

**An Examination of the Social Networks of Children  
with Autism in the Inclusive Classroom**

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THESIS

Submitted as partial fulfillment of the requirements  
for the degree of Doctor of Philosophy in Special Education  
in the Graduate College of the  
University of Illinois at Chicago, 2012

Chicago, Illinois

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## **DEDICATION**

To my parents, Lois and Edward Power, who have instilled in me the notion that I can accomplish anything that I set out to do. And to my sister, Karen, and my nieces, Jessica and Kelli, who constantly asked, "When will you finally be done?" And to my brother, Kevin, who has made this whole journey possible through his endless support.

And especially to Julie Coplon for her incredible sense of guidance, love, compassion, and motivation. Without her, I would never have learned the true meaning of perseverance.

## **ACKNOWLEDGEMENTS**

I heartily acknowledge my chair, Rick Van Acker, for his support and direction during this process. I also want to thank my committee, Kim Lawless, Ward Weldon, Dan Maggin, and Susan Goldman for their support and assistance. Without the inspiration of Susan's classes and her ability to push my thinking, this paper would not be what it is. I thank you for enhancing my intellectual and social cognition! Special thanks also to Dr. George Karabatsos for his statistical advice.

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**LIST OF ABBREVIATIONS**

AA	African American
ADHD	Attention Deficit Hyperactive Disorder
AI	American Indian
AS	Asian
ASD	Autism Spectrum Disorders
Ath	Athletic
CDB	Cognitive Disorder Borderline
CI	Centrality Index
Col	Cool
Cop	Cooperative
DIS	Disability
Dis	Disruptive
EBD	Emotional Behavior Disorder
F	Female
Fri	Friendly
Ft	Starts Fights
Gst	Good Student
HL	Hispanic/Latino(a)
Hlp	Seeks Help
IEP	Individual Education Plan
Ldr	Leader
M	Male

**LIST OF ABBREVIATIONS (continued)**

nonASD	Students without Autism Spectrum Disorders
OHI	Other Health Impairment
OR	Odds Ratios
PDD-NOS	Pervasive Developmental Disorders-Not Otherwise Specified
Pop	Popular
REG	Regular/General Education; Students with no Identified Disabilities
S/L	Speech/Language impairment
SCM	Social Cognitive Mapping
SLD	Specific Learning Disability
SNA	Social Network Analysis or Social Network Assessment
SNC	Social Network Centrality
SST	Social Skills Training
ToM	Theory of Mind
Trb	Gets into Trouble
W	White/Caucasian

## SUMMARY

A multidimensional study of the social relations of students with Autism Spectrum Disorder (ASD) included in general educational classroom settings for more than 50 percent of the school day were examined. An extant data base was used that surveyed 20 students with ASD and their classmates in 14 third- through fifth-grade classes (N = 359) in a large Midwestern city. Through the administration of social cognitive mapping and peer behavioral assessments, data were gathered on four measures of social competence: peer relations, behavior problems, social skills and social cognition.

Findings revealed that the majority of students with ASD were identified as social isolates and characterized as rejected by their peers. The few students with ASD who were able to gain entry into a peer group tended to have higher rates of externalizing antisocial behaviors (e.g., gets in trouble, disruptive) and affiliated in peer groups that were characterized as being shy, asks for help and sad. Interestingly, the majority of the students with ASD that were socially isolated tended to be perceived by their peers with these same traits.

Social cognitive accuracy measures further revealed that children with ASD tended to be aware of the friendship networks within their classrooms but were not particularly aware of their own membership in their classroom's social network, regardless of their social status. Students with ASD also were not particularly aware of their antisocial externalizing behaviors when compared with peer consensus reports. The findings of this study suggest that social cognition may indeed be a mediating factor in developing peer relations.

## **I. INTRODUCTION**

### **Children's Social Functioning with Peers**

The importance of belonging to a social group and the influence that peer networks have on children has been shown to impact many aspects of their social, cognitive, and emotional development which often determines their current functioning and long term outcomes (Berk, 2000, Craig, 2000). In line with social-cognitive theory (Bandura, 1995), how children think and feel has been thought to be a mediating factor in determining their behavior, which then determines the quality and quantity of their social interactions. Their social interactions, in turn, contribute to subsequent changes in their cognitive, social, and emotional development. Thus, being able to develop healthy peer relationships and friendships are vital in children's development.

### **Social Competence**

Social groups are a natural part of school settings, a place where children spend the majority of their time in their early years. However, given that most school-aged children are consistently exposed to the same social networks for the same amount of time, difficulty in joining social groups is discerning. The discrepancies in gaining social group membership have been suggested to be a result of poor social skills, behavior problems, and impairments in social cognition (Vaughn & Hagar, 1994). It has further been suggested that such difficulties may lead to peer rejection. Peer rejection (i.e., how much a child is disliked by his or her peers) has been linked to a wide range of maladjustment issues that often continue into adulthood (Berndt, 2002; Broidy et al., 2003; Crosnoe, 2000; Nowicki, 2003). Research has often investigated children who have been identified as rejected to determine the type of social skills building interventions to employ that would help these children become more socially accepted (Barnard,

Prior, & Potter, 2000; Campbell, Ferguson, Herzinger, Jackson, & Marino, 2005; Graham & Cohen, 1997; Pijl & Frostad, 2010; Symes & Humphrey, 2010; Walker, 2009).

However, children who have been taught social skills in isolated environments often have not been able to generalize these learned skills to other environments, such as the inclusive classroom (Cappadocia & Weiss, 2011; Collins, 2010; Schrandt, Buffington, & Poulson, 2011). So researchers began to consider the extent to which social networks and peer groups influence and contribute to peer rejection or acceptance (Cairns & Cairns, 1994; Farmer & Farmer, 1996; Gaines, Cairns, & Cairns, 1994; Kindermann, 1993). Their findings suggest that interventions should be implemented at the group level, as it seems that peers are more influential in the development and maintenance of children's behaviors (Neckerman, 1990). Therefore it is plausible that the group social structures that are formed in classrooms can and may influence the development of positive peer affiliations or promote the social rejection or isolation of students.

### **Social Functioning in Children with Autism Spectrum Disorders (ASD)**

Taking into consideration that impairments in perception and social interactions, such as developing peer relationships, constitute core areas of deficit in children with ASD, it would inherently seem that they are a vulnerable population that is at the greatest risk for peer rejection (Handleman, 1999). It has long been thought that children with ASD simply lacked the desire to engage in peer interactions and preferred being alone (Bandura, 1989). However, there is evidence that suggests that high-functioning children with ASD are aware of their peers and do have a desire for friendships as they are able to express feelings of being lonely (e.g., Bauminger, Solomon, & Rogers, 2010; Bauminger, Shulman, & Agam, 2003; Ferraiolo & Harris, 2011; Smith et al., 2000). Numerous interventions, such as social skills building, have focused on

improving the social interactions of children, especially those with ASD as a means of avoiding social isolation.

### **Theoretical Perspectives**

**Social skills deficit/Peer rejection perspective.** Research on the peer relations of children with disabilities suggest that they are such a population of students who are less likely to develop positive peer affiliations and are more likely to face social rejection or isolation (e.g., Estell, Jones, Pearl, & Van Acker, 2009; Gallagher et al., 2000; Ochs, Kremer-Sadlik, Solomon, & Gainer Sirota, 2001). There are many perspectives that have been put forth to explain this social phenomena. One well-established perspective, social skills deficit, suggests that children with disabilities lack the necessary social skills to positively interact with peers (Coie, Lochman, Terry, & Hyman, 1992; Conduct Problems Prevention Group, 1999). As a result of these deficiencies, these students often are characterized as being aggressive and disruptive, traits that have often been associated with peer rejection (Bellini, 2006a; Hay, Hudson, and Liang, 2010). In accord with this perspective, social skills training would be one suggested intervention to help remediate defunct social skills (Asher, 1990; Cairns et al., 1988).

**Social network perspective.** Another perspective that has been actively used in understanding peer rejection is the social network perspective. This view is based on studying classroom social networks as it has been demonstrated that students often form relations with peers that have shared social characteristics, such as gender, ethnicity and behavioral attributes to name a few. Unlike the social deficit approach, the social network perspective suggests that students that are rejected and/or those students with aggressive and disruptive behavior are likely to affiliate with other peers who have behaviors that either support or complement their own behaviors, which in turn, is likely to result in the maintenance of these antisocial patterns (Cairns

et al., 1998). Based on this model, interventions are aimed at remediating issues at the group or environmental level (Farmer, Pearl, & Van Acker, 1996).

**Theory of mind perspective.** The theory of mind perspective (ToM) also has been discussed in association with peer rejection. ToM is the cognitive ability of an individual to imagine or to make deductions about the mental states of other individuals: What does the other person know? What will the other person do? ToM is an essential component of ascribing beliefs, intentions, and desires to other individuals, specifically in order to predict behavioral responses and outcomes (Baron-Cohen, 1978; Malle, 2004; Premack & Woodruff, 1978). For example, a child who is not socially competent is more susceptible to peer rejection, as he or she may not successfully be able to understand the facial expressions of others, tone of voice, body posture, gestures, etc. Without accuracy in these interpretations, the child often is not able to make correct judgments about another person's state of mind, emotions and intentions (Hughes & Leekam, 2004; Repacholi & Slaughter, 2003; Wellman, Cross, & Watson, 2001). The child's lack of social competence then becomes observable when he or she uses these faulty interpretations to make inferences about another person's inner states and, in turn, uses that information to make decisions on how to engage responding behaviors (Carpendale & Lewis, 2004). For example, if a child misreads another child's teasing as a threat, that child might react aggressively. In this case, the behavioral reaction would not be a result of inadequate social skills; rather it would be due to impaired perception. These kinds of "misreadings" have been extensively studied in children, especially in children with ASD as a means of developing appropriate cognitively based interventions (e.g., Berlin et al., 2008; Hobson, 2005, Kasari et al., 2001; Tager-Flusberg, 2007).

## **Inclusion and Children with Autism Spectrum Disorders**

Several laboratory-based findings further suggest that high-functioning children with ASD do have the cognitive capacity to learn from social skill training interventions but are not always successful in generalizing those skills outside of the laboratory environment (Cappadocia & Weiss, 2011; Collins, 2010; Schrandt, Buffington, & Poulson, 2011). As a result, the National Research Council (2001) recommended that students with ASD be taught skills in contexts with peers without disabilities in which they would naturally be a part of in their daily life functioning.

For children and adolescents, school is where a majority of their waking hours are spent. Thus, it seems that the most 'natural context' in which opportunities for students with ASD to spontaneously interact with peers without disabilities would best be offered in the general education classroom setting. Access to peer modeling of students without disabilities was a core premise for the initial conceptualization of the inclusion for children in other disability categories, specifically children in higher incidence categories such as specific learning disabilities (SLD), emotional behavioral disorders (EBD), cognitive disability borderline (CDB), and speech and language impairments (S/L). Though there are mixed findings, a strong body of research suggests that learning alongside children without disabilities has resulted in significant academic and social gains for children with disabilities (Fisher & Meyer, 2002; Peterson & Slaughter, 2002; Stahmer & Ingersoll, 2004; Whitaker, 2004). There are several theories that have been offered to explain these learning outcomes. One such theory is the social cognitive and reciprocal determinism theory.

**Social cognitive and reciprocal determinism theory (SCT).** Social cognitive and reciprocal determinism theory (SCT) recognizes that children grow and develop through the cultivation of innate psychobiologic factors and acquired experiential conditions (Bandura, 1989).



Within this theoretical perspective, human behavior is viewed as the product of a multi-faceted interplay of personal, environmental, and behavioral influences. For example, Pajares (2002) states "how children interpret the results of their own behavior informs and alters their environments and the personal factors that they possess, which, in turn, informs and alters subsequent behavior". This interplay is the foundation of Bandura's (1986) conception of *reciprocal determinism*, which extends the view that (a) behavior, (b) personal factors in the form of cognition, affect, and biological events, and (c) environmental influences create interactions that result in a triadic reciprocity. Reciprocal determinism distances itself from previous social learning theories by emphasizing that cognition is at the forefront of a child's ability to self-regulate, encode information, construct reality, and perform specific behaviors.

In line with this perspective, the reciprocal nature of the determinants of human functioning in SCT makes it possible for interventional efforts to be aimed at personal, environmental, and/or behavioral factors. For example, strategies for increasing a child's well being can be directed at improving that individual's emotional, cognitive, or motivational processes, increasing competencies in social behaviors, or altering social conditions in which he/she participates. In school, for example, teachers can work to improve students' emotional states, correct faulty self-beliefs and ways of thinking, self-regulatory behaviors, etc., by altering classroom social structures that serve to undermine students' social success.

The results of studies that have focused on high incidence disability categories may have been an influencing factor in the National Research Council's (2001) recommendations to advocate for more aggressive measures to be taken to include children with low incidence disabilities, specifically children with ASD, in general education classrooms. It has been hypothesized that this is the most naturalistic environment in which these students would be

offered authentic peer interactions and consistent access to peer modeling of socially appropriate behaviors. It was assumed, as Bandura's theory of reciprocal determinism posits, that the increase in these interactions would result in a multitude of social benefits for children, specifically in enhancing peer relationships and successful social integration in general education environments (Bierman, 2005; Boutot & Bryant, 2005; Kasari & Rotheram-Fuller, 2007).

