then all of the sources of variation in those effect sizes (other than sampling error of subjects) have been accounted for.

A significant degree of heterogeneity of effects was identified (Q = 71.011, p<0.001). Table 14 displays the results of moderator analyses for publication type
(published vs. unpublished), time period, disability categories, intervention duration and type, and the type of social competence measured. The statistics presented in Table 14 include results for both fixed and mixed effects models. This provides both a more and less conservative investigation of the differences associated with the selected moderators. In all cases, fixed model statistics are reported first. Where mixed effects values differ from those obtained from the fixed model, they follow in parentheses.

A total of 23 published and 8 unpublished studies were included. The overall effects for both published studies ($d = 0.358$) and unpublished studies ($d = 0.316$) were small to moderate. A value of 0.143 (non-significant) was obtained for $Q_B$ (the between-groups homogeneity statistic) indicating that effects were not significantly different between these two groups of studies. The confidence interval for unpublished studies (0.254 to 0.462) fell completely within that of published studies (0.122 to 0.509), reinforcing the conclusion that no differences exist between the outcomes of two groups of studies. While the number of published studies included in the analysis is notably higher, this result nevertheless provides some support to the conclusion regarding a lack of significant publication bias. Significant heterogeneity was found in the both groups of studies, indicating that unexplained variance in their effects remains.

For this analysis, time of publication was divided into five categories: pre-1975 (before the passing of P.L. 94-142, or the Education for All Handicapped Children Act), 1976-1990 (between P.L. 94-142 and its first reauthorization, at which time the law was expanded to include early childhood special education and early intervention), 1991-1997 (at which time the law, now referred to as IDEA, was again reauthorized), 1998-2004,
and post-2004 (until and following the most current reauthorization of the law). Each reauthorization included changes in identification, assessment, education, and intervention practices; these reauthorizations also served as motivation for updated research. Here, only one study published prior to 1975 was included, with six from 1976-1990, four from 1990-1997, fourteen from 1997-2004, and six studies between 2004 and the present. A value of 10.036 (p<.01) was obtained for $Q_B$, indicating significant differences among the effect sizes within these time periods, but only when a fixed model was used. These differences disappear when the more conservative mixed model is applied to the moderator analysis. In this case, the effect size for pre-1975 was significantly larger than that of the other time periods. It should be noted, however, that this effect size is the result of only one study. Within-groups homogeneity statistics were significant for the 1998-2004 time period (p<.01) and for 2004-2009 (p<.01). Homogeneity statistics were non-significant for the 1976-1990 and 1991-1997 categories, indicating that the effect sizes within these time periods were relatively consistent. Nevertheless, effect sizes for these two time periods were nearly identical ($d=0.639$ for 1976-1990 and $d=0.614$ for 1991-1997).

Participant disability categories were divided into the following categories: hearing impairment, speech/language impairment or delay, emotional and/or behavior disorder, at-risk, and those studies focusing on groups of children with diverse labels. The single study of children with hearing impairment yielded a negative effect ($d=-0.050$). The overall effect in studies of children with speech/language problems was positive but negligible ($d=0.024$). The small number of studies addressing either population (as well
as insufficient power) ultimately serves only to highlight the need for additional research. Studies of children with emotional and behavior problems (k=7), children at risk (k=11), and children with a variety of disabilities (k=10) all produced positive effects overall. Values for Cohen’s $d$ were 0.278 for the at-risk groups, 0.452 for the group with emotional and behavior problems, and 0.476 for the studies of diverse children with a variety of disabilities. This indicates that treatment effects are positive both for more and less diverse groups of children. The confidence intervals for these three groups do not include zero, while those for hearing impairment and speech/language do. A value of 8.017 (non-significant) was obtained for $Q_B$, indicating a lack of significant differences among the effect sizes across these disability categories. The at-risk and diverse groups displayed significant heterogeneity ($p<.01$), as did the emotional/behavior disorder group ($p<.01$).
Table 14. Results of Moderator Analyses Examining the Effect of Interventions on Social Competence

<table>
<thead>
<tr>
<th>Moderators</th>
<th>k</th>
<th>d</th>
<th>95% confidence interval</th>
<th>Q_b</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Low estimate</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>High estimate</td>
<td></td>
</tr>
<tr>
<td><strong>Publication type</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Published</td>
<td>23</td>
<td>0.358**</td>
<td>0.254 (0.249)</td>
<td>0.143 (0.471)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.421**)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unpublished</td>
<td>8</td>
<td>0.316**</td>
<td>0.122 (-0.113)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.273)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Time period</strong></td>
<td></td>
<td></td>
<td></td>
<td>10.036* (3.741)</td>
</tr>
<tr>
<td>Pre-1975</td>
<td>1</td>
<td>1.173</td>
<td>0.188</td>
<td>2.157</td>
</tr>
<tr>
<td>1976-1990</td>
<td>6</td>
<td>0.639 (0.508**)</td>
<td>0.319 (-0.137)</td>
<td>0.958 (1.153)</td>
</tr>
<tr>
<td>1991-1997</td>
<td>4</td>
<td>0.614 (0.527**)</td>
<td>0.293 (-0.220)</td>
<td>0.935 (1.274)</td>
</tr>
<tr>
<td>1998-2004</td>
<td>14</td>
<td>0.276**</td>
<td>0.121 (0.074)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.279**)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2004-2009</td>
<td>6</td>
<td>0.297**</td>
<td>0.149</td>
<td>0.445</td>
</tr>
<tr>
<td><strong>Disability categories</strong></td>
<td></td>
<td></td>
<td></td>
<td>8.017 (2.722)</td>
</tr>
<tr>
<td>represented</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hearing impairment</td>
<td>1</td>
<td>-0.050</td>
<td>-0.661</td>
<td>0.561</td>
</tr>
<tr>
<td>Speech/language delay/disorder</td>
<td>2</td>
<td>0.024 (-0.079)</td>
<td>-0.397 (-1.195)</td>
<td>0.445 (1.037)</td>
</tr>
<tr>
<td>Emotional/behavioral problems</td>
<td>7</td>
<td>0.452** (0.432*)</td>
<td>0.236 (0.091)</td>
<td>0.667 (0.773)</td>
</tr>
<tr>
<td>At-risk</td>
<td>11</td>
<td>0.278** (0.388**)</td>
<td>0.142 (0.163)</td>
<td>0.414 (0.613)</td>
</tr>
<tr>
<td>Variety of disabilities</td>
<td>10</td>
<td>0.476** (0.429**)</td>
<td>0.307 (0.114)</td>
<td>0.646 (0.745)</td>
</tr>
</tbody>
</table>

*p<.05, ** p<.01 for Q_w

Table 15 displays the results of moderator analyses for additional intervention-related variables. Intervention features were examined first. Duration of intervention
was divided into the following groups: interventions less than two weeks in duration (k=2), interventions lasting two weeks to one month (k=2), one to three months (k=15), four to six months (k=7), and 7 to 9 months (k=5). These periods represent a continuum from brief, targeted interventions to extensive integrated interventions lasting an entire school year. The largest overall effect was for the briefest studies of less than two weeks in duration (d=1.162). However, only two effect sizes are represented in this group. The 1-3 month interventions comprised the largest groups of studies (k=15) and the largest effect size (d=0.416) of all groups other than the briefest interventions. Longer interventions of 4-6 months (d=0.400) and 7-9 months (d=0.287) were represented by several more studies and yielded positive effects as well. The only group which produced a negative treatment effect was that of the interventions lasting between 2 weeks and 1 month (d=−0.108). In this case (as in the case of the brief interventions mentioned above), only two effect sizes were included, so many questions remain as to the effectiveness of interventions of those lengths. A value of 8.107 (non-significant) was obtained for Q_B here, again indicating a lack of significant differences across these intervention duration categories. In this case, variance in effect sizes across these lengths of intervention was comparable. The vast majority of the interventions in included studies took place over one to three months, and the effect sizes in this 1-3 month group proved to be heterogeneous, along with those for all of the interventions that produced positive effects.

Intervention effects were grouped according to whether they were best described as environmental arrangement, instructional, behavioral, or combined approaches. These
effects proved to be homogeneous as a group, with no significant differences noted across the effects of the intervention types ($Q_B = 3.256, \text{n.s.}$). The vast majority of these effect sizes resulted from instructional interventions (26 out of the total of 31). Instructional interventions yielded an overall effect of 0.361 and proved to be one of two interventions for which the resulting confidence interval for effect size did not include zero. The dearth of studies focusing on environmental arrangement, behavioral, and combined approaches leads to difficulty in interpreting the remaining effect sizes. However, it should be noted that the combined approach yielded a negative effect ($d=-0.114$), environmental arrangement yielded a negligible effect ($d=0.020$) and behavioral approaches ($k=3$) yielded the largest positive effect ($d=0.444$).