### **Social Competence Variables**

There are many different ways in which researchers define and measure social integration. Probably the most holistic definition that supports the premise of inclusion is the one used in studies like that of Boutot and Bryant (2005). Boutot and Bryant (2005) identify three interrelated factors that have been found to be associative and influential in assessing positive peer relations, social competency, and successful social integration in inclusive classrooms. These interrelated factors include being visible to other students (peer acceptance), someone with whom peers want to interact with (social preference) and being a member of a peer group that spends time together (social network affiliation). While the constructs used to describe peer relations can vary, so are the methodologies in which they are measured.

### **Social Competence Measures**

**Sociometrics.** Sociometrics is a commonly used measurement to assess students' social statuses through the administration of peer rating or peer nomination procedures. Peer ratings do not necessarily yield information on each child in the classroom, while peer nominations do. However, whichever measurement is used, both use predetermined computational analyses and predetermined scales to identify children's social status levels (e.g., popular, average, controversial, neglected, rejected). Peer behavioral assessments often are used to determine the social preferences of children. In this method, children may be given a survey with the

instructions to identify up to three peers, including self if applicable, who best fit predetermined questions with embedded behavioral attributes (e.g., “Who is sad in your class? Who starts fights?”). Calculations are the same as used in determining social status using peer ratings with the exception of the change in the predetermined scale.

**Social network analysis.** Social Network Analysis (SNA) is an alternative procedure that identifies a student’s social affiliations (membership in a peer cluster) and his or her social position within the classroom (social network centrality). In SNA, children are asked to respond to a given question such as, “Are there any students in your class who hang around together a lot? Who are they?” Responses from students are aggregated to generate a composite social mapping of the classroom’s social structure including peer clusters. Based on peer cluster formations, this procedure also identifies and classifies social network centrality (the prominence of a peer group) and the social positions of individual students. There are four possible classification systems that are used to identify centrality and social levels: nuclear, secondary, peripheral or isolated (Cairns, Garipey, & Kindermann, 1990; Cairns et al., 1985).

While sociometric and SNA methodologies have been useful in identifying children who are rejected, it seems that SNA allows for a more accurate understanding of classroom social structures, particularly in its ability to incorporate other measurement tools that move beyond just the identification of social status. For example SNA becomes significant in examining the peer relations of children when it is correlated with peer behavior assessments. In merging these techniques, it is possible to determine group and individual centrality levels, the behavioral characteristics of individual children, as well as the characteristics of the peers in which they affiliate. Social Cognitive Mapping (SCM) is the term that is used to describe the use of SNA and peer behavior assessments in studying peer relations.

**Social cognitive mapping.** SCM has proven useful in many studies on peer relations. Farmer and Cairns (1991) have found that rejected children often affiliate with similar peers. Through SCM, they were able to notice a link between a child's rejected status and high rates of antisocial behaviors (e.g., starts fights, gets in trouble, shy). Hence, using SCM might just reveal that this is true in the relations of students with ASD. It may be possible that children with ASD are rejected and that they associate with other children in peer groups that are characterized with high rates of antisocial behaviors. Therefore, it seems plausible that these affiliations may be encouraging children with ASD to maintain and enact those antisocial behaviors, which may be a factor in why these children continue to be not well liked by their peers. The implications for interventions would then reside at the group level which may lead to a better understanding of why social skills building has not been very successful as an intervention tool.

### **Social Cognition as an Indicator of Social Competence**

Despite the methodology used in SCM or sociometrics, the information generated is based on peers' perceptions of observed behavioral patterns of their peers and their perception of their own behaviors. While more recent studies are increasingly using the three constructs of peer acceptance, social preference, and social network affiliation, some researchers are starting to add social-cognitive accuracy as another important factor to consider in examining peer social relations (e.g., Diesendruck & Ben-Eliyahu, 2006; Estell, Jones, Pearl, & Van Acker, 2009; Heiman, 2000; Nowicki, 2003; Weiner & Tardif, 2004). The construct of perception is an important dimension in defining peer relations. Peer perceptions of an individual's social skills are used to gain social status within a peer group (Estell, Cairns, Farmer, & Cairns, 2002). As Coie, Dodge, & Coppotelli (1982) claim, social competence in social skills is associated with

peer acceptance or popular status, whereas poor social skills often are related to neglected or rejected states (p. 561).

The interconnectedness of social-cognitive accuracy and social networks are best explained by Farmer (2000). In a review by Farmer (2000), he states that various research studies (e.g., de Bruyn & van den Boom, 2005; Cole and Cole, 2001; Gresham & MacMillan, 1997; Pelligrini & Bartini, 2000) have found that a number of rejected children were strongly perceived as being aggressive and disruptive by their peers, yet the targeted (rejected) child had a perception of himself as being popular and socially competent. He also stated that these rejected children also tended to rate themselves higher in social status than their peers, often perceiving themselves as being strongly involved in a peer group when in actuality they were not (see also Cairns & Cairns, 1994; Cantin & Boivin, 2004; Cole & Cole, 2001; Rodkin et al., 2000). It has been suggested that when children are not able to perceive relationships accurately, then moderating self-behaviors in compliance to classroom norms becomes a daunting task (Harter, 1988) thus the implications for interventions seem not to reside in social skills building, but rather in cognitive or social-cognitive skills building.

High-functioning children with ASD often perform in the normal range on intelligence testing and have been shown to engage in higher levels of social relationships and are often able to understand more complex emotions than low-functioning children with ASD (Bauminger, 2002). It has been hypothesized that high-functioning children with ASD compensate for social deficits by utilizing their relatively high cognitive abilities (Hermelin & O'Connor, 1985; Kasari, Chamberlain, & Bauminger, 2001; Sigman & Ruskin, 1999). Therefore, it seems to reason, that children with ASD may have more social and perceptive capabilities to develop and interact socially with peers. However, knowing that children with ASD often have difficulties in

perception, it may be possible that high-functioning children with ASD may have the capabilities to perceive more, but the accuracy of their perceptions remains unanswered. Therefore, further examination of these perceptions through the inclusion of measurements of social-cognitive accuracy is warranted.

### **Statement of the Problem**

The central inquiry in this quantitative descriptive study sought to examine two main diagnostic groups, children with ASD and their peers in fourteen 3<sup>rd</sup>-5<sup>th</sup> grade inclusive classrooms, to explore how peer social relations operate in students with and without ASD. This descriptive study specifically explored levels of acceptance, preference, social network affiliations, and social-cognitive accuracy with a primary focus on students with ASD as they navigate the social structures in inclusive classrooms as reported by self and peers using peer behavioral assessments and peer group nomination methods. Thus, the overarching framework of this study uses SCT based on the implication and the application of its core principle in examining the interconnectedness of social competence, specifically, social acceptance, social preference, network affiliations, and social-cognitive accuracy of peers and their relation to the social structures in inclusive classroom settings that contained at least one child with ASD.

While there have been a number of studies that have specifically looked at the ability of children with ASD to develop friendships, to date there have been no studies located that have explored the perceptive ability of this groups of children in accurately naming the peer affiliations of others and/or their own peer affiliations. This study attempts to fill this gap by employing a more integrative social network model that includes social-cognitive accuracy in perception as an additional variable of interest which will be measured using a procedure designed by Leung (1996). This method measures the degree of overlap in the similarity of

responses to items presented in the peer behavioral assessment and in the identification of peer groups. The higher the degree in which these reports overlap is indicative of the accuracy between individual children's reports and those of their peers' reports. The use of the procedure has the ability to yield data that may offer insight into whether perception is a factor that places children with ASD at risk for peer rejection. It may also provide additional support for the development and implementation of cognitive skills building to increase social success in peer relations and whether effective interventions reside at the group level.

In addition to adding social-cognitive accuracy as a variable of interest, this study is also unique in its use of SCM to examine the social networks of children with ASD. Of the few studies that have assessed the centrality of individuals and the peer groupings in classrooms, most have used SNA and behavior quality as two separate constructs of measurements which does not take into account actual classroom social structures. As discussed previously, identifying whether a student is rejected and his behavioral characteristics is not an accurate picture of his or her social relations as this child may actually affiliate with a peer group. Using SNA and behavioral qualities as distinct measurements also does not describe the nature of those peer groups or how a classroom social structure might be promoting social rejection of certain types of students, whereas SCM is able to take these factors into consideration.

### **Purpose of the Study**

The purpose of this study is to examine the social networks of children with ASD whose educational placements were in inclusive classroom settings. Since, social networks and peer affiliations have been found to influence whether a child is socially accepted or rejected and can predict later life trajectories (Farmer, 2000), the importance of this study seems self-explanatory. In keeping with the contextually driven nature of the SCT framework, the researcher obtained

the perspectives of individuals and their peers using SCM to define and describe the nature of the social relations of children with ASD in 14 classrooms that were part of schools that embraced the inclusion model of education. Using peer and individual reports allowed the researcher to explore the nature of classrooms' social structures at the group and individual levels by considering the constructs of peer acceptance, social preference, social network affiliation and social-cognitive accuracy all of which Boutot and Bryant (2005) have suggested are critical components in developing and promoting interventions that support positive peer relations.

This current chapter, the Introduction, details the rationale for this study. Recent research has suggested that social success in inclusive classrooms along with centrality levels of individuals and their peer groups in addition to peer acceptance, social preference, social network affiliation and social-cognitive accuracy may in fact promote positive developmental trajectories for children who are at risk of peer rejection. The goal for this inquiry was to describe the social networks of children with ASD from the perspectives of individual children with ASD and their peers in an effort to further define components of social competency that may promote positive social outcomes for children with ASD.

Chapter II presents a review of the literature in the development and significance of peer relations, context and reasoning for social inclusion, education which offers preliminary findings related to the characteristics associated with peer relations and social status in inclusive classroom settings and presents the rationale for the selection of the methodology of this study. Chapter III provides an in-depth description of the methodology of this study, which utilizes a subset of an extant data set that was collected as part of a larger study, including the criteria set by the original investigators for site selection, subject recruitment, and the procedures for data



collection, as well as the present researcher's means of analyzing the data. Chapter IV presents the results of the study and Chapter V offers discussion.

### **Research Questions**

1. Do students with ASD identify themselves as a member of a social group in their inclusive classroom?
2. Do children with ASD find their way into the social networks in their inclusive classrooms? Specifically, are peers nominating children with ASD as members of peer groups? Are students with ASD receiving peer nominations at levels of frequency that allow peer group entry?
3. If students with ASD are included in these social networks, what is the nature of the groups with whom they affiliate?
4. How accurate are students with ASD in their ability to identify peer groups in which they are and are not a member as compared to peer consensus reports? How accurate are children with ASD identifying the behavioral characteristics of self and others as compared to peer consensus reports?

## II. A REVIEW OF THE LITERATURE

After lunch, thirty-one 1<sup>st</sup> graders are walked to recess in two straight lines. As soon as they reach the playground, the two lines quickly dissipate as children find their friends and decide on which activity they are going to engage in for the next twenty minutes. The same children tend to play together. The children know that little Karri, Jessica, and Kelli will take over the swings. Kevin, Hakeem, and Juan will surround the slide pretending that they are fending off dragons with imaginary swords. Melissa and Sophie will chase Kali. Laurie and Julie will sit in the corner and braid each other's hair while Carrie, Emily, Nancy, and Sherie will continue to create a strategy to conquer the slide by chasing the dragon slaying boys away. The playground is full of peer groups such as these. However, in the corner of the playground will sit Keith, who will likely be curled up, with his head lowered to his knee caps, and his arms wrapped around his legs. As with most days, Keith will probably be crying. When asked what has him upset, Keith will reply, "No one likes me and they won't let me play." As teachers in the early years of schooling, this scene is one that is all too familiar. There always seems to be a 'Keith' in every classroom, the child who sits alone and wants to play but, for a variety of possible reasons, does not have a peer group in which he is a member. The daily rejection that Keith experiences is just as important to address as the child who struggles in class with reading and math, as both have severe developmental consequences. Like Keith, children with ASD often face similar difficulties in developing peer relations in inclusive classrooms.

If children with ASD are to reap benefits from being socially included in general education settings, it is important for researchers and practitioners to be aware of the social structure in these classrooms. With this knowledge, it is possible to provide interventions so that children like Keith are not left crying alone on the playground. The following chapter reviews

literature relevant to this objective. First, a brief summary of existing research related to the role of peer relationships in children's development and adjustment will be reviewed. Second, a description of the different methods of measuring and the different conceptualizations of children's social functioning will be shared. Afterwards, literature substantiating the impaired social functioning of children with ASD will be infused with a review of research that supports an indirect link between social functioning and impaired social competences. Lastly, an overview of the Social Cognitive Mapping (SCM) methodology and its important contributions to the current study will be discussed.