The final intervention-related moderator examined (and presented in Table 15) the ways in which the dependent variable of social competence was measured. Studies either assessed emotional knowledge ($k=1$), overall social skills/competence ($k=17$), cooperative play behaviors ($k=10$), or social problem-solving ($k=3$). The results here are encouraging. Social competence interventions produced positive effects on all of the socially competent behaviors and indices represented here, ranging from 0.282 (for overall social skills/social competence, $k=17$) to 0.626 for social problem-solving ($k=3$). The overall effect for emotional knowledge was 0.467, with only one effect size represented. Studies attempting to increase cooperative play behaviors ($k=10$) yielded an overall effect of 0.282. None of the confidence intervals associated with indicator effect sizes included zero. Each of these groups of effect sizes proved to be heterogeneous ($p<.01$), while failing to exhibit significant between-groups differences ($Q_B = 3.911$).
Table 15. Additional Results of Moderator Analyses Examining the Effect of Interventions on Social Competence

<table>
<thead>
<tr>
<th>Moderators</th>
<th>k</th>
<th>d</th>
<th>95% confidence interval</th>
<th>Qb</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Low estimate</td>
<td>High estimate</td>
</tr>
<tr>
<td><strong>Duration of intervention</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Up to 2 weeks</td>
<td>3</td>
<td>1.162**</td>
<td>0.389</td>
<td>1.935</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-0.108</td>
<td>(-0.165)</td>
<td>-0.720</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(-1.041)</td>
<td></td>
</tr>
<tr>
<td>2 weeks to 1 month</td>
<td>1</td>
<td>-0.108</td>
<td>(-0.165)</td>
<td>-0.720</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.258</td>
<td>(0.206)</td>
<td>0.575</td>
</tr>
<tr>
<td>1 to 3 months</td>
<td>15</td>
<td>0.416**</td>
<td>(0.439**)</td>
<td>0.258</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.143</td>
<td>(-0.219)</td>
<td>0.658</td>
</tr>
<tr>
<td>4 to 6 months</td>
<td>6</td>
<td>0.400**</td>
<td>(0.360)</td>
<td>0.143</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(-0.165)</td>
<td></td>
</tr>
<tr>
<td>7 to 9 months</td>
<td>5</td>
<td>0.287**</td>
<td>(0.290**)</td>
<td>0.158</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(0.152)</td>
<td></td>
</tr>
<tr>
<td><strong>Intervention type</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Environmental arrangement</td>
<td>1</td>
<td>0.020</td>
<td>-0.653</td>
<td>0.694</td>
</tr>
<tr>
<td>Instructional</td>
<td>26</td>
<td>0.361**</td>
<td>(0.409**)</td>
<td>0.265</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(0.238)</td>
<td></td>
</tr>
<tr>
<td>Behavioral</td>
<td>3</td>
<td>0.444**</td>
<td>(0.537)</td>
<td>0.033</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(-0.151)</td>
<td></td>
</tr>
<tr>
<td>Combined</td>
<td>1</td>
<td>-0.114</td>
<td>-0.744</td>
<td>0.516</td>
</tr>
<tr>
<td><strong>Indicator of social competence</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Emotional knowledge</td>
<td>1</td>
<td>0.467**</td>
<td>0.214</td>
<td>0.721</td>
</tr>
<tr>
<td>Cooperative play behaviors</td>
<td>10</td>
<td>0.372**</td>
<td>(0.399**)</td>
<td>0.193</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(0.201)</td>
<td></td>
</tr>
<tr>
<td>Overall social skills/competence</td>
<td>17</td>
<td>0.282**</td>
<td>(0.310**)</td>
<td>0.159</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(0.076)</td>
<td></td>
</tr>
<tr>
<td>Social problem-solving</td>
<td>3</td>
<td>0.626**</td>
<td>(0.456)</td>
<td>0.230</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(-0.569)</td>
<td></td>
</tr>
</tbody>
</table>

*p<.05, ** p<.01 for Q_W
Next, five indicators of study quality were examined in order to determine their role (if any) in explaining the variance among included studies. The results of these analyses are presented in Table 16. Here as before, fixed model estimates are presented with mixed model values following in parentheses when they differed from the fixed values.

Hedges’ (1982) analog to the analysis of variance was used again for this set of analyses of categorical variables, although in this case each analysis involved only two categories. Groups were formed based upon the presence or absence of each indicator of quality. The analog tested for the presence of differences between the mean effect size for each of the pair of groups (essentially a t-test for differences between the means). A difference here would indicate that effect sizes from studies with each indicator of quality vary significantly from those from studies without it. As before, the analog then tested for homogeneity within each of the two categories. As stated previously, where variance among effect sizes within a category is homogeneous, sources of variation in those effect sizes (other than sampling error of subjects) have been accounted for.

The indicators examined were as follows. First, studies were groups according to whether efforts were made to randomly assign participants to intervention and control groups. Studies in the ‘yes’ group (k=24) were generally quasi-experimental and used random assignment within a center or school, at times with slight compromises. Studies in the ‘no’ group (k=7) either offered interventions in existing classrooms/groups or failed to report information regarding groups assignment. In the end, no differences were found between the groups ($Q_B = 1.081$). The overall effect for studies including attempts
to randomize was 0.330, while that for studies that failed to do so was 0.478. Both
groups proved to contain significant heterogeneity (p<.01).

The picture was similar for studies relative to their treatment of pre-test score
difference between treatment and control groups. Either studies reported nothing about
such differences (k=18, d=0.297), or they controlled/eliminated such differences by
adjusting group make-up or the scores themselves (k=12 with one study excluded due to
missing information, d=0.483). This grouping of studies resulted in a value of 5.702 for
$Q_B$ (n.s.) with significant heterogeneity still unaccounted for in the two groups of effect
sizes (p<.01).

The next variables examined were the presence or absence of measures of
treatment fidelity, generalization of acquired skills, and sustained treatment effects at
follow-up. Again, studies were grouped according to the presence or absence of these
indicators. In every instance where the presence of such a measure was found, the
author(s) noted favorable results (in other words, wherever fidelity was reported, it was
found to be high, wherever follow-up was tracked, treatment effects were sustained, and
in the single study in which generalization was assessed, it was in evidence). But none of
these three sets of moderator variable categories showed significant differences between
the effect size distributions of studies that included them vs. the studies that did not.
Specifically, studies with measures of fidelity (k=12) yielded an overall effect of 0.282,
while those without (k=19) yielded an overall effect of 0.458. In this case significant
heterogeneity was identified (p<.01) within these categories with no significant
difference between them ($Q_B = 3.314$). Where a measure of generalization was included
(k=1), the overall effect in the study was 0.687. For the 30 remaining effect sizes, no generalization measure was used (d=0.343). Finally, with respect to follow-up measures, the overall effect for the 10 studies that included these was 0.361, while d=0.345 for studies that did not include them.

What can be said about every one of these indicators of study quality is that positive effects were found regardless of whether the indicator was present or not. In fact, in only one case did the confidence intervals for effect sizes include zero. This was for studies that included measures of generalization and was indicative overall of the wide variability in effect sizes in that group. The possibilities for explaining these relationships can only be explored through further research, since the included studies provide insufficient information to answer such questions. Table 16 displays the results of the moderator analysis for study quality-related variables.

Heterogeneity was noted in several of the categories. In both of the fidelity and generalization categories, significant heterogeneity was present (p<.01). This was also the case in the group of studies that did not include a measure of generalization (p<.01) and those which did not include a measure of follow-up (p<.05).
Table 16. Results of Study Quality-Related Moderator Analyses

<table>
<thead>
<tr>
<th>Study quality-related moderators</th>
<th>k</th>
<th>d</th>
<th>95% confidence interval</th>
<th>Qb</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Low estimate</td>
<td>High estimate</td>
</tr>
<tr>
<td>Effort to randomize</td>
<td></td>
<td></td>
<td></td>
<td>1.081 (0.236)</td>
</tr>
<tr>
<td>No</td>
<td>7</td>
<td>0.478** (0.485*)</td>
<td>0.217 (0.022)</td>
<td>0.738 (0.949)</td>
</tr>
<tr>
<td>Yes</td>
<td>24</td>
<td>0.330** (0.363**)</td>
<td>0.232 (0.197)</td>
<td>0.428 (0.530)</td>
</tr>
<tr>
<td>Differences at pre-test</td>
<td></td>
<td></td>
<td></td>
<td>5.702 (2.640)</td>
</tr>
<tr>
<td>Not assessed</td>
<td>18</td>
<td>0.297** (0.332**)</td>
<td>0.154 (0.118)</td>
<td>0.440 (0.545)</td>
</tr>
<tr>
<td>None, or controlled for</td>
<td>12</td>
<td>0.483** (0.482**)</td>
<td>0.335 (0.204)</td>
<td>0.631 (0.759)</td>
</tr>
<tr>
<td>Fidelity measured</td>
<td></td>
<td></td>
<td></td>
<td>3.314 (1.437)</td>
</tr>
<tr>
<td>No</td>
<td>19</td>
<td>0.458** (0.468**)</td>
<td>0.309 (0.187)</td>
<td>0.608 (0.750)</td>
</tr>
<tr>
<td>Yes</td>
<td>12</td>
<td>0.282**</td>
<td>0.166</td>
<td>0.398</td>
</tr>
<tr>
<td>Measure of generalization</td>
<td></td>
<td></td>
<td></td>
<td>0.767 (0.594)</td>
</tr>
<tr>
<td>No</td>
<td>30</td>
<td>0.343** (0.380**)</td>
<td>0.251 (0.219)</td>
<td>0.436 (0.541)</td>
</tr>
<tr>
<td>Yes</td>
<td>1</td>
<td>0.687</td>
<td>-0.076</td>
<td>1.450</td>
</tr>
<tr>
<td>Follow-up measure</td>
<td></td>
<td></td>
<td></td>
<td>0.018 (0.001)</td>
</tr>
<tr>
<td>No</td>
<td>21</td>
<td>0.345** (0.389*)</td>
<td>0.244 (0.218)</td>
<td>0.447 (0.560)</td>
</tr>
<tr>
<td>Yes</td>
<td>10</td>
<td>0.361 (0.382)</td>
<td>0.150 (-0.004)</td>
<td>0.572 (0.768)</td>
</tr>
</tbody>
</table>

*p<.05, ** p<.01 for Qw

Overall, the results of this meta-analysis suggest positive outcomes in studies of social competence interventions and with a variety of social competence variables.
However, these effects were not identical for children with every type of special need studied, nor were they similar for each of the types of intervention used. Furthermore, a significant degree of unexplained variability in effects remains across nearly all of the variables of interest in this study. These findings will be explored in greater detail in the chapter to follow.
CHAPTER FIVE
DISCUSSION

Introduction

There is little doubt as to the importance of social competence and its influence on
development, achievement, and quality of life. But social competence is a broad term,
defined and conceptualized in a variety of ways. Over the past several decades, interest
in the social competence of children has increased, resulting in persistent attempts to
clarify the definition of this term and develop reliable methods of assessing it. Another
outcome of this increased interest has been a body of research within which attempts
have been made to increase the social competence of children, particularly those who are
at risk for social failure and other developmental problems. These risk factors include
poverty, abuse/neglect, emotional and behavior problems, and developmental
delays/disabilities.

A failure to develop minimally competent social behaviors can divert children
onto developmental pathways that take them further away from social competence as
time passes. Since early childhood is a period when major early developmental
milestones in social development appear, and when the effects of social failures begin to
take their cumulative toll, interventions during this period have been increasingly
recommended, implemented, and evaluated over the past few decades.
Researchers and practitioners examining the effects of social competence interventions for younger children have used a wide range of methods and analytical approaches, all under the assumption that, as a result of systematic intervention, these children can learn the types of behaviors (and behavioral patterns) necessary for success as socially active individuals. These studies have produced varied results, and the authors of previous research syntheses have encountered some challenges in categorizing a diverse body of studies (Vaughn, 2007). The purpose of the present study was to examine the effects of these interventions across all of the available studies focusing on preschoolers with disabilities and risk factors in order to draw conclusions about their features and effectiveness.

These objectives were unique for the following reasons: first, meta-analysis has focused on studies of older children and younger typically-developing children, as well as those with autism. Children with other disabilities and risk factors have not been examined systematically since 1994. Studies have focused on a wide range of settings (including universities, laboratory settings, and other specialized environments), but those focusing exclusively on interventions done in schools or centers (where they are more feasible for practitioners to provide) are less common. Furthermore, younger children have often been neglected as a distinct group, disappearing into studies of older children that fail to examine them as a unique group. The following chapter provides a summary of the findings of a systematic search of the literature and an analysis of the outcomes of this meta-analysis.
Features of this literature base

Initially, a comprehensive search of the literature was conducted in order to locate eligible intervention group studies; this included electronic databases, hand searches of relevant journals, and follow-up searches of bibliographies and authors’ names. Articles were screened for inclusion by an examination of titles and abstracts, and then coded by two reliable raters using an established protocol. The intervention studies included in the formal analysis focused on preschool-aged children with identified disabilities or other factors placing them at risk for social failure or rejection. Studies published between 1965 and 2008 were included if they involved school-based or center-based interventions specifically chosen or designed to improve participants’ social skills/competence. They were also required to include a control group and a dependent measure of social competence as perceived by teachers. Studies of children with autism spectrum disorders were excluded from the present study for several reasons. First, this group is recognized as having significant and persistent difficulties with the development of social relationships. Therefore, intensive social skills instruction is essential to these children and must follow them into middle childhood and beyond, as many prior studies have established. Next, these children have repeatedly been studied as a distinct group both in intervention studies and in meta-analyses. In many cases, children with more severe autism have been included. As a result, the picture is already much clearer as to if, how, and why these interventions work in that population. Children with developmental delays or with milder forms of autism are more likely to be participants in studies of diverse inclusive classrooms, and these were included in the present study as well. While
children with other more severe disabilities were also included, the children in these
groups are often more likely to be included in general education classrooms or blended
early childhood programs, and deficits in social interaction are not necessarily a primary
symptom. The present study focused on children for whom social competence deficits
are a risk, concern, and/or consequence of having a disability rather than assumed life-
course persistent characteristic.

Electronic searches located most of the included studies which, in the end,
covered the time period from 1970 to 2008, as no studies published between 1965 and
1969 were located. Examinations of literature reviews and other meta-analyses, as well
as author searches, were done in order to locate earlier studies of younger children via
follow-up on authors and bibliographies. These strategies failed to yield any earlier
studies. Some question therefore remains as to whether additional relevant studies
remain unearthed.

While hand searches proved to be redundant due to the exhaustive electronic
searches, they were nevertheless successful in locating many single subject design
studies. In fact, the number of single subject design studies that passed initial screening
was over three times that of included studies with group designs. Clearly, single subject
studies comprise the majority of social competence intervention studies for young
children with special needs. These warrant close examination and will be examined in a
follow-up study.

As a result of an increase in publications focusing on young children over the
period of time under study, the period of 1998-2004 was covered disproportionately here.
Still, the literature appeared to follow a thematic progression during the broader time period. Many earlier articles addressed the need to identify the degree of social competence of various groups of children. Next, a focus on the detection of differences between typical children and those with disabilities emerged. A simultaneous general trend was also identified in which the populations of interest were initially more likely to include only children with severe disabilities and/or mental retardation. Through the 1980’s and 1990’s, as federal law was expanded and refined relative to early intervention and early childhood special education, research expanded to include children with developmental delay, milder forms of developmental disability, and risk factors such as poverty and neglect. As a result, interventions evolved from intensive strategies designed for less diverse groups of children with particular impairments to a variety of strategies, settings, and levels of intensity for an increasingly diverse population.

The initial passing of P.L. 94-142 (the Education for All Handicapped Children Act of 1974), now referred to as IDEA (Individuals with Disabilities Educational Improvement Act), represented the advent of specialized services as we now know them. As evidenced by the literature, this legislation fueled attempts to first identify differences among increasingly diverse children entering the education system. Intervention studies focusing on social, emotional, and behavioral competencies represented a ‘next logical step’ that followed some years later. The fact that children aged 3-5 were not originally covered under the federal legislation certainly may have served to further shift initial emphasis toward intervention research for older children. As interest in early
intervention increased (both a cause and outcome of its eventual inclusion in federal special education law), so did empirical research focusing on this population. At the same time, if consistent themes are infused throughout the time period under study here, they are as follows:

1. the (still ongoing) search for a consistent definition or social competence and a model for explaining how, when, and where it develops in young children;
2. the development, validation, and application of tools to measure social competence, as well as continued attempts to address measurement issues (e.g., sensitivity and reliability) in light of changing and expanding definitions of the construct;
3. the development and implementation of various intervention strategies for improving a range of social behaviors in preschool- and elementary-aged children (comprising the body of research under study here).

An argument may be made that some of the goals referred to above were achieved. As illustrated in the forest plot in Appendix C, earlier studies yielded, in some cases, effect sizes that were quite large. However, the variability of obtained effect sizes from earlier studies is quite dramatic, ranging from 1.565 (Dougan, 1999) to -0.667 (McCabe, 1998). During the period between 1999 and 2009, however, effect sizes were much less variable, ranging from 0.108 (Han, 2005) to 0.705. No negative effect sizes are present in these later studies. One possible explanation for this is a decrease in the amount of error in individual studies, perhaps through increased precision of
measurement, a better match of intervention strategies to participant needs, or other factors. This inference is difficult to test, however, given the heterogeneity and overall small number of studies.

Features of included studies

The present study consisted of 25 journal articles and dissertations reporting the results of studies conducted in the United States. The authors representing the majority of studies of young children were psychologists and child development specialists. Authors from the areas of education, public health, public policy, and social work comprised a smaller portion of the researchers. Given the need to educate increasing numbers of preschool-aged children in the least restrictive environment (as well as the frequency with which these studies took place in preschool classrooms), increased involvement on the part of educators in research taking place in school settings could certainly be beneficial.

In most cases, quasi-experimental designs were used in these types of studies. While the strictest controls are not possible in such settings, efforts were typically made to reduce the potential effects of non-equivalence of treatment and control groups through random assignment or clustering within existing programs or classrooms. While internal validity presents an interpretive problem across many of the studies, the research settings are representative of the classrooms and programs in which these types of interventions are most implemented and needed. In fact, preschool and Head Start classrooms were the most frequently used research settings, with over half of participating children receiving interventions there. Head Start classrooms have also been frequently studied, while day
care centers and public elementary or laboratory schools remain essentially unaddressed in this literature. Given that a great number of these interventions involved classroom teachers in their delivery, indicators of the potential for utility in clinical settings are favorable.

This research has focused mostly on children at risk who live in large urban/metropolitan areas. While a smaller number of children from suburban settings have been studied, rural populations remain conspicuously absent. Not a single study examining the effects of social competence interventions on rural preschool children with special needs has been published in over 40 years of research on this population. If these children have unique needs, profiles of socially competent behavior, and/or patterns of response to intervention, then they are yet unidentified. A related issue in published research is that of missing or unreported data. Given that the research context (urban, metropolitan area, suburban, rural, or combination) could not be determined for approximately 30% of participating children, and that socioeconomic status could not be determined for nearly two-thirds of the samples, the questions of how and to whom any results might be generalized remains difficult to answer.