### **Children's Social Functioning with Peers**

Behavioral interventionists have long been interested in children like Keith, as research has shown that friendships and peer relations have a far more reaching impact than simply having someone to play with at recess (Craig, 2000). It has been well documented that children's social functioning with peers plays a key role in their social, academic, and behavioral development (Bagwell et al., 2000; Welsh et al., 2001). Throughout the schooling years, children construct their identities and social status through mutual socialization with peers. In the early school grades, children begin to develop and practice fundamental prosocial behaviors such as empathy, mutual caring, and companionship. They begin to sort out and make meaning of what friends are and the importance of developing relations. In middle childhood, children begin to build trust and experience intimacy by sharing personal experiences and feelings with their friends (Asher et al., 1996; Parker & Gottman, 1989). These friendships begin to provide the child with a sense of self-worth and belonging (Bagwell et al., 2000). The quantity of friendships that one has does not seem to matter as it has been shown that just one friend can serve as an important venue for emotional protection from loneliness, social rejection, and

emotional support (Burgess et al., 2006; Parker & Gottman, 1989; Parker et al., 2005). Thus, it seems that friendship may serve as an important mediator of social adjustment, both in the childhood years and into adulthood.

The positive influences of peer friendships have been shown in many studies to impact a child's social-cognitive (Brendgen, Bowen, Rondeau, & Vitaro, 1999; Dunn, Cutting, & Fischer, 2002), cognitive (Azmitia & Montgomery, 1993), and linguistic development (Durkin & Conti-Ramsden, 2010; Zajac & Hartup, 1997). Examples of positive peer interactional influences are when children learn how to communicate through turn-taking and use appropriate words (Zajac & Hartup, 1997), cooperate and problem-solve (Azmitia & Montgomery, 1993) and by practicing self-regulatory behaviors such as emotion regulation and responding to the emotions of their peers without being aggressive (Brendgen, Bowen, Rondeau, & Vitaro, 1999; Dunn, Cutting, & Fischer, 2002; Gomes, 2011) as well as developing an ability to think through and negotiate different situations that arise in their relationships so that they are able to make good decisions (Shonkoff & Phillips, 2000).

During childhood and adolescence, children that are well liked by their peers (*accepted*) tend to be socially competent (Newcomb & Bagwell, 1995), demonstrate advanced leadership skills (Berndt, Hawkins, & Jiao, 1999), have higher self-esteem and positive self-images (Azmitia, 2002), have a decreased chance of experiencing peer victimization (Hodges, Boivin, Vitaro, & Bukowski, 1999), have higher academic achievement levels (Fleming, Cook, & Stone, 2002; Wentzel, Barry, & Caldwell, 2004), and often are insulated from the negative impact of family issues (Bolger, Patterson, & Kupersmidt, 1998; Gauze, Bukowski, Aquan-Assee, & Sippola, 1996). While positive peer relations have been associated with prosocial behaviors and

other psychological protective factors that are indicative of social adjustment, the same has not been observed in children who lack friends and peer relations.

Children who lack friends are highly likely to experience social maladjustments. Parker and Asher (1987) best summarize the impact that not having friends has on children when they state that the absence of these relationships deprive children “of opportunities to learn normal, adaptive modes of social conduct and social cognition...[and] undermine(s) academic progress as well” (Parker & Asher, 1987; p.358; see also Mead, 1934; Piaget, 1932). Other investigations have supported these results and have also found that these children often exhibit difficulties in social competence, have lower self-esteems, experience higher rates of victimization, exhibit higher levels of aggressive behavior, have lower levels of academic achievement, and have a tendency toward being vulnerable to depression and dropping out of school (Diesendruck & Ben-Eliyahu, 2006; Ladd & Price, 1987; Parker & Asher, 1987; Roff & Wirt, 1984).

It appears that a number of children who lack friends are caught in a vicious cycle whereas their antisocial behaviors have interfered with their ability to develop friendships and in being without friends, they are denied opportunities to practice self-regulatory behaviors and to learn new behaviors that are more socially acceptable (Underwood, 2004). Thus it seems that without appropriate interventions, these children, who are often not well liked by their peers, will continue to engage in the same behaviors that will forever perpetuate this cycle of isolation. However, a body of current research is finding that this may not be a totally accurate picture.

It has long been thought that children who were not well liked by their peers (i.e., *rejected children*) did not have friends. However, this has been found not to be the case. Dishion, Patterson, and Griesler (1994) found that rejected children often associated with peers who were also antisocial (e.g., exhibited high rates of problematic behaviors) and that these

relationships often reinforced negative social behaviors between partners. For example, one investigation found that antisocial dyads of boys were increasingly more likely to engage in coercive acts and threatening or deviant talk with each other (Dishion, Patterson, & Griesler, 1994).

A study conducted by Farmer (2000a) investigated the interactions of delinquent friendship dyads and found that friends of the delinquents supported rule-breaking and violent behavior by laughing and giving verbal approval when these students engaged in other antisocial acts. This type of support also has been seen in bullying when the student who acts as the bully is empowered by those that surround him or her and encourage their negative actions thus promoting the maintenance of the antisocial conduct. It appears then, that children who are without friends or have developed peer relations that support antisocial behaviors are more vulnerable to later life difficulties.

Recalling the scenario of the 1st graders at recess, it then becomes more apparent as to why children like Keith have been the attention of many research investigations. For Keith, it is highly likely that without intervention, he will be prone to continuing relationship problems in his early school years to psychosocial difficulties, such as internalizing (e.g., depression, suicidal ideations, low self-esteem) and externalizing behaviors (aggression, bullying, verbal assaults) in his later years. He is also more susceptible to develop negative life trajectories in such social arenas as poor job performance, substance abuse, criminality, risky sexual behaviors, and suicide (Diesendruck & Ben-Eliyahu, 2006; Ladd & Price, 1987; Parker & Asher, 1987; Roff & Wirt, 1984). Therefore, to help maximize the prosocial adjustment of children like Keith, behavioral interventionists are working to understand the social mechanisms that facilitate peer rejection

and what interventions and supports are needed to help these students become socially competent in their formative years.

### **Social Competence**

The term *social competence* is a multifaceted concept that has been defined in many ways that are reflective of diverse theoretical perspectives. As varied as these perspectives may be, there is an underlying agreement that social competence consists of social, emotional (e.g., affect regulation), cognitive (e.g., skills for processing/acquiring information, perspective taking), and behavioral (e.g., conversation skills, prosocial behavior) skills as well as motivational interests (Brendgen, 2004; Cavell, 1990; Klin, Jones, Schultz, Volkmar, & Cohen, 2002; Semrud-Clikeman, 2007). The interconnectedness of these skills reflects what has been coined as Theory of Mind (ToM). ToM describes the ability to take another individual's perspective concerning a particular situation or event, and learning from past experiences and applying that learning to changing social interactions. Social competence is considered the foundation where interactions with others (i.e., peer relations) is built, and the platform in which individuals develop insight into their own behaviors and adjust their behaviors accordingly to engage in socially acceptable relations with others. As Waters and Sroufe (1983) write, “the competent individual is one who is able to make use of environmental and personal resources to achieve a good developmental outcome” (p. 81). In sum, a competent individual is considered to have a well developed and activated ToM.

Because social competence is a higher order construct in which there is no one definition that is inclusive of all of its complexities as proposed by various researchers, for purposes of this paper, the model of social competence construed by Vaughn and Haager (1994) will be employed as it best relates to the objectives of interest in the current study. In their model,

Vaughn and Haager (1994) propose measuring an individual's social competence in terms of one's peer relations, behavior problems, social skills, and social cognition. Following is a brief summary of the four indirect competency measures as proposed by Vaughn and Haager.

**Peer relations.** Vaughn and Haager (1994) define peer relations as being the quality of one's relationships with peers. Considering the previous findings associating positive peer relationships and their influences on future socialization and adjustment, the presence of good peer relationships seems to serve as one indicator of a child's overall social competence. Peer acceptance measures typically serve to measure peer. Peer acceptance is the degree to which a child is socially accepted and viewed by his or her peers as a worthy social partner (Berk, 2000; Estell, Farmer, Pearl, Van Acker, & Rodkin, 2003; Gest, Farmer, Cairns, & Xie, 2003). Peer acceptance seems to be a reliable indicator of the quality of a child's peer relations as it uses the reportings from peers to yield overall indices of acceptance and rejection. The two most commonly used methods that measure peer acceptance are sociometrics and SCM. Sociometrics is a widely used measure of peer acceptance that involves asking students to identify peers in their class with whom they like least and peers in their class with whom they like most (e.g., Barnard, Prior, & Potter, 2000; Campbell, Ferguson, Herzinger, Jackson, & Marino; 2005; Graham & Cohen, 1997; Pijl & Frostad, 2010; Symes & Humphrey, 2010; Walker, 2009). This measure will be discussed in more detail later in this chapter.

SCM is another measure of overall peer acceptance, which will also be discussed later in more detail. SCM assesses the overall peer acceptance level of a child both formally and informally. Informally, SCM serves as an indicator of a child's peer acceptance by elucidating whether he or she is a member of several, one, or no peer groups. Formally, SCM computes a child's overall peer acceptance by categorizing each child to a social network centrality level



which serves as an indicator of how prominent (i.e., visible) the child is within his or her classroom's social structure. Further, SCM is able to assess whether a child has reciprocal friendships, which is another important aspect to consider in exploring a child's peer relations.

**Social skills.** The second component of social competence described by Vaughn and Haager (1994) is social skills. Social skills is defined in various ways by researchers due to the wide range of behavioral attributes that one considers as being characteristic of being socially competent. In 1996, Kavale and Forness conducted a literature review to consider the various attributes used to define a socially skilled individual. In their review, they used a definition that was proposed by McFall (1982). McFall suggested that social skills are specific behaviors that any person uses to perform competently on a social task or mandate. That is to say, that social skills are those positive behaviors which are instrumental in bringing about a positive or a desired social goal. An important aspect of McFall's definition is the notion that social skills need to be a part of a child's behavioral repertoire so that the child may be viewed as socially competent. For purposes of this literature review, McFall's (1982) definition will be embraced for consistency and coherency to the current study's rationale.

Various researchers have examined the interplay between social skills and a child's ability to achieve social competence. Many of these studies have been conducted to examine if children who were having difficulties in developing peer relations also exhibited deficient social skills. Dishion and his colleagues (1994) did find that delinquent children who were rejected by their peers often were lacking in certain social skills. These children were often found to exhibit social skill deficiencies such as not making or maintaining eye contact when interacting with a peer, a lack of proper questioning skills to engage in conversation and the inability to verbally acknowledge peer directives, or engage in proper physical acknowledgement such as appropriate

head nods. In addition, Wahler and Dumas (1986) supported these findings but also included that children who deviated from the norm in interpreting the body and facial cues of peers carried negative consequences in limiting the accessibility of peer interactions. Thus, it does appear that social skills are another important factor that has been linked to social competence.

**Behavior problems.** The third component in Vaughn and Haager's (1994) social competency model is that of problem behaviors. They state that behavior problems appear to be a construct that is divergent of social skills as it is reasoned that a child may show deficits in particular social skills but can be well behaved or show no signs of behavior problems. And conversely, children with behavior problems may have the capacity of having numerous positive social skills however they do not execute them appropriately in particular social situations. Thus, Vaughn and Haager's model makes a distinction between social skills and behavior problems. They use a contemporary approach that encompasses the psychological constructs of internalizing and externalizing behavior patterns when discussing social difficulties. Internalizing behaviors are those inner qualities such as depressive behaviors, anxiety, and low self-esteem while externalizing behaviors encompass more observable actions, such as aggression, attention issues, coercion, and antisocial tendencies (Achenbach, 1991; Quay and Peterson, 1987; Reynolds & Kamphaus, 1992).

Faulty externalizing and internalizing behavior patterns have been associated with social difficulties. Research on the status of children that exhibit these types of behaviors (particularly those that are aggressive and antisocial) show that these children are more likely to have low acceptance ratings or to be rejected by their peers than classmates that do not have these behavioral features (Dishion et al., 1994). As well, children with internalizing behaviors such as shyness or social withdrawal may be prevented from adequately experiencing or learning from

peer interactions (Parker & Asher, 1987) or to be able to increase their language skills or generalize their ability to initiate interactions with others in various settings (Schneider, 1999). More specifically, difficulties in external or internalizing behavior often have adverse affects on a child's ability to enter into ongoing interactions or to initiate an interaction with another child, to maintain successful social interactions and the ability to resolve conflicts appropriately. Some of these social interactions include being able to joke and playfully tease others and to be the recipient of such teasing from others, complementing and receiving complements, being able to engage in verbal differences and argue assertively but not aggressively, and being able to maintain conversation about mutual topics of interests (Bellini, 2004, 2006b; Gresham, Sugai, & Horner, 2001; Spence, 2003; Vickerstaff, Heriot, Wong, Lopez, & Dossetor, 2007).