A total of 2019 children (57% of whom were male) participated in the 25 studies included in this synthesis. This included 976 children with disabilities who received social competence interventions. Ethnic diversity was a claim made by the majority of researchers, with the primary source of that diversity stemming from the participation of African-American children. However, nearly half of participants were of indeterminate ethnicity due to insufficient data.
More consistently reported were the developmental challenges faced by participants. The majority of this research has been done using at-risk preschoolers rather than those with identified disabilities or delays. Researchers reported the frequent presence of poor social skills, low interaction rates, and behavior problems among these at-risk children, indicating that their vulnerability to social failure is viewed as comparable to that of children with other disabilities. They also represent a diverse group, and the fact that they have primarily been examined in preschool and child care settings indicates that this group of studies does, at least, focus on a population of children in need in settings where they are most commonly served. The potential to address the research-to-practice gap is, in this sense, enhanced. Along with children with emotional disorders, at-risk children account for three-quarters of all studied children, with the remainder consisting of those with speech and language disorders of those with hearing impairment. Children with other types of disabilities (developmental delay, genetic disorders, visual impairment, physical disabilities) have not been studied as distinct groups but have instead been included in diverse groups accounting for a smaller proportion of the treated participants.

While little may be said about the effectiveness of interventions for any one of these groups, their potential for assessing their potential in classrooms of diverse children is greater. Given previous findings for some of these groups, however (e.g., the consistent finding that children with speech and language delays/impairments engage in significantly fewer conversations that typical children), the precise role of intervention in addressing their social competence remains unclear.
The research question in the present study stemming from study features (*How is social competence operationalized in group studies examining preschoolers with special needs?*) requires some discussion of social competence measurement and its associated challenges. While a host of dependent variables was present in this research base, their primary emphasis was the improvement of children’s overall social skills and/or competence. These variables were also represented by only a handful of measures.

Social competence measures in included studies consisted primarily of norm-referenced rating scales completed by participating children’s classroom teachers. Nevertheless, the selection of an appropriate (and consistent) measurement from which to estimate treatment effect proved to be challenging. Although social competence/social skills served as the primary focus of these studies, social competence itself was often only assessed with one instrument or various subscales of an instrument (e.g., Child Behavior Checklist). In the absence of a clear rationale for assessment in these studies, questions remain as to whether so many measures were necessary, particularly in light of small treatment effects. Measures of social competence and social skills do exist and were frequently used here. They included the Social Skills Rating System (Gresham & Elliot, 1990) the Social Skills scale of the Preschool and Kindergarten Behavior Scales (Merrell, 1996), and the California Preschool Social Competence Scale (Levine, Elzey, & Lewis, 1969). Each of these measures has accumulated some evidence of both validity and reliability, which is an important step in the process of addressing the fact that issues with instrument sensitivity can be a problem in the detection of changes in young children’s social competence. But these measures are, of course, standardized and some
question exists as to their appropriateness for use with children with a range of
disabilities.

Perhaps the greatest limitation of conceptualization of social competence here is a
failure to adequately assess or incorporate contextual variables and caregiver perceptions.
While a handful of studies did include caregiver perceptions, the vast majority did not,
making any summative statement about changes in children’s behavior outside of the
research context difficult to make. The failure to consistently address caregiver
perceptions of social competence also appears to reflect an ignorance of the importance
of caregivers in education and development. Nevertheless, studies including parent
measures have been conducted and will be examined in a follow-up study that will also
address home-based and family-mediated intervention strategies with admittedly broader
goals than improving social competence in isolation.

Figure 2 represents one model designed to illustrate more comprehensively the
diverse influences on young children’s social competence (Whitehurst & Lonigan, 1997).
While school and center based interventions are clearly designed to address classroom
and teacher-related variables, as well as influencing peer relationships in school, the
persistent question of their cultural appropriateness remains unaddressed, as does the role
and responsibility of caregivers. Future intervention studies must address these factors
(e.g., by working with local stakeholders to assess the cultural appropriateness of
intervention activities and materials) in order to cover more comprehensively the various
direct influences on social development and to match interventions to needs. In none of
the included studies was the topic of cultural appropriateness addressed relative to the
choice, development, or implementation of these interventions, nor in the choice of measurement tools.

Figure 2. Whitehurst & Lonigan’s (1997) Model of Influences on Social Competence

If social competence is indeed hierarchical, contextual, and situated within key relationships, then a model for assessing social competence should include measures at each level and from each key individual, and the conceptualization of competence assessment should be linked more directly to this broader notion of competence. The use of assessment strategies that are linked to clearly defined models of competence remains a key need in this field. In particular, assessment that focuses on the success in attaining...
social goals and matching one’s behavior to social context would better represent some notions of early social competence (Renshaw & Asher, 1983; Rose-Krasnor, 1985).

Features of the social competence interventions

The second research question under investigation in this meta-analysis was: *What does existing evidence suggest regarding the effects of social competence interventions?* As discussed previously, there was little variability in the models of social competence intervention studied during this time period. Nearly all of the included studies used teacher-mediated social skills instruction to produce change. These activities were embedded into the classroom curriculum or added on as a form of curriculum enrichment, and follow-up was then typically provided during children’s play. 21 of the 25 studies used this approach, but while they shared an overall structure, they inevitably varied in duration, intensity, and emphasis. Still, the overwhelmingly preferred approach to addressing social competence in these studies was to provide social skills instruction during group activities or circle time over a period of months. These instructional activities were often designed around particular groups of social skills or followed the scope and sequence of a formal social skills curriculum. Most commonly, they continued for either 1-to-3 or 7-to-9 months. In other words, they tended to either span the length of an instructional unit, a season/quarter, or the entire school year.

Overall, interventions produced a small-to-moderate effect in teacher-reported social competence of young children with special needs. In this sense, these interventions appear to be successful. More specifically, the teacher-reported overall competence of the children who participate in these interventions is higher than that of
comparable groups of children who did not. Despite widely varying treatment effects, contexts, and populations, these interventions have served to increase a vital group of skills in children at high risk for long-term negative outcomes. This is an encouraging finding and reinforces the need to direct increased instructional planning and classroom time to the development of young children’s social competence. These findings were also consistent overall with those of previous syntheses. The Beerman (1994) meta-analysis reported an overall effect size of 0.45, which is similar to the overall effect of 0.348 found here. Meta-analysis was not attempted in the Vaughn (2003) study, but moderate-sized effects were nevertheless reported for studies involving social skills instruction for young children with disabilities.

Other important questions regarding how the goal of addressing social competence in this population should be accomplished remain unanswered. Furthermore, the question remains as to whether the effect is large enough to increase young children’s quality of life, especially in light of the absence of measures of generalization, follow-up and caregiver perceptions. Nevertheless, it may be argued that even a small effect may be sufficient to produce much greater benefit over time. Just as children who experience early social failure veer from a more typical developmental trajectory, children who reap early benefits of such interventions are potentially returned to a more adaptive trajectory and better outcomes overall. For this reason, additional longitudinal research and an increased focus on post-intervention follow-up measures are necessary.

A few very brief interventions (two weeks or less in duration) were represented in this group of studies, and they yielded the largest overall effect size. However, only two
widely disparate effects are represented. Brief interventions of two weeks to one month in duration were included, and these did not prove to be effective overall. Again, however, this group was comprised of only two studies. For none of other duration categories (which included interventions from one to nine months in duration) did the overall effects on social competence vary significantly. Programs that lasted 1 to 3 months yielded approximately the same effect size (on average) as those which lasted for 7 to 9 months.

While it is tempting to conclude that briefer programs might be more cost-effective in that they produce similar effects to those of longer programs, unfortunately the picture is not so clear. The lack of follow-up measures (or other indicators of study quality, such as treatment integrity) makes it difficult to explain similarities in degree of outcome. Poorly delivered interventions might decrease the effectiveness of long-term interventions, thus leading to effects that appear similar to shorter-term curricula. Conversely, shorter-term interventions might produce dramatically greater treatment effects that wash out in comparison to long term interventions due to factors associated with treatment integrity. It may also be the case that long-term interventions reach a peak of effectiveness at a certain point during the school year, after which these effects begin to drop off. Many scenarios are possible, and the heterogeneity in this small group of treatment effects unfortunately remains unexplained. At the very least, however, it may be argued that insufficient support exists for the use of interventions of 1 to 3 months in duration for young children, as they are the only studies in which a negative effect was found.
Other types of social competence interventions remain understudied. While three studies included behavioral approaches that prioritized reinforcement/redirection over formal instruction, and one utilized environmental arrangement to increase social interaction, it is clear that social competence interventions for preschool-aged children have been almost exclusively defined as instructional activities or curricula including formative and summative assessment of overall competence in the classroom. For nearly half of treated children, these interventions lasted for close to an entire school year. Briefer interventions one to three months in length were the next most common, suggesting that for this population, a substantial investment of time and intensity was necessary to produce an effect, particularly since interventions of less than a month in duration were rare. The exception to this finding is the one very brief intervention study that produced a large treatment effect. While this is hardly surprising given what is known about the social difficulties faced by children with disabilities, it is surprising that longer interventions that spanned up to an entire school year produced overall effects that were no different from those of the one-to-three month interventions.

A limited definition of social competence would certainly fail to capture many of the key variables necessary for understanding these complex social systems. But a broader question is also raised as to whether a one intervention fits all philosophy is likely to maximize intervention effects on dependent variables of interest, regardless of definitions of competence. Since the groups under study are usually quite diverse, it stands to reason that diverse approaches to instruction (or at least locally evaluated ones) would need to be considered. Furthermore, previous research in this area has
demonstrated that the relationship between interventions and competence is complex. If an intervention serves to increase the frequency of social interaction in a classroom, but this is perceived by a teacher as more chaotic as a result of increased conflict and/or noise, then teachers’ perceptions of competence would be less predictable. However, this does not mean that more is more when it comes to designing interventions. A combined intervention that included features of all of the other intervention types was the only type to produce a negative treatment effect. This suggests that it may be the case that interventions must be selected carefully and targeted to the needs of the specific population.

A related and mostly unaddressed issue in social competence research is that of study quality. First, researchers have either failed to address or to report measures of treatment fidelity in the majority of included studies. Future research must address this problem, especially in light of findings that teachers find it difficult to implement social skills interventions in their classrooms and require ongoing support in order to increase their self-efficacy. Without consistent reports of treatment fidelity, study results are more difficult to translate into practice. In particular, valuable information about challenges to implementation is lost, and an opportunity to address the research to practice gap is missed.

Generalization and maintenance are also areas of missed opportunity and have not been sufficiently addressed in this body of research, as the majority of included studies failed to include these features as well. As a result, the previously mentioned question regarding the impact of these interventions on the quality of children’s lives becomes
even more difficult to answer. Furthermore, the question of whether shorter vs. longer interventions are necessary to produce substantive overall change (which is highly relevant in educational settings where limited resources and prioritization of curricular emphases must be considered) is one that future studies should address.

The next questions addressed in this study were as follows: *Does variation exist in the effects of these interventions?* and *If variation exists, can it be explained by intervention type, participant characteristics, or other study features?* Given the small size of this research base and the variety of instruments, conceptualizations, and interventions used, as well as the findings of previous syntheses, the heterogeneity of effect sizes found here is hardly surprising. Hypothesized moderators were examined, including publication period and a host of study features discussed in the preceding sections. None of the moderators (or their component categories) served to explain heterogeneity of effect sizes.

Publication status and time period were examined first. While published studies produced an overall effect (0.421) larger than those of unpublished studies (0.273), this difference was not significant. Time period was predictive of the number of social competence intervention studies, but not their effects. In fact, no significant differences in effects across the time periods following each of the IDEA reauthorizations were found. This is likely due to the overall variability in effect sizes over much of the time period under study, as well as other sources of unexplained variability.

The same was true for the types of special needs addressed. While the effects of studies were heterogeneous, this could not be explained by the types of special needs of
participating children. This is undoubtedly due not only to the diversity of these samples, but also to the limited number of studies. In fact, only three studies focused on children with hearing impairments or with speech/language issues. In the case of both of these groups, overall effects were negative (-0.050 and -0.079 respectively), indicating that interventions that effectively specifically address the social competence of these populations of young children do not have a research base. Effect sizes for children with emotional/behavior problems (0.432), those at risk (0.388) and those in diverse groups (0.429) were all similar.

In terms of the forms of social competence assessed in these types of studies, overall ratings of either social skills/competence or cooperative play behavior were used in nearly all included studies. Measures of social problem-solving and emotional knowledge were used in a small number of studies, and the effect size on these types of dependent variables was no different from that of the other competence variables. One interpretation of this result is that the interventions have a similar effect across many types of competence variables, but factors such as heterogeneity and a limited number of studies using social problem-solving or emotional knowledge undermine such definitive conclusions.

Limitations

The present study, while broad in scope, nevertheless suffers from several significant limitations that must be taken into account when considering its findings. First, while broad search criteria and an exhaustive screening process were used, a relatively small number of studies were located. The possibility exists that identified
gaps in the literature base are actually the result of gaps in the search strategy employed here, particularly where earlier studies are concerned. At the same time, however, the focus here was on interventions in the types of educational settings where which young children frequently spend time, and other researchers (e.g., Schneider & Goldstein, 2008) have identified research conducted in these natural environments as an area of need. Too often this research has been conducted in university, clinic, or otherwise controlled settings that are difficult to replicate. As a result, limited external validity and a continued research-to-practice gap remain as risks. The small number of included studies is related to this narrow focus. It should also be stated that none of the previous syntheses of this research base included studies from the period of 1965-69 either.

Next, competence as measured in studies has not been conceptualized as the complex set of contextually-situated interactions, experiences, and perceptions that it is. Qualitative differences may exist that behavioral measures fail to capture. For example, no difference in frequency of social play or aggressive behavior, but aggressive themes may be present (Darwish et al., 2001).

Complex relationships among variables

Physical and relational aggression are related, but this relationship may be moderated by age and overall social skills. For example, Carpenter and Nangle (2006) found (in a sample of Head Start children) that preschoolers who are more physically aggressive may be more likely to exhibit relation aggression as well, but only when their overall social skills are closer to average; in contrast, children with lower overt aggression tended to exhibit lower relational aggression regardless of social skill level.
This may be the place to discuss publication bias, the ease of locating published studies, efforts to include unpublished ones, how many were eventually included, and whether the effect size for those studies differed from the published ones.

Implications and areas of future research

The findings of the current investigation suggested that adult-mediated instructionally-based social competence intervention can have a significant positive effect on the social competence of young children with special needs when offered in naturalistic settings. Given that instructional approaches are the most widely studied, and that these may be integrated into existing classroom activities across a wide variety of settings, the potential for their utility in inclusive classrooms is great. What remains to debate is whether they produce effects across contexts that are long-lasting and that make an impact on meaningful social behaviors. Studies examining these factors are greatly needed, as well as ones that include the perspectives of peers and caregivers within a more comprehensive and culturally situated model of competence.

A crucial step in capturing a full picture of this intervention literature must involve further use of meta-analytic techniques. Specifically, while the search procedures for the present study were designed to capture a variety of research designs, only studies using experimental and quasi-experimental designs with a comparison group were included. As a result, a significant portion of relevant social competence intervention studies were excluded and set aside for subsequent examination. In fact, the proportion of studies using single-subject design is large enough that they offer an equally important and comprehensive view of social competence intervention research
for young children with disabilities. Synthesizing single-subject designs presents certain methodological and analytical challenges; in particular, selecting a reliable metric for effect size that is meaningful (and comparable) across vastly different studies, adequately sensitive to change, and inclusive of widely varying studies presents a challenge (Wendt, 2009). However, an examination of these studies through the lens of meta-analysis is not only warranted, but an essential next step in charting a path forward. Single-subject designs may appear more comprehensible, and replicable to early childhood professionals, and they hold potential for identifying causal relationships between interventions and outcomes. Furthermore, they are frequently used with populations such as children with lower incidence disabilities who have been neglected in group studies. Their synthesis might result in a clearer set of strategies for reducing the research-to-practice gap in this field. It is also possible that some of these single subject studies include children from populations underrepresented in (or absent from) this study. In particular, the role of these interventions in meeting the needs of children who live in rural settings remains unclear.

A final important step in this area of research involves forging stronger connections between models of intervention and contemporary models of service delivery. In particular, the role of social competence interventions in response-to-intervention models (which emphasize a tiered approach to universal, targeted, and intensive strategies to address academic and behavioral problems) is still elusive in light of the findings here. For instance, while behavioral approaches complement this framework, they have been utilized in only three studies, so their effectiveness has not yet
been systematically demonstrated. Intensive strategies are by nature individualized, so a process of matching intervention features with unique needs is also still needed. Brown, Odom, & Conroy’s (2001) hierarchical model of social skills intervention is useful for this purpose, in that it organizes common approaches as classroomwide (universal), naturalistic (targeted), and explicit (intensive). Considering available interventions through this three-tiered lens is an essential step in aligning practice with federal law. However, the ways in which such a framework applies to young children with special needs is not so clear. At-risk children in particular might fit at any of the tiers based upon instructional, classroom, and teacher variables as well as their own behavioral repertoires. Alternatively, children with emotional and behavior problems would conceivably require tier 3 support in order to function at all in an inclusive setting. Ultimately, the present study illustrates that social competence interventions require considerable planning and effort to implement and sustain. In fact, when compared to the tiered model in Figure 2, these interventions appear to be significantly more intensive than some of those identified as Naturalistic or Explicit. In other words, the tiers of this model need closer consideration in light of individual needs, classroom structure, and especially the intensity and duration of intervention. In this sense, social competence curricula might actually represent the most explicit and intensive types of interventions available for diverse inclusive classrooms. A closer look at single subject research will also assist in better organizing this model to reflect the reality of inclusive settings.
Siperstein & Favazza (2009) identify four pathways for expanding research and education, a process they refer to as placing children at promise for future social success rather than viewing them as at-risk for failure. These pathways include an expansion of models for understanding social competence, an attempt to reach greater numbers of children, increasing evidence-based practice, and increasing the number and strength of home-school partnerships. The present study certainly serves as reinforcement that each of these goals is highly relevant to this literature base. By emphasizing and building upon essential competencies in all children and using an ecological approach to understanding how their social behavior operates within familial and cultural
frameworks, collaborative efforts to enhance development may meet with greater success.