**Social cognition.** The final construct of social competence in Vaughn and Hagar's (1994) model is social cognition. Social-cognitive development can be described as the process in which the brain encodes, stores, retrieves and processes information that is related to conspecifics (Blair & Blair, 2005; Harmon-Jones & Winkielman, 2007; Stone & Gerrans, 2006). For a child who is engaging in peer relations, this can be defined as the changes in the cognitive functioning that allows him or her to engage in increasingly complex and potentially more meaningful interactions with other peer groups based on his or her previous learning experiences. (Merrell & Gimpel, 1998). From this standpoint, it can be deduced that social-cognitive ability is correlated to the enactment of one's social-cognitive behavior. It therefore seems plausible that social information processing or social cognition is an important pathway by which social behaviors and subsequent social competence emerge (Ashford, LeCroy, & Lortie, 2001; Kinsey, 2000; Ladd, 2000). The significance of these two variables is that difficulties in peer relations may result from faulty social cognitions or social-cognitive difficulties, which in turn, can lead to

future social-behavioral difficulties (e.g., Jackson et al., 1987; Sisterhern & Gerber, 1989; Smith & Daunic, 2004).

Investigations on the ineffectiveness of social skills training (SST) provides indirect support for the influence of social cognition on behavior. In social skills intervention approaches, the focus is typically on modifying children's maladaptive behaviors. Such interventions may teach children, for example, how to ask for help using appropriate words instead of throwing a tantrum. Children may also be taught how to initiate entrance into a social interaction by asking a peer to join in play instead of hitting the child to gain attention. The skills that are taught to children to engage in situations such as these are broken down into discrete and intentional steps in SST. But as studies have consistently shown, social skills interventions are often not effective as many children are not able to generalize what they have been taught to different situations or may do so for a short period of time and lapse back into the same maladaptive behaviors that were present before the training (Bellini, 2007). Erdley, Rivera, Shepherd, and Holleb (as cited in Nangle et al., 2010) contend that this relapse of antisocial behaviors is because the thought processes related to the social behaviors in which children choose to engage also needs to be addressed and modified.

An earlier study by Oden and Asher (1977) suggested as much. They revealed that teaching children concepts that focused on *interactional* constructs (rather than *responsive* constructs) such as communication, validation-support, participation, and cooperation, led to more gains in acceptance levels and that these levels were not only maintained, but also were shown to increase after a one year follow-up. Therefore, it is possible to infer from their study that social-cognitive training vs. social skill training may influence changes in behavior that can positively affect a child's peer acceptance status and peer affiliations and that it is possible that

maintenance can be held over time. It seems to reason that by guiding children in *understanding* which social interactions are appropriate may lead to positive social changes.

While there seems to be a strong association between improved social understanding and increased peer acceptance levels, research also has demonstrated that children with social difficulties experience differences in discrete social-cognitive processes. For example, children with such deficiencies were more likely to interpret ambiguous behavioral cues from other children to be threatening and provoking (Dodge & Feldman, 1990) and have higher rates of susceptibility in the involvement of aggressive and disruptive behavior (Council for Children with Behavioral Disorders and Council of Administrators in Special Education, 1995).

It has further been shown that children that are socially rejected often are inaccurate in their perceptions of their own functioning. One such example is the investigation conducted by van Roekel, Scholte, and Didden (2009). Their findings showed that low accepted children were often more likely to interpret ambiguous behavioral cues by other children as threatening or hostile. Whether these children's poor interpretations of behavioral cues are the cause of poor peer relations or a consequence of them, a large body of research suggests that faulty social cognition is most associated with peer rejection (e.g., Abrams, Rutland, Pelletier, & Ferrell, 2009; Ferraioli & Harris, 2011; Gifford-Smith & Brownell, 2003; Slaughter, Dennis, & Pritchard, 2002). Thus, it seems to stand that social cognition plays an influential role in mediating the acceptance or rejection of children in their classroom's social structure and should be considered as a construct of interest when examining social competency in the social functioning of children and their peer relations.

### **Social Functioning in Children with Autism Spectrum Disorder**

Autism spectrum disorders (ASD) is a neurobiological disorder that significantly impairs

reciprocal social relations, verbal and nonverbal communication, and behavior (DSM-IV-TR; American Psychiatric Association, 2000). These deficits have a marked influence on the social functioning of children with ASD, especially in terms of developing and socially engaging with peers. The development of meaningful peer relationships is one of the biggest challenges that children with ASD face given that social skills are a core deficit in children with ASD.

Traditional views such as Kanner (1943) have assumed that children with ASD lack the desire and the skills to foster meaningful relationships with peers. However, research is beginning to challenge this view. For example, Hughes, Russell, and Robbins (1994) identify the common misconception that children with ASD prefer solitary activities and have no awareness of their peers. They extend claims that children with ASD do not make a deliberate choice to alienate themselves but rather they lack the skills that may lead to the development of good peer relations (Happé, 1994). Some of the common identifiable social deficits that have been found to be exhibited by children with ASD is the inability to understand facial expressions and body language, initiating and ending conversations, initiating and maintaining peer interactions, joining play, observing and mimicking appropriate social behavior in specific situations, and predicting and understanding the emotions and reactions of others (Hirschfeld, Bartmess, White, & Frith, 2007). Without these strengths, it is difficult for children with ASD to forge any meaningful peer relationships. That is, to form a friendship with a peer, one must be aware of their feelings and have the ability to understand their reactions in a variety of contexts (Asher, Parkhurst, Hymel, & Williams, 1990; Bandura, 2005; Bauminger & Kasari, 2000; Peplau & Perlman, 1982).

However, recent research has begun documenting that individuals with ASD do indeed have an interest in developing friendships (e.g., Bauminger & Kasari, 2000; Whitehouse, Durkin,

Jaquet, & Ziatas, 2009) and are reporting having at least one friend (Bauminger & Kasari, 2000; Bauminger, Shulman, & Agam, 2003; Bauminger, Solomon, & Aviezer, 2008; Konig & Magill-Evans, 2001; Orsmond, Krauss, & Seltzer, 2004) and that there is some self awareness of feelings, particularity in the construct of loneliness (Bauminger & Kasari, 2000; Bauminger, Shulman, & Agam, 2003; Bauminger et al., 2008; Whitehouse, Durkin, Jaquet, & Ziatas, 2009).

While there is evidence that children with ASD are aware of friendships, there is a question that arises as to the quality of those relations. Particularly, children with ASD have often been reported to perceive friendships as people who they have recently encountered or regularly are interactive (e.g., "The mailman is my best friend.") rather than based on psychological and emotional reasonings (Carrington, Papinczak, & Templeton, 2003; Church, Alisanski, & Ammanullah, 2000). Carrington, Templeton, and Papinczak (2003) infer that establishing friendships in young people with ASD is less spontaneous and that attempts to attain friendships are more reflective of pragmatic efforts than an intersubjective motivation that is often seen in peers without disabilities. It therefore seems plausible that if children with ASD do have a desire to develop relationships with peers, then deficiencies or impairments in social competencies may be prohibiting them from doing so. Research into the social difficulties of children with ASD have been found to add support to this theory, specifically in conjunction with the four dimensions of social competency previously introduced. In the following section, the social difficulties of children with ASD, with respect to the dimensions of peer relations, behavior problems, social skills, and social cognition, will be discussed.

**Peer relations.** The peer relations of children with their classmates have often been used as a gauge in assessing social functioning. Social acceptance has been considered one competency in the Because social acceptance is an overall measure of how well a child is liked

or disliked by his or her peers, the results of sociometric status research has been utilized by a number of investigators as a direct indicator of a child's peer relations (social preference) and, in turn, his or her social difficulties (e.g., Farmer, Pearl, & Van Acker, 1996; McConnell & Odom, 1996; Merrell, 1999). Studies on the social preferences of students with mild disabilities have consistently found that these children experienced lower social preference than their peers without disabilities (Coben & Zigmond, 1986; Gottlieb, Gottlieb, Berkell, & Levy, 1986; Sabornie, Kauffman, Ellis, Marshall, & Elksnin, 1988; Stiliadis & Wiener, 1989). For example, in a study conducted by Sabornie, Marshall, and Ellis (1990), it was found that students with learning disabilities had significantly lower social preference scores than their peers without disabilities. Their findings substantiated previous research that identified students with mild disabilities as not being selected as preferred classmates. Relatively fewer studies have been conducted that have looked at more severe or lower incidence disabilities such as ASD. Of the studies that have been done, most have noted that these students had significantly lower social preference than their peers without disabilities (e.g., Bender, Wyne, Struck, & Bailey, 1984; Sabornie & Kaufman, 1987; Symes & Humphrey, 2010).

However, sociometric results tend to infer that children that have low social preference scores (i.e., those children that are not well liked by their peers) are without peer relations. However, Farmer and Farmer (1996) proved that this was not true when they used social network analysis (SNA) as a different methodological procedure to assess peer relations. The results of their studies indicated that students who may not be well accepted by their peers may in fact be well known by their classmates. Additional SNA studies have supported the findings by Farmer and Farmer (1996) as they have also found that a number of students with low social preference had a group of friends with whom they affiliated (Hall & McGregor, 2000; Pearl et al., 1998).



To date, there are only a few studies that have used SNA to assess the peer relations of children with ASD. One of the existing studies, Chamberlain, Kasari, & Rotheram-Fuller (2007), discovered that despite lower overall peer acceptance scores, no child with ASD emerged as isolated (i.e., not having at least one friend). The investigation by Boutot and Bryant (2005) yielded similar results. Such findings are suggestive that children with ASD may indeed be not well liked within their general education classrooms, but that they are forming some level of relationship with at least one peer.

Research on peer relations and friendships has been shifting its focus from the quantity of friendships to the quality of those friendships. Despite the growing research on the friendship qualities in children without disabilities, this construct has rarely been studied in children with ASD. For decades, friendships in children with autism were thought to non-existent or a rare phenomenon as it was widely accepted that children with ASD preferred to play alone and did not seek out interactions with peers (Kanner, 1943; Hobson, 2005; Rogers & Pennington, 1991). However, Bauminger (2002) found that children with ASD reported high rates of feeling lonely and did express desires to affiliate with peers.

Chamberlain, Kasari, and Rotheram-Fuller (2007) were among the first researchers to examine the social networks of children with ASD. In their study, they used social network analysis to explore the involvement of children with ASD who spent a part of their school day enrolled in inclusive classroom settings. Participants included 398 children, of which 196 were male, in 2<sup>nd</sup>-5<sup>th</sup> grade general education classrooms. Each of the inclusive classrooms had at least one child that had been formally diagnosed with high-functioning ASD or Asperger syndrome ( $N = 14$  boys). The participants were given surveys that assessed certain friendship qualities (e.g., this child is nice to me), peer acceptance (e.g., rating the likeability of a child on a

scale from 1-10), loneliness, and classroom social network structures (e.g., naming peers with whom the child associates). Their results indicated that children with ASD were involved in classroom social networks but were not as visible or well known as their peers without ASD (i.e., they had low centrality levels), experienced lower rates of acceptance, companionship, and reciprocity. This is significant in that there is some evidence that children with ASD are capable of, and are finding their way into the social structures in their inclusive classroom settings.

**Social skills.** For a significant number of individuals with ASD, social deficits are not explained by a lack of social interest. Rather, it is reasoned that the lack of social skills and the ability to determine when to use such skills contribute to their overall disability (Mesibov, 1984; Bauminger et al., 2003). For example, children with ASD often engage in more ritualistic behaviors and poor social behaviors such as maintaining close proximity to peers rather than performing more normed behaviors such as engaging in shared feelings and experiences while respecting individual space (Sigman & Ruskin, 1999). In his research, Russell (1997) shared his observations of children with ASD. Initially, he stated that children with ASD appeared solitary and only preferred their own company and would aggressively defend their space from others who wanted to enter. However, when children with ASD wanted to interact with others, they appeared to lack the appropriate skills to approach their peers. By sending out wrong signals in an attempt to gain entry, these children often faced a high risk of rejection that progressively locked them out of classroom social circles. Russell's research is supported by previous studies that acknowledge that students with ASD lack the understanding of how behaviors may need to vary in different social situations, thus children with ASD are often out of sync with ongoing social circumstances. As a result of this skill deficit, it is suggested that children with ASD opt to take the anti-social route and play alone (Vaughn, Hogan, Kouzekanni, & Shapiro, 1990).

Russell (1997) also expands on how the issue of limited communication skills in children with ASD may also be socially inhibiting. While many high-functioning children with ASD may have a good vocabulary and adequate articulation skills, they may not be able to effectively communicate due to their poor use of language (Konig & Magill-Evans, 2001). Russell observed that this communication breakdown often coincided with the constant repetition of the same question and insistence on the same topic of discussion. With only literal understanding and the inability to understand humor, this communication breakdown is further exasperated (Bryan & Bryan, 1983). Compounded with the inability to decipher facial expressions, gestures, signs, intonation and body language, students with ASD often encounter difficulties in their ability to socialize with peers. Ozonoff (2010) concludes that children with ASD are not in a social position that allows them to forge proper social skills, individually or successfully, unless they obtain direct assistance and modeling from a mediator, typically in the form of social skills training. Without such interventions, behavior problems are likely to develop and be maintained.