In the end, the true importance of early intervention in this population does not lie in the possibility of improving social competence in the short term. Rather, in the face of disabilities with such a strong potential for corrosive and debilitating negative effects, interventions such as these may serve as early course corrections to the learning curve (Thompson, 2007). In this sense, even small effects on intervention groups may represent the first in a series of cumulative effects that improve the social functioning of individuals with disabilities over their lifetimes via a cycle of increased functioning, active participation, learning, and eventually self-awareness and self-determination.
APPENDIX A:

META-ANALYSIS DATA CODING INSTRUMENT
SECTION A

BIBLIOGRAPHICAL INFORMATION AND SCREENING

A1. Study ID# __ __ __ __

A2. Coding Date __ __ - __ __ - __ __ __ __

A3. Coder initials __ __ __

A4. Primary author (LN, FI)

A5. Bibliographic info in APA format:

A6. Year of publication __ __ __ __

A7. Does study measure social competence (or component skill) as an outcome?
   1. yes
   2. no (STOP)

A8. Is the focus of this publication an intervention intended to increase the social competence of young children?
   (DV might not necessarily be identified as social competence – social behavior, social language, interaction are all appropriate)
   1. yes – increasing SC is stated as a primary goal
   2. yes – SC is a primary construct used to operationalize or measure the stated primary goal (e.g., participation, achievement)
   3. yes – as a secondary outcome
   4. no (STOP)
   99. cannot tell

A9. Was this study conducted in North America?
   1. yes
A10. Where was this study conducted?
   1. Early intervention
   2. Preschool
   3. Head Start
   4. Day care
   5. Elementary school
   6. other: ________________________________ (STOP)
   (e.g., residential facility, home, or laboratory setting)
99. cannot tell

A11. Indicate the type of paper/study below:
   1. outcome/program/intervention evaluation (CONTINUE)
   2. review of social competence outcome studies  (STOP)
   3. position paper, editorial, book review  (STOP)
   4. guidelines for treatment or intervention (STOP)
   5. qualitative research (STOP)
   6. other: ________________________________  (STOP)
99. cannot tell

A12. Indicate the source of the paper below:
   1. peer-reviewed journal
   2. dissertation
   3. technical report
   4. other: ________________________________
99. cannot tell

A13. Indicate the type of source utilized to access the publication:
   1. electronic database
      Specify________________________________________
   2. electronic book search
   3. web search
      Insert URL:
      ___________________________________________
   4. reference in a book or study
      Specify________________________________________
   5. peer or expert
      Specify________________________________________
   6. other
      Specify________________________________________
99. cannot tell

A14. Publication (listed publications are examples)
1. Psychological journals:
   - Jnl. of Primary Prevention
   - Jnl. of Clinical Child/Adolescent Psychology
   - Journal of instructional Psychology
   - Jnl. Of Abnormal Child Psychology
   - Jn. Of Emotional & Behavioral Disorders
   - Behavior modification

2. School psychology journals:
   - Journal of School Psychology
   - School Psychology Quarterly
   - Psychology in the Schools
   - School Psychology Review

3. Counseling and Social Work publications
   - Family Relations

4. Specialized
   - Journal of Visual Impairment and Blindness
   - Language, Speech, and Hearing Services in the Schools
   - Volta Review

5. Development
   - Child Development
   - Developmental Psychology

6. Early Childhood Education
   - Topics in Early Childhood Special Education

7. Dissertation

8. Research/technical/government report

9. other
   - Specify______________________________
SECTION B
CONTEXT OF STUDY

B1. Primary author’s discipline: [AUTHDISC]
   1. education
   2. psychology
   3. child development
   4. speech/language pathology
   5. social work
   6. other: _________________________________
   99. cannot tell

B2. Terminology used to describe competence problem: [COMPTERM]
   1. behavior/problems/disorder
   2. social interaction/isolation/withdrawal
   3. general, e.g., ‘disabilities’
   4. social competence/social skills or lack thereof (incl. specific social skills)
   6. other: _________________________________

B3. Insert actual language used by the authors to describe [PROBDEF]
   the general issue/global dependent variable being addressed:

_____________________________________________________________________
_____________________________________________________________________

B4. Research setting [SETTING]
   1. inclusive setting
   2. general education
   3. special education
   4. alternative
   6. other: _________________________________
   99. cannot tell

B5. Research location [LOCATION]
   1. urban
   2. suburban
   3. rural
   4. more than one of the above (i.e., ‘metropolitan area’)
   99. cannot tell
SECTION C
STUDY PARTICIPANTS

C1. Total N at beginning of study _________ [INITIALN]

C2. Total N at end of study _________ [FINALN]

C3. Race/ethnicity of participants – indicate predominant ethnicity [RACE]
   1. Caucasian
      Specify %_______________________________________
   2. African American
      Specify %_______________________________________
   3. Hispanic/Latino
      Specify %_______________________________________
   4. Other
      Specify %_______________________________________
   99. cannot determine

C4. Total Caucasian N _______ [NCAUC]

C5. Total non-Caucasian N_______ [NOTHER]

C6. Total % males__________ [MALES]

C8. Indicated socioeconomic status of majority of participants [SESCAT]
   1. Low (at or below poverty line)
   2. Working or lower middle class
   3. Middle class or above
   4. Combination
   99. cannot tell

Treatment group(s) for the overall study

C9. Disability categories represented [TXDISABIL]
   1. Intellectual/Developmental disabilities
   2. Visual impairment
   3. Hearing impairment
   4. Multiple/severe
   5. at-risk, incl. socially isolated or other risk factors as identified by authors)
   6. Speech/language
   7. Diverse group
   8. typical
9. abused/maltreated
99. cannot tell

Comparison group(s) for the overall study

C10. Disability categories represented  [COMPDISABIL]
   1. Intellectual/Developmental disabilities
   2. Visual impairment
   3. Hearing impairment
   4. Multiple/severe
   5. at-risk
   6. Speech/language
   7. Diverse group
   8. typical (STOP if C9 and C10 are both ‘8’)
   9. abused/maltreated
   99. cannot tell
SECTION D
INTERVENTION FEATURES

D1. What do the authors call the intervention? [TXNAME]

D2. Who delivered the intervention? [INTVNIST]
   1. teacher-mediated
   2. caregiver mediated
   3. peer-mediated
   4. teacher-mediated with caregiver component
   5. multifaceted program w multiple contexts incl. home
   6.
   7.
   8. experimenter
   99. cannot tell

D3. Program model (for children) [MODEL]
   1. environmental arrangement
   2. instructional (may involve reinforcement)
   3. behavioral (utilizes reinforcement/redirection only)
   4. other: ____________________________

D4. Treatment fidelity: measure reported, or comments included [FIDELITY]
   1. yes
   2. no
   99. cannot tell

D5. Duration of intervention [DURATION]
   1. up to 2 weeks
   2. 2 weeks to 1 month
   3. 1-3 months
   4. 4-6 months
   5. 7-9 months
   6. 10 months to 1 year
   7. more than 1 year
   99. cannot determine
## SECTION E
### METHODOLOGICAL FEATURES AND QUALITY

**E1. Type of design**
1. randomized controlled trials
2. quasi-experimental design
3. within-group pre-post test design
4. other: ________________________________
99. cannot determine

**E2. Method of assignment to treatment condition**
1. random after matching, stratification, blocking, etc.
2. non-random
3. no control or comparison group
4. other: ________________________________
5. random within a school, center, or district
99. cannot determine

**E3. Comparison of pretest differences**
1. none made
2. judged to be similar
3. no statistically significant differences
4. other: ________________________________
5. no comparison group
6. one or more significant differences noted

**E4. Was attrition greater than 20% in either or both groups?**
1. no
2. yes, comparison or control only
3. yes, one or more tx only
4. yes, in both
99. cannot determine

**Final Decision regarding this study**

**E5. Should this study be retained for further analysis?**
1. yes
2. no
99. unsure based upon information obtained up to this point
SECTION F
EFFECT SIZE

One SECTION F should be completed for each outcome variable.

F1. Study ID __ __ __ __ [ID]

F2. Outcome number ______ [OUTID]

F3. Insert author’s label for this outcome [LABEL]

Codes for Dependent Variable

F4. Construct measured [DV]
   1. understanding emotions
   2. conflict resolution/problem-solving
   3. impulse/inhibitory control/self-control
   4. attention/social attention
   5. overall social competence/social skills
   6. externalizing/problem behavior
      (e.g., aggression, explosive behavior)
   7. internalizing behavior e.g., anxiety, depression
      (except social withdrawal)
   8. social withdrawal
   9. cooperation/cooperative play/interactive play
      (includes solitary play as the poorest form of interactive play)
  10. frequency of social interaction
  11. independence/leadership/assertiveness/responsibility
  12. overall appropriate behavior
  13. overall inappropriate behavior
  14. other: _________________________________
  99. cannot determine

F5. Respondent or source of data [DVSOURCE]
   1. Parent or caregiver report
   2. Teacher report
   3. Independent observer
   4. Therapist (occupational, speech/language, etc.)
   5. Child
   6. other: _________________________________
   99. cannot determine or not reported

F6. Type of measure [MEASURE]
   1. Behavioral observation/observational measure
2. Rating scale/checklist/questionnaire
3. Standardized test
4. Direct assessment
6. other: _________________________________
99. cannot determine or not reported

F7. Focus of measure
1. Initiation behavior
2. Response behavior
3. Interactive behavior during play (e.g., competence, social skills, assertion, cooperation, etc.)
4. Conflict resolution
5. Overall level of competence/social skills
6. other (e.g., emotional understanding)
7. Behavior in general, incl. prerequisites such as attention (e.g., levels of appropriate or inappropriate out of play context)
99. cannot determine or not reported

F8. Is information regarding reliability and validity provided?  [RELIAB]
1. yes (e.g., interrater, internal consistency)
2. no
99. cannot determine or unclear

F9. Was data collected on generalization for this outcome?  [GENERAL]
(Direct measures should be used – multiple raters are not sufficient)
1. yes
2. no
99. cannot determine or unclear

F10. Was data collected regarding maintenance of treatment effects over time (follow-up)?  [FOLLOW]
1. yes (proceed to next item)
2. no
99. cannot determine or unclear