**Behavior problems.** Repetitive and stereotyped behavior is another impairment that children with ASD often exhibit. They do not develop the ability to use their imagination fully and thus tend to be insistently engaged on carrying out specific routine activities that are self-stimulating (Aboud & Mendelson, 1998). For example, children with ASD often are able to only focus on minute details, omitting the larger scope of the situation. As Locke, Ishijima, Kasari, and London (2010) reveal, individuals with ASD are rarely able to understand someone else's perspective and tend to assume that the other person's thoughts are exactly the same as their own. This often can result in behavioral problems when children with ASD are redirected to tasks that do not allow them to indulge in their preferred routines (Chandler-Olcott & Kluth, 2009). In any environment, change (which may inhibit the preferred routines) is unavoidable, hence children

with ASD are likely to react negatively (e.g., by showing anxiety, frustration, temper tantrums) when their specific interests are limited or routines disrupted (Asher & Paquette, 2003).

Individuals with ASD often have significantly higher rates of sensory difficulties. These sensory impairments are thought to be triggered when the brain is not able to process information in a typical manner that often results in an individual being hypersensitive or hyposensitive to stimuli (Asher & Paquette, 2003). An instance of being hypersensitive is when a child with ASD is touched by one of his or her peers. This simple stimulus, which is often filtered out by peers without disabilities, can become a source of extreme agitation, which may result in an aggressive response or temper tantrum (Attwood, 2000). Attwood (2000) also states that common responses to sensory discomfort in children with ASD can result in repetitive actions such as spinning, jumping, or flicking of objects, which may serve to calm the child from the stimuli. These types of spontaneous externalizing responses to typical stimuli may come across to peers as being annoying or disruptive (Campbell, Ferguson, Herzinger, Jackson, & Mariano, 2004; Rosenbaum, Armstrong, & King, 1986; Swaim & Morgan, 2001).

With the behavioral difficulties that the majority of students with ASD exhibit, relatively little is known about the quality of their social interactions with peers in the inclusive classroom. Recent examinations of children with identified behavioral disorders (not ASD specific) have found that the social networks in which they were affiliated, consisted of peers with similar social and behavioral characteristics. Farmer and Farmer (1996), Farmer and Hollowell (1994) and Farmer, Pearl, and Van Acker (1996) found that youth with emotional behavior disorders (EBD) in mainstream settings tended to affiliate with other students who had higher levels of disruptive behavior and lower levels of peer-assessed positive characteristics (e.g., leader or cooperative). They also found that aggressive behaviors did not impede on positions of social

prominence and that, in fact, some children with EBD attained highly central positions in their peer groups. Therefore, it is plausible that children with ASD, who exhibit behavioral difficulties, may indeed be able to find similar affiliates in their classrooms.

**Social cognition.** An investigation into the peer relations of children with ASD is not complete without considering the role of social cognition. Given that social cognition is thought to mediate the relationship between social cues and an individual's response to that cue, examining the role of social cognition in peer interactions seems vital (Augoustinos, Walker, & Donaghue, 2006). For children with ASD, substantiating the existence of social-cognitive deficits could suggest that intervening with these problematic social cognitions may be a more effective means of improving their ability to understand and respond appropriately to social cues, thus allowing positive social functioning and peer social acceptance (Boutot & Bryant, 2005).

Altering social cognitions may be an alternative way to improve children's social difficulties and is of interest due to the ineffectiveness of previous social skills training programs in maintaining and generalizing the behavioral and social gains that children initially make (DuPaul & Eckert, 1994; Zaragoza, Vaughn, & McIntosh, 1991). The idea of moving towards cognitive-based interventions is just beginning to surface in studies with children with ASD, specifically in the population of high-functioning children with ASD as it has been shown that they exhibit higher capacities for cognitive tasks when compared to low-functioning children with ASD (Leekam, Prior, & Uljarevic, 2011; Minne & Semrud-Clikeman, 2011; Sofronoff, Eloff, Sheffield, & Attwood, 2011; Stichter, O'Connor, Herzog, Lierheimer, & McGhee, 2012; Stichter et al., 2010).

High-functioning children with ASD often perform in the normal range on intelligence testing and have been shown to engage in higher levels of social relationships in special

education classrooms and often have the capacity to understand more complex emotions than low-functioning children with ASD (Bauminger, 2002). It has been proposed that high-functioning children with ASD compensate for their social deficits by utilizing their relatively high cognitive abilities (Hermelin & O'Connor, 1985; Kasari, Chamberlain, & Bauminger, 2001; Sigman & Ruskin, 1999). Therefore, it seems to reason, that children with ASD may have more social and perceptive capabilities to develop and interact socially with peers. However, knowing that children with ASD often have difficulties in social-cognitive processing, the accuracy in which they perceive the behaviors of their peers and their own behaviors in the inclusive setting warrants further investigation. The information yielded from such studies may carry significant implications for possible interventions, specifically, in teaching children with ASD how to read and respond to social cues so that they are able to self-regulate behaviors to match the social situations in which they are involved. Without such knowledge, it is likely that these students will continue to be victims of social rejection.

### **Research on the Social-Cognitive Deficits of Students with ASD**

Research has been accumulating since 1943 when Leo Kanner first introduced ASD. He defined ASD as a developmental disorder characterized by qualitative impairments in reciprocal social interactions, qualitative delays in early language and communication, and presence of repetitive stereotyped behavior and/or restricted interests. While there are a number of diverse perspectives and theories offering ways of defining and understanding the dynamics of ASD, there is a consensus with Kanner's (1943) definition that individuals with ASD have impaired social cognitions in that they are less successful at reasoning about what other people think, know or believe, in recognizing affective expressions and interpreting gestures, and in making judgments about behavior (Baron-Cohen, Golan, & Ashwin, 2009; Hobson, Lee, & Hobson,

2010; Loveland, 2005; Loveland & Tunali-Kotoski, 2005; Volkmar et al., 1997). It also has been suggested that the behavioral manifestations of ASD are the results of these underlying social-cognitive deficiencies and are the influential factors that lead to social rejection (Baron-Cohen, Golan, & Ashwin, 2009; Baron-Cohen, Leslie, & Frith, 1985; Couture et al., 2010; Hobson, Lee, & Hobson, 2010; Kievit & Geurts, 2011; Schwenck et al., 2011; Serra, 1996; South, Dana, White, & Crowley, 2011).

By the very nature of its definition, children with ASD demonstrate impairments in social-cognitive abilities. Bauminger (2002) provides a succinct definition of what constitutes social cognition and the mechanisms that operate within it. According to Bauminger (2002):

Social cognition includes the ability to spontaneously read and correctly interpret verbal and nonverbal social and emotional cues; the ability to recognize central and peripheral social and emotional information; the knowledge of different social behaviors and their consequences in diverse social tasks (e.g., how to initiate a conversation, how to negotiate needs, how to make group entry); and the ability to make an adequate attribution about another person's mental state (p. 284).

Recognizing that there are a variety of identified constructs that have been used in other studies to define social cognition and social-cognitive abilities, the operational framework offered by Bauminger (2002) will be utilized for purposes of discussion in this paper. Hence, discussion will focus on the areas of (a) verbal and nonverbal social and emotional recognition, (b) the ability to focus on larger social contexts (e.g., the classroom), and (c) the ability to attribute mental states to other people as a way of predicting behavior. Bauminger (2002) posits that deficiencies in any of these domains may affect how children with ASD perceive and understand their own behaviors and the behaviors of their peers in response to various social stimuli. The

decision to use this model stems from these inferences as well as the fact that the three named constructs have been empirically explored in relation to high-functioning children with ASD in a number of studies (e.g., Frith & Hill, 2004; Happé, 2004; Pierce et al., 1997; Repacholi & Slaughter, 2003; Stone, Ousley, Yoder, Hogan, & Hepburn, 1997; van Roekel, Scholte, & Didden, 2010) and are the most relatable in laying the foundation of social-cognitive inquiry in the present study.

**Verbal and nonverbal social and emotional cues.** The first domain that Bauminger (2002) recognizes as being important in achieving social competence is the ability to understand verbal and nonverbal social and emotional cues. A child's ability to discriminate among various affective expressions in facial, gestural, and verbal displays, both in others and in one's self, as well as the ability to understand their social-contextual meaning is known as emotion recognition (Buitelaar, Van der Wees, Swaab-Barneveld, & Van de Gaarg, 1999). Emotion recognition is an area of social cognition that has continually been identified as problematic for children with ASD. However, a number of more recent studies have focused on high-functioning children with ASD and have tested their abilities to understand a variety of basic emotions such as sadness, happiness, anger, fear and socially complex emotions such as empathy, loneliness, embarrassment, surprise, and pride (e.g., Bacon et al., 1998; Bauminger and Kasari, 2000; Bormann-Kischkel, Vilsmeier, & Baude, 1995; Buitelaar et al., 1999; Jaedicke, Storoschuk, & Lord, 1994; Kasari, Chamberlain, Paparella, & Bauminger, 1999; Loveland et al., 1997).

Contradictory to Kanner's definition (1943), high-functioning children with ASD were able to recognize simple emotions (e.g., happy, sad, angry) with levels of significance when they were presented implicitly and explicitly in a variety of social contexts (e.g., Capps et al., 1992; Rotheram, Kasari, Chamberlain, & Locke, 2010, Garfinkle & Schwartz, 2002; Loveland et al.,



1997). Additionally, Bauminger (2002) found that when children with ASD were asked to explain the causes of simple and complex emotions (e.g., surprise, empathy, fear), that they exhibited significant difficulties in doing so. Bauminger (2002) further analyzed the emotions presented in the tasks and the responses given by his subjects. He discovered that complex emotions that required a social understanding of cultural norms and rules of behavior (e.g., guilt), or required a self-other perspective (e.g., embarrassment), and emotions that were reflective of one's own behavior (e.g., pride) were less likely to be understood by children with ASD. The implications of his study suggests that high-functioning children with ASD need intervention in broadening their knowledge base of complex emotions and in linking simple and complex emotions to different social situations. By not having a developed knowledge base of these types of emotions, children with ASD may not be able to accurately interpret nonverbal social cues from their peers, thus inhibiting their ability to learn contextually bound prosocial behaviors.

**Understanding larger contexts.** A second tenet in Bauminger's (2002) model of social-cognitive competency is that of understanding larger social contexts. Children with ASD often do not show an understanding of the social meanings related to social stimuli; rather they tend to focus on the physical characteristics of the environment. For example, Bauminger and Shulman (2003) investigated the social-cognitive abilities of high-functioning adolescents with ASD in terms of being able to describe the affective dimensions of various scenarios involving children interacting in different social situations. In one sampling, subjects were shown a picture of two friends sharing a secret together. Rather than describing the affective elements of the friendship as children without disabilities often did, the adolescents with ASD described more physical features in the scene, such as how the girls were sitting close to one another, the clouds in the sky, and the color of the children's clothing. They did not seem to have an understanding of the girls'

relationship with one another such as the intimacy of sharing a secret, trusting someone to keep a secret, or how secrets are part of friendships.

Klin (2000) also found similar results in his investigation of how children with ASD experienced various social scenes with cartoon figures. A comparison group of same-aged matched peers with no identified disabilities described the cartoon figures using significantly higher rates of affective terminology and references to social norms and conventions (e.g., referencing school rules) whereas the group of children with ASD was less able to infer personality features from the cartoon characters' actions, were less aware of social elements and used very few affective terms. Klin (2000) questioned whether the lack of socially sophisticated understanding by the children with ASD was due to a lack of social understanding or from processing issues. He concluded in his study, the same recommendations found in previous studies, particularly that children with ASD were in need of help in understanding social norms and rules (Kunce & Mesibov, 1988) and in processing of social information (Attwood, 1998).

The research findings of Siegel, Goldstein, and Minshew (1996) extends these recommendations to include that interventions should also teach skills in how to read social cues in different social situations, skills that would enhance the capacity for accuracy in social interpretations as well as increasing the repertoire of providing alternative behaviors in response to different social tasks. Siegel and colleagues (1996) contend that such interventions are vital in assisting children with ASD in processing the larger context of their social environment so that they are able to be more socially competent. By not understanding the larger scope of their environments, these children are often not able to learn appropriate prosocial behaviors that fit specific social situations.

**Theory of mind.** The final construct that Bauminger (2002) recognizes as a domain of social cognition is theory of mind (ToM). ToM is the ability of an individual to make inferences about what others are thinking and feeling by attributing mental states (e.g., desires, imagination, intentions, beliefs, and emotions) to self and others to understand and predict behavior accordingly (Baron-Cohen, 2001; Baron-Cohen, Leslie, & Frith, 1985; Frith, 2000). Evidence suggests that high-functioning children with ASD have mixed capabilities when responding to different complexity levels of ToM tasks. For example, Bauminger and Kasari (1999) conducted a study that assessed the ToM abilities in 22 high-functioning children with ASD and 19 children without disabilities that were between the ages of 7 and 15 years old. The investigators administered a measurement task that was created by Perner and Wimmer in 1985. This task has been widely used to measure's children's ToM, specifically children's ability to take into account what people think about other people's thoughts. The task uses various props, such as a toy village that includes two houses, a school, a park and four characters (e.g., two children: John and Mary and two adults: John's mother and a man selling ice cream). The administrator sets up the village in front of the examinee and then uses the four characters to act out the following story:

The story starts when John and Mary are in the park and see an ice-cream man coming to the park. John wants to buy an ice cream, but does not have money. The ice-cream man tells John that he can go home and get money, because he is planning to stay in the park all afternoon. Then John goes home to get money. Now, the ice-cream man changes his mind and decides to go and sell ice cream in the school. Mary knows that the ice-cream man has changed his mind. She also knows that John could not know that (e.g., John already went home). The ice-

cream man goes to school, and on his way he passes John's house. John sees him and asks him where is he going. The ice-cream man tells John that he is going to school to sell ice cream there. Mary at the time was still in the park, thus could not hear their conversation. Then Mary goes home, and later she goes to John's house. John's mother tells Mary that John had gone to buy ice cream.

Throughout the telling of the story, the administrator prompts the examinee to assess the comprehension of the story. For example, when the ice-cream man tells John that he will be in the park all afternoon, the examinee is asked: "Where did the ice-cream man say to John he would be all afternoon?" When Mary approaches John's mother, the examinee is then asked a belief question (i.e., a question that requires individuals to integrate their beliefs and their awareness of someone else's different belief), "Where does Mary think that John has gone to buy an ice cream?" The appropriate answer is "in the park" since Mary is not aware that John has already spoken with the ice-cream man. The examinee is then asked a justification question ("Why?") so as to inquire about the thinking behind the answer he or she gave on the belief question. The justification question is an important indicator of the examinee's ability to take Mary's point of view. This type of questioning and perspective taking is often referred to as a second-order belief attribution task (see Bennett & Matthews, 2000 for a detailed review) because the examinee is required to understand that: *Mary thinks* that *John thinks* that the ice-cream man is in the *park*, when in fact, *John knows* that the ice-cream man is at the *school*. This justification question also assesses the examinee's ability to differentiate between the self and others, which provides information on the examinee's development of ToM (Perner & Wimmer, 1985).

At the end of the telling of the story, the examinee is then asked a reality question: "Where did John really go to buy an ice cream?" and a question to cue memory: "Where was the ice-cream man in the beginning of the story?" This last question is used to assess that an incorrect answer on the belief question was due to a lack of recall in regards to the location of the ice-cream man at the start of the story. The reality question is used to assess whether the examinee's answer was related to his or her understanding of the story (Baron-Cohen, Leslie, & Frith, 1985). In 1999, Bauminger and Kasari analyzed examinees' responses to these questions and found that children with ASD, who had significantly higher full-scale and verbal I.Q. scores, and children without disabilities performed equally as well on the belief question and equally as well in the complexity of the justification of their responses to the belief question. The findings of their study are significant in that it suggests that children with ASD, specifically those high-functioning individuals with ASD, possess the same general cognitive ability to answer the task questions and to justify their answers at similar levels of complexity than their peers without disabilities.

Despite the above findings, children with ASD, as a group, tended to answer the belief question with accuracy however they were more likely to provide incorrect or irrelevant responses in their justification of their answer to the belief question. Such findings suggest that children with ASD, who also have high cognitive abilities, do not fully compensate for deficiencies in social understanding as was suggested earlier in this paper. Further, it is likely that the irrelevant responses given by these students to the justification question is reflective of inadequacies in social understanding. Other investigations have found similar patterns of deficiencies in children with ASD on similar ToM tasks (e.g., Dahlgren & Trillingsgaard, 1996; Fine, Lumsden, & Blair, 2001; Gillot, Furniss, & Walter, 2004; Happé, 1994; Liddle & Nettle,

2006) suggesting that children with ASD may benefit from interventions that teach ToM tasks as a way of improving social competence.

While the current study does not explicitly measure the three domains of social cognition as offered in Bauminger's model, the implications in the ToM domain are of significance and are relatable in examining the peer relations of children with ASD in inclusive classroom settings. For example, according to Bauminger and Kasari (1999), a key component in understanding relationships is what children understand about themselves and other people. Using the findings from the above studies and the Perner and Wimmer (1985) task, it seems to reason that if children with ASD do not fully understand their peers' mental states, then their ability to mediate and direct reciprocity in relationships would become a daunting task.

Secondly, it might also be inferred that children with ASD, who do exhibit impairments in ToM, would be at a greater risk of misinterpreting the social behaviors of their peers, which may in turn lead to an increase in peer affiliations with other less socially competent peers (i.e., peers that exhibit high rates of antisocial behaviors). And lastly, it has been suggested that self-perceptions are shaped in large part by the culmination of many factors, such as interpretations of interactions with others, social comparison with peers, behavioral tendencies and other social-cognitive domains (e.g., Cooley, 1902; Jussim, 2005; Ruble, Boggiano, Feldman, & Lobel, 1980; Shavelson, Hubner, & Stanton, 1976). Therefore, it seems plausible that children with ASD may perceive themselves in one way, while their peers perceive them in another. For example, a child with ASD may think of herself as being shy, friendly, and helpful, while her peers may view her as being aggressive, sad, and unfriendly. The differences in perceptions could be a factor in why children with ASD continue to be at a heightened risk for peer rejection as it is possible that they are not aware of their behaviors or their reactions to their peers' behaviors.

It appears that social cognition is an important factor that needs to be considered when examining the social competencies of children, especially children with ASD who are already at a heightened risk for peer rejection. Taking into account that children with ASD have been shown to have impaired social cognitions, specifically in the domains of verbal and nonverbal social and emotional recognition, the ability to focus on larger social contexts, and deficits in ToM, it isn't difficult to understand why they are a population that seems to be continually rejected by their peers without disabilities. There are many perspectives that have been put forward to further explain this situation, specifically the social skills deficit/peer rejection perspective, the social network perspective, and, as previously discussed, the theory of mind perspective. Each of these theoretical perspectives are briefly summarized below.

### **Theoretical Perspectives**

**Social skills deficit/Peer rejection perspective.** One well established perspective, the social skills deficit/peer rejection perspective, has commonly been used to explain the social difficulties of students. The premise of this perspective suggests that students with disabilities tend to have low social acceptance and are often rejected by their peers due to deficits in cognitive and behavioral social skills (Farmer & Farmer, 1996). In this perspective, social skills training is identified as the vital intervention to help lessen these deficits (Asher, 1990; Cairns et al., 1988). There is strong empirical support for the social skills deficit/peer rejection perspective (see Asher & Coie, 1990; Hymel & Rubin, 1985).

The social skills deficit/peer rejection perspective uses sociometric status (a more detailed definition of sociometrics will be provided later in the paper) to determine the acceptance/rejection levels of students. Through either peer ratings or peer nominations, students are asked to rate the level in which they like their classmates. The peer nominations or peer ratings are

transformed into averaged scores (for peer ratings) or Z-scores. Then, each student's score is compared to the scores of his or her classmates (peer consensus reports) and are categorized according to a predetermined sociometric scale (e.g., popular, average, controversial, neglected, rejected) to determine sociometric status (Coie, Dodge, & Copotelli, 1982; Sabornie & Kauffman, 1987). Rejected status is one level of sociometric status. These students have been found to be more likely to display aggressive and disruptive behaviors (Bellini, 2006a; Hay, Hudson, & Liang, 2010) whereas students with more prosocial attributes, such as leadership and cooperative behaviors, are more likely to have popular status (Asher & Coie, 1990; Hymel & Rubin, 1985). Lower sociometric-status levels and associative problematic behaviors, as discussed previously, have often been interpreted to mean that rejected children do not have friends or peer relations, which has been found not to be the case (Cairns & Cairns, 1991).

While sociometric-status procedures measure a student's overall social acceptance, they do not reveal whether the child has actual friends or peer relations in the classroom. As Farmer and Farmer (1996) have identified, there are three concerns when using sociometric procedures:

1. Students who associate with less popular classmates may not name their actual associates as the classmates that they like most as they may like popular-status students who have more popular statuses more than their own associates.
2. The status-classification procedures makes it possible to assign a student to a 'rejected' status even though he or she may receive a few positive nominations, along with a high number of negative nominations.
3. The sociometric-status classification system does not retain information about the social characteristics of the student's friends and associates (p. 433).



As Farmer and Farmer (1996) indicate, the social skills deficit/peer rejection perspective does not provide for an accurate account of children's peer relations. For example, the association between low sociometric status and having problematic behaviors (i.e., fights, seeks help, etc.) seems to imply that these behaviors inhibit social relations and that these children are without friends. An alternative perspective, the social network perspective, has been offered that takes into account that children with problematic behaviors are not always without friends or peer associates.

**Social network perspective.** The social network perspective is an alternative but complimentary perspective to the social skills deficit/peer rejection perspective. While it uses similar identifiers in categorizing students as being rejected, popular, etc., SNA extends beyond the social skill deficit/peer rejection perspective as it factors in and addresses the concerns that Farmer and Farmer (1996) discuss. This perspective is based on shifting the focus on an individual's behavioral attributes to a focus on the social structure in their classroom. Social networks, as defined in this perspective, refer to an individual's social position and his/her peer groups situated within a broader social context (e.g., classroom, school). Specifically, this perspective suggests that peer rejection can be attributed to the peers and the peer groups in which a child affiliates. It describes, not only who affiliates with whom, but it reveals who affiliates with whom *and* how prominent (salient) the various groups and individuals are within their setting which offers a more accurate account of the social world of children.

From a developmental perspective, classroom social structures are a complex web of both individual and group factors. For example, in studies at the elementary and secondary school levels, investigators have found that students form social networks that are composed of distinct peer clusters that are reflective of similar attributes amongst its cluster mates. For example,

cluster mates tended to share a variety of social and interpersonal characteristics such as gender, behavior, and leadership to name a few (Adler, Kless, & Adler, 1992; Cairns, Perrin, & Cairns, 1985; Farmer & Hollowell, 1994; Hallinan & Smith, 1989; Kindermann, 1993; Kinney, 1993; Neckerman, 1990; Shrum, Cheeck, & Hunter, 1998).

According to Farmer and Farmer (1996), the premise of the social network perspective can be crudely summarized in that “social structures are formed in a nonrandom fashion that both reflects and promotes similarities among peer associates” and that “such similarity is considered to result from two different distinct social processes: (a) selective homophilic affiliation, and (b) synchrony in social interchanges” (p. 433). *Homophily* is defined as the tendency for individuals to associate with other peers who have similar characteristics to their own (e.g., gender, demographics, social and behavioral characteristics) (Cohen, 1977; Kandel, 1978; Kandel, Davies, & Baydar, 1990; Neckerman, 1990). *Social synchrony* is a term that refers to the "tendency of peers to organize their behavior whereas the behavior of each supports that of the other through either reciprocal or complimentary interchanges" (Farmer & Farmer, 1996).

*Reciprocal interchanges* are those interactions between peers where each peer is viewed as socially equal. Through reciprocal interchanges, each peer has something to share in the relationship as well as supporting the viewpoints of their counterpart. There is a balance between give-and-take in this relationship as each peer maintains similar behaviors and viewpoints (Cairns, 1979; Youniss, 1980). In *complementarity interchanges*, peers are not seen as being equal and often engage in different acts towards each other. The actions of an individual supports the actions of another peer as both are needed to maintain the interactions that are engaged in (Cairns, 1979). Similarity in behaviors and viewpoints can be supported as

peers often influence the behaviors and viewpoints of another peer (Youniss, 1980). These interchanges, whether reciprocal or complementarity, are important in understanding how children develop socially and competent they are in forming and maintaining social relations with their peers

Social networks are an important aspect in understanding the social development of students with disabilities as it analyzes the characteristics of the classroom social structure as being influential in the behavioral characteristics of the child and vice versa (Farmer & Farmer, 1996). As Farmer and Farmer (1996) explain:

In general education classrooms, students form social structures that are stratified along dimensions of specific behavioral, social, and demographic characteristics such that their peer associations reflect both social and structural constraints (e.g., homophilic selection) and socialization processes (e.g., social synchrony, reciprocity, and complementarity). That is, specific characteristics are likely to result in membership in specific peer clusters. In turn, these peer associations are likely to promote specific social and behavioral characteristics that support the same or similar peer associations (p. 434).

To better understand the influence between classroom structures and individual and group characteristics, the following examples are provided. Pelligrini (1998), and Pepler, Craig, and Roberts (1998), found that peer associations where similarity in behavior patterns were shared amongst group members, was only one supportive factor in their social bonding. The investigators researched the processes of complementarity, where children who were dissimilar were found to be supportive of each other's behavior. They observed that children with highly aggressive behavior associated with peers with whom they could bully and with peers who were

not aggressive but reinforced and supported their aggression. Cairns, Cadwallader, Estell, and Neckerman (1997) suggested that the aggression of these individuals was valued and supported by nonaggressive peers as it served as a means of protection or promoted their statuses with other peers. Cairns et al. (1988) also found that highly aggressive boys tended to affiliate with other aggressive boys but that their shared aggressive behaviors helped them to develop prominent or influential social roles that served to sustain these aggressive patterns (Farmer & Farmer, 1996; Farmer et al., 1999; Locke, Ishijima, Kasari, & London, 2010). As a result, aggressive children may become rejected but are treated by their peers in ways that provoke and reinforce their aggressive behaviors (Chamberlain, Kasari, & Rotheram-Fuller, 2007).