F11. How much time (in months) passed between the end of the study and the collection of follow-up data?  [FOLTIME]
99. cannot determine or not applicable
**Codes for Effect Size Statistic: Post-test**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>F12</td>
<td>n of treatment group for this effect size _______</td>
<td>[NTX]</td>
</tr>
<tr>
<td>F13</td>
<td>n of comparison group for this effect size _______</td>
<td>[NCOMP]</td>
</tr>
<tr>
<td>F14</td>
<td>Treatment group mean___________________________</td>
<td>[MEANTX]</td>
</tr>
<tr>
<td>F15</td>
<td>Comparison group mean___________________________</td>
<td>[MEANCOMP]</td>
</tr>
<tr>
<td>F16</td>
<td>Treatment group standard deviation_______________</td>
<td>[SDTX]</td>
</tr>
<tr>
<td>F17</td>
<td>Comparison group standard deviation_______________</td>
<td>[SDCOMP]</td>
</tr>
<tr>
<td>F18</td>
<td>Treatment group standard error__________________</td>
<td>[ERRTX]</td>
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<td>F19</td>
<td>Comparison group standard error__________________</td>
<td>[ERRCOMP]</td>
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<td>F20</td>
<td>Effect size (if calculated)_____________________</td>
<td>[ES]</td>
</tr>
<tr>
<td>F21</td>
<td>Standard error of effect size___________________</td>
<td>[ESERR]</td>
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</table>

**Pre-test information**

<table>
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<tr>
<th>Code</th>
<th>Description</th>
<th>Code</th>
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</thead>
<tbody>
<tr>
<td>F22</td>
<td>Treatment mean (pretest)________________________</td>
<td>[PREMEANTX]</td>
</tr>
<tr>
<td>F23</td>
<td>Comparison group mean (pretest)___________________</td>
<td>[PREMEANCOMP]</td>
</tr>
<tr>
<td>F24</td>
<td>Treatment group standard deviation(pretest)______</td>
<td>[PRESDTX]</td>
</tr>
<tr>
<td>F25</td>
<td>Comparison group standard deviation(pretest)______</td>
<td>[PRESDCOMP]</td>
</tr>
<tr>
<td>F26</td>
<td>Treatment group standard error__________________</td>
<td>[ERRTX]</td>
</tr>
<tr>
<td>F27</td>
<td>Comparison group standard error__________________</td>
<td>[ERRCOMP]</td>
</tr>
</tbody>
</table>


F28. Treatment group for this effect size:  
Disability categories represented  
1. Intellectual/Developmental disabilities  
2. Visual impairment  
3. Hearing impairment  
4. Multiple/severe  
5. at-risk  
6. Speech/language  
7. Diverse group  
8. typical  
9. abused/maltreated  
99. cannot tell  

F29. Comparison/control group for this effect size:  
Disability categories represented  
1. Intellectual/Developmental disabilities  
2. Visual impairment  
3. Hearing impairment  
4. Multiple/severe  
5. at-risk  
6. Speech/language  
7. Diverse group  
8. typical  
9. abused/maltreated  
99. cannot tell  

F30. Was this effect meant to indicate an increase in a desired behavior/skill?  
1. yes  
2. no, it is meant to indicate a decrease in an undesired behavior or symptom  
99. cannot tell  

F31. How was effect size calculated?  
1. Reported by authors  
2. f-test  
3. t-test  
4. odds-ratio  
5. T/C group differences  
6. Pre-post differences  
7. Other”______________________________
APPENDIX B:

LIST OF FEATURES OF STUDIES INCLUDED IN THE META-ANALYSIS
<table>
<thead>
<tr>
<th>Author/Source, Program description</th>
<th>Participants</th>
<th>Disabilities represented</th>
<th>Time/Duration</th>
<th>Social competence outcome measures</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antia 1997 (journal article)</td>
<td>Preschool, kindergarten, and first grade students aged 2-3 to 6-3</td>
<td>All children were reported as “deaf/hard of hearing”</td>
<td>5 months of 20 min. sessions, occurring 2-3 times /wk</td>
<td>Behavioral observation of play types and interactive behaviors</td>
<td></td>
</tr>
<tr>
<td>Barkley 2000 (journal article)</td>
<td>Preschool children Classroom: N=79 T=37 C=42 Combined: N=82 T=40 C=42</td>
<td>All children were suspected of having emotional or behavioral problems/disorders</td>
<td>Multiple behavioral interventions timed over the final preschool year before kindergarten</td>
<td>Social Skills Rating Scale (SSRS, 1990); social skills subscale</td>
<td></td>
</tr>
<tr>
<td>Bierman 2008 (journal article)</td>
<td>4 year-old children in Head Start N=356</td>
<td>All children were at risk due to economic disadvantage</td>
<td>Social-emotional enrichment: 33 lessons, approx. 2 per week over 9 months Early literacy enrichment: Several lessons and activities per week over 9 months</td>
<td>Emotional understanding and social-cognitive skills: Assessment of Children's Emotional Skills (2004); Emotion recognition questionnaire (1988) Challenging Situations Task (1994) Social-emotional behaviors: Social Competence Scale (1995) Teacher Observation of Child Adaptation – Revised (1991) This study also included measures of learning engagement and early literacy. Only outcomes related to social competence were included in the present analysis</td>
<td></td>
</tr>
<tr>
<td>Bradley 1987 (dissertation)</td>
<td>Preschoolers aged 3-5 N=26 T=13 C=13</td>
<td>All children were enrolled in a preschool program for students with developmental disabilities</td>
<td>Instructional activities during five 10-minute sessions offered over five days</td>
<td>Observed behavior</td>
<td></td>
</tr>
<tr>
<td>Author/ Source, Program description</td>
<td>Participants</td>
<td>Disabilities represented</td>
<td>Time/ Duration</td>
<td>Social competence outcome measures</td>
<td>Comments</td>
</tr>
<tr>
<td>-----------------------------------</td>
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<td>----------</td>
</tr>
<tr>
<td>Colby Sharp 1981 (journal article) Interpersonal problem-solving training</td>
<td>Preschoolers aged 3:9-4:9  N=54  Impulsive/inhibited children:  N=12  T=8  C=4  Adjusted children:  N=25  T=10  C=15</td>
<td>All children were at risk due to economic disadvantage</td>
<td>Pull-out instructional program offered within preschool setting; 44 sessions of 15-20 minutes each, 4 per week over 11 weeks</td>
<td>Interpersonal problem-solving: Preschool Interpersonal Problem-Solving Test (PIPS, 1974)  What Happens Next Game Test (WHNG)  Classroom behavior (teachers): Hahnemann Preschool Behavior Rating Scale  Sharp Behavior identification Checklist</td>
<td>All participants were African-American</td>
</tr>
<tr>
<td>Dougan 1999 (journal article) Peer-mediated social skills instruction</td>
<td>Preschool-aged Head Start children  N=14  T=7  C=7</td>
<td>All children were at-risk due to economic disadvantage</td>
<td>Sessions occurred twice weekly for 20 minutes to an hour over 6 months</td>
<td>Coded behavioral observation</td>
<td></td>
</tr>
<tr>
<td>Fantuzzo 2005 (journal article) Peer-mediated, classroom-based intervention</td>
<td>Preschool-aged Head Start children  N=82  T=43  C=39</td>
<td>A combination of abused and non-abused children, all identified as the most socially withdrawn</td>
<td>15 sessions: 3 per week over 2 months</td>
<td>Amount and quality of social interaction: Interactive Peer Play via: Observational Coding System (1996), Penn Interactive Peer Play Scale (1998); Social Skills Rating System (SSRS, 2000)</td>
<td>All participants were African-American</td>
</tr>
<tr>
<td>Ferentino 1991 (dissertation) Social skills instruction</td>
<td>Preschool-aged children in a special education school  N=100  T (school) =34  C=33</td>
<td>Majority of students were speech-language impaired with a small number of students with visual, orthopedic, emotional, and multiple impairments</td>
<td>30 sessions: 30 minutes each over four months</td>
<td>Social competence: Vineland Adaptive Behavior Scales – Socialization Domain  Child Behavior Checklist  Comprehension subtest of the Wechsler Preschool and Primary Scales of Intelligence (WPPSI-R)  Social skills rankings (all teacher measures)  Sociometric scales (peers)</td>
<td>Included a school/home program comparison group, but only the school-based treatment/control comparison was used</td>
</tr>
<tr>
<td>Author/ Source, Program description</td>
<td>Participants</td>
<td>Disabilities represented</td>
<td>Time/ Duration</td>
<td>Social competence outcome measures</td>
<td>Comments</td>
</tr>
<tr>
<td>-----------------------------------</td>
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<td>-----------</td>
</tr>
<tr>
<td>Han 2005 (journal article)</td>
<td>4-5 year-old preschoolers N=149 T=83 C=66</td>
<td>All children were at-risk due to economic disadvantage</td>
<td>2-3 sessions per week over 9 months, including daily reinforcement</td>
<td>Social and emotional competence: Parent and teacher versions of SSRS; Child Behavior Checklist</td>
<td>Extensive multi-component model</td>
</tr>
<tr>
<td>Jakichuk 1976 (journal article)</td>
<td>Preschool children N=22 T=11 C=11</td>
<td>All children were at risk due to low social responsiveness and interaction rates</td>
<td>4 sessions: 5 min. each over 4 days</td>
<td>Positive social behaviors toward and from peers, as well as social interaction, all via behavioral observation</td>
<td>Multiple conditions were compared</td>
</tr>
<tr>
<td>Johnson 2000 (dissertation)</td>
<td>4 year-old preschoolers N=96 T=48 C=48</td>
<td>All children were determined to be ‘high risk’ without an explanation of this risk</td>
<td>32 sessions: 2 one-hour sessions per week for 16 weeks</td>
<td>Social problem-solving: Wally Child Social Problem-Solving Detective game (WALLY, 1990)</td>
<td>Observed classroom behavior: positive, negative, and cooperative play behavior</td>
</tr>
<tr>
<td>Keller 1974 (journal article)</td>
<td>3-5 year-old preschoolers N=19 T=10 C=9</td>
<td>T children were judged by teachers to be socially isolated</td>
<td>4 sessions: 5 min. each over 4 days</td>
<td>Behavioral frequencies: giving and receiving (+) social reinforcement (5 types)</td>
<td>Included 3-week follow-up</td>
</tr>
<tr>
<td>Kops 1999 (dissertation) Therapeutic playgroups</td>
<td>4-5 year-old preschoolers N=44 T=22 C=22</td>
<td>All children were determined to be at-risk due to behavioral issues and economic disadvantage but failed to qualify for SPED services</td>
<td>16 weekly sessions: 50 min. each</td>
<td>Social Competence and Behavioral Evaluation (SCBE), Social Competence scale</td>
<td></td>
</tr>
<tr>
<td>Lau 2005 (journal article) Teacher facilitation of social interaction during computer sessions</td>
<td>3-5-10 year-old preschoolers N=36 T=18 children with disabilities C=18 children w/o disabilities</td>
<td>Autism, CP, Down syndrome, Fragile X, and developmental delay</td>
<td>24 sessions: 8 min. each over 6 weeks</td>
<td>Interaction frequency and type: Teacher Impressions Scales (TIS, 1993); Social Interaction Observation System (SIOS, 1991)</td>
<td>Included fidelity measure. Study included four children with autism</td>
</tr>
<tr>
<td>Lowe Vandell 1982 (journal article) Instructional program with peer-mediation focusing on disability awareness and communication techniques</td>
<td>Preschool-aged children N=32 (16 children with hearing impairments, 16 hearing children) T=8 (HI) C=8 (typical)</td>
<td>Hearing impairment</td>
<td>15 sessions: 15-30 min. each, 1 per day over approximately 3 weeks</td>
<td>Interaction frequency and duration Frequency of initiating behaviors</td>
<td>Study was conducted in a laboratory school</td>
</tr>
<tr>
<td>Matson 1991 (journal article) Instructional social skills training</td>
<td>Preschoolers aged 4-5 N=28 T=14 C=14</td>
<td>Children with developmental delays, impaired speech and motor skills</td>
<td>12 one-hour sessions twice per week for six weeks</td>
<td>Occurrence of target behaviors: Positive social skills Negative social behaviors Social play</td>
<td></td>
</tr>
<tr>
<td>Author/ Source, Program description</td>
<td>Participants</td>
<td>Disabilities represented</td>
<td>Time/Duration</td>
<td>Social competence outcome measures</td>
<td>Comments</td>
</tr>
<tr>
<td>-------------------------------------</td>
<td>--------------</td>
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<td>--------------</td>
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<td>----------</td>
</tr>
<tr>
<td>McCabe 1998 (dissertation) Enhance Social Competence Program</td>
<td>Preschool-aged children Language- delayed participants: T=18 C=18</td>
<td>Specific language impairments</td>
<td>Instructional units integrated into classroom over 12-16 weeks</td>
<td>Social Skills Rating System (SSRS), Howes teacher ratings, and sociometric ratings from peers</td>
<td>All participants were African American children in preschools.</td>
</tr>
<tr>
<td>McKinney 1998 (journal article) Teacher-/Investigator-delivered social skills curriculum (Taking Part)</td>
<td>Children in day care aged 3:3-5:8 N=29 T=19 C=10</td>
<td>All children were judged to be at risk for underdeveloped social skills and social deviance</td>
<td>30 sessions: 45 min. – 1 hr. each over 15 weeks</td>
<td>Overall social skills and problem behavior: Parent and teacher versions of SSRS</td>
<td>All participants were African American children in day care.</td>
</tr>
<tr>
<td>Mize 1990 (journal article) Social skills training provided by author</td>
<td>4-5 year-old children in six day care and preschool classrooms N=33 T=18 C=15</td>
<td>All children were judged to be at risk due to low sociometric status and aversive behaviors</td>
<td>8 sessions: 30 minutes each over 8 weeks</td>
<td>Observed social skills and peer interaction: Observation scheme Social knowledge ratings: interviews</td>
<td></td>
</tr>
<tr>
<td>Odom 1999 (journal article) Four distinct models of intervention in different settings</td>
<td>Preschool children with a variety of disabilities N=98 C=18 EA=16 CS=19 PM=18 CM=21</td>
<td>Diverse groups including behavior disorders, Peer-mediation intervention utilized typically developing peers as controls</td>
<td>Interventions each took place over 2 months: EA: 6-10 min. play groups CS: 25 daily lessons followed by weekly 'boosters' PM: daily training and play groups CM: combination of the above</td>
<td>Frequency of observed interaction Observer Impressions Scale (OIS, 1990) California Preschool Competence Scale (CPSCS, 1969) Peer rating</td>
<td></td>
</tr>
<tr>
<td>Pettigrew 1998 (dissertation) Social stories with scaffolded social competence intervention</td>
<td>Children aged 3:3-5:6 in Head Start and preschool special education program</td>
<td>Specific language impairment</td>
<td>20 sessions: 20 minutes each over approx. 6-10 weeks</td>
<td>Social competence: Social Competence and behavior Evaluation (SCBE, 1995)</td>
<td></td>
</tr>
<tr>
<td>Shure 1979 (journal article) Interpersonal Cognitive Problem Solving training</td>
<td>Children in day care and kindergarten N=131 Nursery school group T=30 C=27</td>
<td>All children were at-risk due to economic disadvantage</td>
<td>Daily lessons: 20 minutes each over approximately three months</td>
<td>Social problem-solving: Preschool Interpersonal Problem Solving Tests (PIPS, 1974) What Happens Next Game (WHNG) Overall behavior: Hahnemann Preschool Behavior Rating Scale (HPSB)</td>
<td>All participants were African American.</td>
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<tr>
<td>Stafford Stoia 1997 (dissertation) Social and emotional comprehension program</td>
<td>Children aged 3:4-6:4 in a therapeutic nursery school</td>
<td>All children had emotional and behavioral difficulties</td>
<td>24 lessons, one per day over 5 weeks (session length unknown)</td>
<td>Social problem-solving skills: Social Problem-Solving Test (SPST-R, 1982) Also included affect labeling and affective perspective taking tasks</td>
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</tbody>
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APPENDIX C:
META-ANALYSIS RESULTS AND FORREST PLOT
RESULTS OF META-ANALYSIS AND FORREST PLOT