Thus, assertions that children with low peer acceptance are synonymous with not having friends are incorrect. As with the research described previously, studies done by others, such as Hoff, DuPaul, and Handwerk (2003), Rodkin, Farmer, Pearl, and Van Acker (2006), and Wiener and Schneider (2002), have shown, although students have low peer acceptance status and are not well liked by their peers, that these students are capable of affiliating and establishing friendships with their peers. Thus, it is very possible that children with ASD who have been consistently identified as rejected through sociometric methods, may actually have peer relations, but available research is limited as the use of the social network perspective is just beginning to be applied to this population. It is plausible that these students are rejected, not because of deficiencies in social skills, but by the types of peers and peer groups with whom they affiliate.

**Theory of mind perspective.** Theory of mind (ToM) is another perspective that also has been considered to underpin human interactions, or more specifically, peer relationships (Coie et al., 1992). As introduced previously, ToM refers to the cognitive ability to predict and explain behaviors with reference to internal, mental states (see Baron-Cohen, 1995). More specifically,

ToM involves understanding a myriad of different mental states that includes emotions, intentions, desires, percepts and beliefs (Baron-Cohen, 1994; Lee, Eskritt, Symons, & Muir, 1998). A number of studies have found evidence that individual differences in ToM abilities are linked to particular aspects of social functioning. For example, Lalonde and Chandler (1995) reported that children's performance on ToM tasks was positively correlated to socially competent behaviors that rely on an understanding of their peer's mental states (e.g., cooperatively playing with a small group of peers; engaging in make-believe play with others). Dunn and colleagues (Dunn, 1996; Hughes & Dunn, 1997; Macguire & Dunn, 1997) have also shown that children who performed well on ToM tasks are more likely to engage in positive peer interactions. For example, these children tended to play with peers in a coordinated give-and-take fashion as well as being able to keep conversation connected and on-going during play (Slomkowski & Dunn, 1996).

Slaughter, Dennis, and Pritchard (2002) studied the relations between sociometric status, aggressive and prosocial behaviors, and ToM in two samples of preschoolers. The results of their studies found a developmental trend where ToM ability was the best predictor of popularity for children over 5 years old. For children that were under the age of 5, the best predictors of peer popularity were based on the frequency of prosocial behavior and aggression. Likewise, Peterson and Siegel (2002) reported that preschoolers who were popular scored significantly higher on ToM tasks than peers with rejected status. Additionally, popular children who reported having at least one mutual friendship obtained the highest ToM scores whereas children with rejected status and no mutual friends were among the lowest scorers.

Investigations such as the aforementioned have revealed some level of positive relation between an intact ToM and social functioning. These findings suggest and support the theory

that an intact and well functioning ToM promotes social competence and that delays in ToM development are more likely to have a negative impact on children's social functioning. Support for the detriment of underdeveloped ToM abilities has been consistently demonstrated in the research on children with ASD. Researchers such as Baron-Cohen, Leslie, & Frith (1985) have found that children with ASD exhibit impairments in a specific ToM deficit which they suggest accounts for the range of social problems that these children encounter which puts them at a heightened risk for peer rejection.

The suggestion of ToM being a possible factor that contributes to peer rejection for children with ASD, is based on studies that have found that it is hard for these children to deal with the ambiguities in making inferences and predictions when in different situations (false-belief tasks). For example, children with ASD often do not have the cognitive capacities to successfully interpret such things as people's facial expressions, their tone of voice, posture, or gestures. Without this ability, a child is not able to make accurate judgments about a person's state of mind, emotions, and intentions which often leads to observable inappropriate social behaviors (Hughes & Leekam, 2004; Repacholi & Slaughter, 2003; Wellman, Cross, & Watson, 2001).

A child's lack of social competence becomes observable when he or she uses faulty interpretations to make inferences about another person's inner states and, in turn, uses that information to make decisions on how to respond to the person and situation (Carpendale & Lewis, 2004). For example, if a child misreads another peer's teasing as a threat, that child might react aggressively. In this case, the behavioral reaction is not a result of inadequate social skills, rather it is due to impairments in social cognition. These kinds of 'misreadings' have been extensively studied in children, especially in children with ASD, as a means of developing

appropriate interventions to help in the ability to develop friendships and peer relations (e.g., Berlin, Cassidy, & Appleyard, 2008; Hobson, 2005; Kasari et al., 2001; Tager-Flusberg, 2007). Further support for ToM as a mediating factor in peer relations are provided in studies that have focused on social cognition and self-perception, particularly, the accuracy of self-perceptive abilities.

### **Social Cognition and Self-Perception**

The development of self-perception, particularly the accuracy of those perceptions among children, has increasingly been studied in relation to children's friendships and peer associations (Jussim, 2005; Salley, Vannatta, Gerhardt, & Noll, 2010). It has been proposed that self-perceptions are reflective of a variety of general and specific personal attributes including behavioral tendencies, physical characteristics, and domains of social competency (Jussim, 2005; Shavelson, Hubner, Stanton, 1976). Assessments and evaluations of perceptions are a primary component in investigating the quality of a relationship (Furman, 1996).

How a child perceives the quality of his or her relationship with peers not only affects his or her own behavior towards others, but also is correlated to his or her evaluations of his or her friends' behavior (Oltmanns & Turkheimer, 2009). It has been presumed that children's self-perceptions of their own behaviors is a result of their perception and subsequent internalization of their peers' appraisals (Parker & Asher, 1987; Swenson & Rose, 2009; Salley, Vannatta, Gerhardt, & Noll, 2010). Research such as that of Brendgen et al. (2009) have identified that children's perceptions of their peer relationships is vital in understanding the quality of the interactions that children engage in with their peers and that these perceptions are highly indicative in which direction the relationship takes.

Existing research has provided strong evidence that children with ASD do experience difficulties in ToM tasks, specifically those tasks that require self-other perception taking. There is also evidence that these children do indeed experience higher rates of peer rejection because of inappropriate situational behaviors. However, most of these studies have assessed the social relations and social competencies of these students with input coming from teachers, peers, and parents (e.g., Merrell, 1999). Few, if any, studies have looked at how children with ASD perceive their own behaviors and how they interpret the behaviors of their peers. It is possible that children with ASD are not accurately perceiving their own behaviors or the behaviors of their peers, which would offer an explanation as to why their behaviors often seem socially inappropriate. Though, it might also be possible that children with ASD are able to perceive the behaviors of their peers with accuracy and are rejected because of the peers in which they affiliate.

The lack of a solid understanding of this hypothesis makes it challenging to provide appropriate interventions. If children with ASD are not able to perceive the behaviors of self and others, then suggested interventions would be cognitively based. However, if the latter is true, it would seem that ecologically based interventions (i.e., looking at peer group formations, classroom placements) would be more effective in helping these children gain peer acceptance. Further, without this information, it is difficult to understand the extent to which children with ASD are benefitting from social inclusion.

### **Inclusion and Children with ASD**

For children, school is where a majority of their waking hours are spent. Thus, it seems that the most 'natural context' in which opportunities for students with ASD to spontaneously interact with peers without disabilities would best be offered in the general education classroom



setting. Access to peer modeling of students without disabilities has been a core premise for the initial conceptualization of social inclusion for children in other educational classifications, specifically children in higher incidence disability categories (e.g., SLD, EBD, CDB, S/L). It was thought that exposure to peers without disabilities would increase social competencies for children with disabilities; specifically their ability to self-regulate behavior and to develop peer relations. Though there are mixed findings, a strong body of research suggests that learning alongside children without disabilities can result in significant social, emotional, cognitive and academic gains for children with disabilities (e.g., Fisher & Meyer, 2002; Peterson & Slaughter, 2002; Stahmer & Ingersoll, 2004; Whitaker, 2004).

Taking into consideration that developing friendships constitutes a core area of deficit in children with ASD, it would inherently seem that they are a vulnerable population that is subjected to higher rates of peer rejection (Handleman, 1999). It has long been thought that children with ASD simply lacked the desire to engage in peer interactions and preferred being alone (Bandura, 1989). However, there is evidence that suggests that high-functioning children with ASD are aware of their peers and do have a desire for friendships (e.g., Bauminger, Solomon, & Rogers, 2010; Bauminger, Shulman, & Agam, 2003; Ferraiolo & Harris, 2011; Smith et al., 2000). Numerous interventions, such as social skills building, have focused on improving the social interactions of children with ASD as a means of promoting their success in developing peer relations and friendships.

However, several laboratory-based findings suggest that high-functioning children with ASD have the cognitive capacity to learn from social skill training interventions but are not successful in generalizing those skills outside of the laboratory environment (e.g., Cappadocia & Weiss, 2011; Collins, 2010; Schrandt, Buffington, & Poulson, 2011). As a result, the National

Research Council (2001) recommended that students with ASD be taught skills in the natural contexts in which they would naturally be a part. Coupled with the legal mandates of the Individuals with Disabilities Education Improvement Act of 2004, more students with disabilities, including students with ASD, are being placed in the general education classrooms in public schools. It has been suggested that this placement would give these students increased opportunities for spontaneous peer interactions and social skill learning in a naturalistic environment, which in turn, would provide them the ability to learn and adjust their behaviors so that they are able to develop peer relations and friendships.

However, despite the increasing numbers of children with ASD in the inclusive classroom setting, not much is known about how they are socially faring with the exception that they are still more likely to be rejected by their inclusive peers (e.g., Koenig & Magill-Evans, 2001; Orsmond, Krauss, & Seltzer, 2004; Schmidt, Demulder, & Denham, 2002). Few studies have extended their investigations to include an examination of the social networks of children with ASD. As suggested earlier in this review, it is very possible that children with ASD are indeed rejected by their peers but this is not to say that they are without friends. The use of SCM is one methodology that takes these two variables (social status and social network affiliation) into account and not only reveals if a child is rejected, but also indicates if the rejected child affiliates with other peers and the strength of those affiliations (Farmer & Rodkin, 1996).

To date, only a few studies have been located that have utilized the SCM procedure in assessing the peer relations of students with ASD (e.g., Bauminger, Shulman, & Agam, 2003; Bauminger, 2002; Bauminger & Kasari, 1999; Konig & Magill-Evans, 2001). Further, it is difficult to compare studies that have used ecological approaches to gain an overall understanding of the levels in which children with ASD are socially integrating in their inclusive

classrooms because the variables that are measured and the means of measurements vary from study to study. For purposes of this study, the constructs of social competency; peer relations, social skills, behavior, and social cognition have already been identified as variables of interest, while the means of measuring those variables are discussed in the following section.

### **Social Competency Variables**

There are many different ways in which researchers define and measure social competency or the levels of success that children have in social integration with peers. Probably the most integrative definition that supports the premise of inclusion is the definition used in studies like that of Boutot and Bryant (2005). In their study, the researchers investigated the peer relations of children with ASD that were included at varying levels in general education classrooms. To measure how integrated these children were, Boutot and Bryant (2005) used three interrelated factors that have been found to be associative and influential in assessing peer relations and social integration (social competence) in inclusive classrooms. These interrelated factors include the level of being socially accepted by other students (peer acceptance), someone with whom peers want to interact with (social preference), and being a member of a peer group that spends time together (social network affiliation).

The variables of interest in Boutot and Bryant's (2005) study are the same that other studies have used to measure the social competency of other groups of students with disabilities such as those students with emotional and behavioral disorders (e.g., Farmer et al., 2002; Rodkin, Farmer, Pearl, Van Acker, 2000; Stromshak et al., 1999), learning disabilities (e.g., Estell et al., 2008; Vaughn & Haager, 1994; Weiner & Tardif, 2004), and cognitive disorders (e.g., Beart, Hardy, & Buchan, 2005; de Bildt, Serra, Lutejin, Kraijer, Sytema, & Minderaa, 2005; Kraijer, 2000; Stone & LaGreca, 1990). Therefore, this study also uses these variables as a means of

measuring the social competence of children with ASD who are integrated in inclusive classrooms.

In addition, this study uses a fourth construct that is delineated in Vaughn and Haager's model but is not commonly used as a measurement variable in studies such as that of Boutot and Bryant's (2005) and that is *social cognition*. To date, there have been no studies that have been located that have measured the social integration of children with ASD using peer acceptance, social preference, social network affiliation *and* social cognition as variables of measuring social competency. The addition of social-cognitive accuracy as a unit of measurement seems to be an important aspect in examining the relations of students with ASD considering all of the evidence that suggests that these children have significant impairments in ToM (e.g., Boucher, 2012; Buaminger & Kasari, 1999; Durkin & Conti-Ramsden, 2010; Lerner, Hutchins, & Prelock, 2011; Mashhadi, Juzdani, & Borzabadi, 2011).

### **Social Cognition as an Indicator of Social Competence**

Peer perceptions of an individual's social skills are used to gain social status within a peer group (Estell, Cairns, Farmer, & Cairns, 2002). As Coie, Dodge, and Coppotelli (1982) claim, social competence in social skills is associated with peer acceptance or popular status, whereas poor social skills often are related to neglected or rejected states (p. 561). An individual's self-perception of social ability is reflective and based on the individual's assumption that performance on a social task was executed correctly (Klein, 2000). However, many studies have assumed that children's perceptions are accurate as social-cognitive accuracy measures are often not included. In investigations focusing on children with disabilities, especially those children with ASD, it seems that social-cognitive accuracy must be included as an element of measurement because numerous studies have established that this population of

students often have impaired social cognitions which is a factor that heightens their risk of peer rejection (e.g., Flood, Hare, & Wallis, 2011; Galway & Metsala, 2011; Konig, De Los Reyes; Cicchetti, Scahill, & Klin; 2009; Sibley, Evans, & Serpell, 2010; Symes & Humphrey, 2010; Whittington & Holland, 2011). Thus, it appears that social-cognitive accuracy has a direct impact on the social networks of children.