<table>
<thead>
<tr>
<th>Study name</th>
<th>Outcome</th>
<th>Std diff in means</th>
<th>Standard error</th>
<th>Variance</th>
<th>Lower limit</th>
<th>Upper limit</th>
<th>Z-Value</th>
<th>p-Value</th>
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<tr>
<td>1005 Keller</td>
<td>social competence composite</td>
<td>1.73</td>
<td>0.503</td>
<td>0.253</td>
<td>0.188</td>
<td>2.157</td>
<td>2.333</td>
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<td>1007 Jakubčik</td>
<td>social competence</td>
<td>1.145</td>
<td>0.035</td>
<td>0.404</td>
<td>-0.100</td>
<td>2.391</td>
<td>1.802</td>
<td>0.072</td>
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<tr>
<td>1036 Shure</td>
<td>interpersonal p-s</td>
<td>1.395</td>
<td>0.296</td>
<td>0.087</td>
<td>0.816</td>
<td>1.973</td>
<td>4.718</td>
<td>0.000</td>
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<td>1020 Colby Sharp</td>
<td>alt solutions stiffness</td>
<td>-0.19</td>
<td>0.439</td>
<td>0.167</td>
<td>-0.510</td>
<td>0.691</td>
<td>-0.268</td>
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<td>1009 Lowe</td>
<td>propofol versus propibactin</td>
<td>-0.677</td>
<td>0.514</td>
<td>0.264</td>
<td>-1.685</td>
<td>0.331</td>
<td>-1.317</td>
<td>0.188</td>
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<tr>
<td>1029 Bradley</td>
<td>sharing</td>
<td>0.325</td>
<td>0.393</td>
<td>0.153</td>
<td>-0.546</td>
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<td>1007 Maze</td>
<td>socioeconomic status</td>
<td>0.940</td>
<td>0.368</td>
<td>0.136</td>
<td>0.218</td>
<td>1.661</td>
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<td>1021 Forsterius</td>
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<td>1.408</td>
<td>0.273</td>
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<td>0.873</td>
<td>1.943</td>
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<td>1028 Mateen</td>
<td>social competence</td>
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VITA

Adam Kennedy was born and raised in the Chicago area. He attended Benedictine University, where he earned a Bachelor of Arts in Clinical Psychology in 1991. He then attended the University of Illinois at Chicago, where he earned a Master of Education in Early Childhood Special Education in 1996. He has worked as a special education teacher for children from birth through middle school age in specialized and inclusive settings. He began a career in higher education in 2000 and was accepted into the Ph.D. program at Loyola University Chicago in the fall of 2003. Currently, Adam is a school psychologist and Clinical Assistant Professor of Early Childhood Special Education at Loyola University Chicago. He lives in Chicago, Illinois.
The dissertation submitted by Adam S. Kennedy has been read and approved by the following committee:

Therese Pigott, Ph.D.
Associate Professor, Research Methodology
Loyola University Chicago

Meng Jia Wu, Ph.D.
Assistant Professor, Research Methodology
Loyola University Chicago

Lynne Golomb, Ed.D.
Clinical Assistant Professor, School Psychology
Loyola University Chicago

The final copies have been examined by the director of the dissertation and the signature which appears below verifies the fact that any necessary changes have been incorporated and that the dissertation is now given final approval by the committee with reference to content and form.

The dissertation is therefore accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy.

March 30, 2010
Therese Pigott
Date Director’s Signature