The interconnectedness of social-cognitive accuracy and social networks is best presented in various bodies of research that have found that a number of rejected children were strongly perceived as being aggressive and disruptive by their peers, yet the rejected children often had self-perceptions of themselves as being popular and socially competent (e.g., de Bruyn & van den Boom, 2005; Cole & Cole, 2001; Gresham & MacMillan, 1997; Pelligrini & Bartini, 2000). Farmer (2005) also stated that these rejected children also tended to rate themselves higher in social status than their peers, often perceiving themselves as being strongly involved in a peer group when in actuality they were not (Cairns & Cairns, 1994; Cantin & Boivin, 2004; Cole & Cole, 2001; Rodkin et al., 2000). It has been suggested that when children are not able to perceive relationships accurately, then moderating self-behaviors in compliance to classroom norms becomes a daunting task (Harter, 1988). Because of its importance and association with peer relations, the present study incorporates social-cognitive accuracy as a fourth variable in investigating the social networks of included children with ASD and their peer relations.

### **Social Competence Measures**

As briefly discussed earlier in this chapter, there are numerous ways in which researchers measure the social relations of children and their classroom social structures. The determination of which methodology is best for a proposed study depends on the variables that will be looked at. Increasingly, SCM has been employed as the preferred tool in assessing the peer relations of

children with and without disabilities. An advantage of employing SCM is that it allows for the assessment of both social cognition and social status. The following section will provide a summary of related measurements, while emphasizing the decision to use SCM as a primary measure in the current investigation.

**Sociometrics.** Sociometric measurement or assessment methods are used as tools to assess interpersonal relationships in a given social structure. They provide information about an individual's social competence and social status within a peer group by focusing on a child's relationships with regards to such constructs as social popularity, peer acceptance, and peer rejection. Some sociometric assessment methods are designed to derive information on peer social relationships by assessing children's positive and negative social perceptions of one another and self- perceptions of peers' social competencies or social standing.

Sociometrics typically involves the administration of peer rating, sociometric ranking or peer nomination scales to each child in the classroom. *Peer ratings* are typically conducted by providing a list of all of the children in a classroom along with a rating for social acceptance items such as "The most fun to play with, The least fun to play with," and "Has the most friends." Rating methods are typically based on Likert-type scales (e.g., Agree, Neutral, Disagree). *Sociometric rankings* are usually completed by the teacher of the classroom. In this method, teachers rank children on social dimensions similar to those provided by peers. Teachers may be asked to rank the children in the class that they view as having social behavior problems (e.g., name children who you feel are depressed, shy, socially withdrawn, hyperactive). These rankings often serve as an initial screening tool for identifying children who may need additional services or interventions.

*Peer nominations* often ask each child in a classroom to identify social preferences for their classmates. For example, children may be asked to name the three classmates in which they would most like to play and the three students with whom they would least like to play (Merrell, 1999). Peer behavioral assessments are another example of peer nominations that were used in the current study (see Measures for more details on this survey). In peer behavioral assessments, each student in a classroom may be given a survey in which he or she is asked to nominate up to three peers (including self if applicable) to a variety of behavioral descriptors (e.g., "This child is always sad in class").

The difference in the methods is that peer ratings yield information on each child in the classroom whereas sociometric rankings and peer nominations do not necessarily include every child in the classroom. Whichever measurement is chosen, each use predetermined computational analyses and predetermined scales to identify children's peer acceptance levels (e.g., popular, rejected, shy/withdrawn). These labels are used as indicators of the extent to which children affiliate with peers, and thus, of their overall functioning in the classroom.

**Social network analysis.** Social Network Analysis (SNA) is an alternative procedure to sociometrics that identifies a student's peer and social network affiliations (membership in a peer cluster) and his or her social position within the classroom (social network centrality). In SNA, children are asked to respond to the question "Are there any students in your class who hang around together a lot? Who are they?" In computing the number of nominations that each student receives, SNA is able to provide basic information such as who 'hangs out' with whom. SNA also uses the results from the nomination analysis to generate a composite social mapping of the classroom's social structure including peer clusters. The results of these mappings yields data as to how salient a particular peer group is within the class, as well as how salient an

individual in that group is. In addition, the *social network centrality* or a student's overall salience within the classroom can be determined.

Social network centrality of an individual student is configured by combining the centrality level of that student's peer group with his or her centrality (prominence) within that group (see Table 1).

Table 1.

*Data Yields from Social Network Analysis (SNA)*

Data Yield	How SNA conceptually calculates data yield	How SNA determines data yields
Identifying peer groups within a classroom	Tabulates the frequencies in which classmates nominate students to the same group.	Students whose profiles are correlated with at least 50% of the other members in a group are considered to be in that group.
Identifying centrality level of each peer group	The peer group in which the child who is named with the highest frequency by classmates is considered to be the central peer group. Remaining peer groups are compared to this central peer group to determine their level of centrality.	The average number of nominations for the two students in each social group that are most frequently named is compared to the average of the two students with the highest number of nominations in the most central group.
Identifying centrality level of each student in each peer group	The frequency of nominations that each student receives is compared to the two students in their group with the most nominations.	The frequency in which an individual is nominated to a peer group is compared to the average of the two students in that group with the greatest number of nominations.
Identifying social network centrality of each student in each peer group	Combines the individual centrality of each student within a group with the centrality of his or her group within the overall classroom social structure.	Individual and peer group centrality are combined and compared to a predetermined classification system which is used to designate a child as a nuclear, secondary, peripheral, or isolated member of their class.



In sum, the SNA procedure combines information from the nominations of the class regarding the social networks that exist and which students are a part of those networks to determine how salient an individual student is within the classroom's social structure (Farmer et al., 1999).

There are four possible classification systems (see Measures section for more details) that are used to identify centrality and social levels: nuclear, secondary, peripheral or isolated (Cairns, Garipey, & Kindermann, 1990; Cairns, Perrin, & Cairns, 1985).

While sociometric and SNA methodologies have been useful in identifying children who are rejected, it seems that SNA allows for a more accurate understanding of classroom social structures, particularly in its ability to incorporate other measurement tools that move beyond just the identification of social status. For example, SCM is one methodology of how SNA and peer behavioral assessments are correlated to yield such data.

**Social cognitive mapping.** Social Cognitive Mapping (SCM) is the term that is used to describe the use of SNA and peer behavioral assessments in studying peer relations. SCM typically involves a three-step process. First, the procedures of SNA are followed as stated in the previous section to configure individual and group positioning. Second, each child in the class is given a peer behavioral assessment survey as described in the discussion on sociometrics. The nominations for each student identified to each behavioral descriptor are then calculated according to the procedures used in sociometrics and are converted to Z-scores. And third, these scores are then correlated to students' individual status levels. The results then provide for a more in-depth understanding of individual and peer group affiliations, particularly in terms of behavioral attributes.

SCM has proven useful as a technique as a variety of social-cognitive measures can be derived from these peer reports. For example, beyond simply determining the composition of

peer groups within a classroom, with SCM it is also possible to assess how salient a particular group is within the class, as well as how salient an individual is in that peer group. In addition, it is also possible to determine each student's overall saliency in the class by configuring their "social network centrality." Social network centrality is calculated by combining the centrality level of an individual student's peer group with his or her centrality within that group (McConnell & Odom, 1986).

Social network centrality analysis can be used to determine who is the leader of a particular peer group and the behavioral characteristics that define that group, as often children are homophobic in selecting their peer affiliations. For example, Farmer, and Cairns (1991) have found that rejected children often affiliated with similar peers. Through SCM, the researchers also noticed a link between a child's rejected status and high rates of antisocial behaviors (e.g., starts fights, in trouble, shy). Hence, using SCM might just reveal that this is true in the relations of students with ASD. It may be possible that children with ASD are rejected but they associate with other children in peer groups that are characterized with high rates of antisocial behaviors. Therefore, it seems plausible that these affiliations may be encouraging children with ASD to maintain and enact those antisocial behaviors, which may be a factor in why these children continue to be not well liked by their peers.

There are many advantages in using SCM over sociometrics. First, SCM is able to provide for a much more comprehensive approach to learning about a child's social functioning. Responses to SCM probes also have the capacity to yield information about a child's social environment well beyond that of his or her overall acceptance (as is done in sociometrics) or that of simply identifying the peer group that a child belongs. Identifying the peer group(s) that

children belong to is important as it indicates which classmates they affiliate as well as the strength of their affiliations.

Second, SCM is able to provide for a wealth of information. Because it directly indexes which peer groups a child affiliates with, as well as how salient that child and his or her peer group are within the classroom social structure, SCM appears to be a much more accurate indicator of how well a child interacts with peers and thus, of overall social functioning. In comparison, sociometrics infers conclusions about how well children are functioning based on nominations of whether they were liked or disliked by their classmates. These peer nominations of likability are categorized into acceptance or rejection labels that typically make assumptions about a child's social relations and social functioning. SCM tends to alleviate the need for these assumptions as it includes this information in its calculations.

Thus, investigations that have focused on children with disabilities that have concluded that these children are isolated from their peers because they are rejected may not be an accurate account of their social relations (Ray, 1985; Sale & Carey, 1995; Pearl et al., 1998). The research of Chamberlain et al. (2007) lends support to this hypothesis. In their investigation, they reported that children with ASD who were included in general education classrooms were often on the periphery of their classroom social structure and tended to associate with a small group of other children. Their findings suggest that children with ASD in inclusive classroom settings are able to establish social connections with other children and that the likelihood of this occurring is similar to that of their peers without disabilities.

A third advantage of SCM, which is essential for attaining the objectives of the present study, is its capacity to produce information about social perception. In using SCM, children's social perceptions can be indexed by examining their accuracy in identifying peer groups within

their classroom. Because each child is instructed to write the names of all of the peers who associate together in peer groups in the classroom, an individual child's responses can be compared to the responses of the rest of the students in the class. Therefore, consensus nominations by the class are used as a standard with which to compare the accuracy of students' perceptions in identifying social relationships.

In the present study, the accuracy or inaccuracy of a particular child's perception is used as an indicator of his or her social-cognitive ability. Hence, low correlations between the perceptions of students with ASD in identifying social networks in his or her class and the consensus namings by the rest of the class would be indicative of difficulties in social cognition. However, high similarity in the perceptions of students with ASD and their classmates would indicate normalcy in social-cognitive functioning.

The final advantage of using SCM is the strong empirical support that has been associated with psychometric properties. As described previously, SCM appears to provide a more accurate picture of a child's social world than does sociometrics. In addition to providing a wider range of information about children's peer relationships, SCM has demonstrated strong reliability and validity in constructing peer groups and in supporting the notion that peers are influential in a child's behavioral development (Farmer et al., 1999).

SCM is being used more frequently in research, which may be a result of its strong research properties and its ability to yield comprehensive information. Its usefulness is evident in the number of studies that have employed its use. For example, Cairns and Cairns (1994) employed the use of SCM in a 15-year longitudinal investigation on peer relations that begin in childhood and went through the adolescent years. Leung (1996) has used SCM in a number of his studies that have been based in the United States and foreign countries such as China. The

central inquiry in all of these studies is their interest in identifying the peer networks of a targeted group of students, such as those with emotional and behavioral disorders (e.g., Farmer et al., 1999), learning disabilities (e.g., Juvonen & Bear, 1992), and developmental delays (e.g., Buysse, Goldman, & Skinner, 2002) to name a few. Research on these peer groups have focused not only on the quantity of peer relations but also the quality of those relations, or more specifically, have sought to identify common behavioral characteristics among these groups of students as well as the degree to which these characteristics are present or correlated among group members.

The use of SCM procedures have suggested that children tend to be a part of a peer group or to affiliate with peers who are similar to them on salient characteristics. For example, even early literature on classroom social networks have found that students often sorted themselves into distinct peer groups that shared common key social characteristics among its members, such as gender, ethnicity, and levels of academic success (e.g., Adler, Kless, & Adler, 1992; Cairns, Cairns, & Neckerman, 1989; Farmer & Hollowell, 1994; Cairns, Perrin, & Cairns, 1985; Eder & Parker, 1987; Edwards, 1990; Neckerman, 1990). Behavioral characteristics are another similarity that has been noted to be a binding tie between peer group members. For example, Farmer and Farmer (1996) found that, in general education classrooms, that social groups appeared to be formed on aspects of social functioning, such as antisocial, prosocial, and shy behaviors. Likewise, Xie, Cairns, and Cairns (1999) indicated that students who exhibited aggressive behaviors tended to affiliate with other aggressive peers and that nonaggressive peers affiliated with other nonaggressive peers.

For the present study, SCM seems to be the most beneficial tool in examining the social networks of children with ASD in inclusive classrooms. The reason for this stems from an

earlier discussion in this paper involving mutual socialization or the ways in which similar behavioral features are supported, reinforced and maintained among friends. The implication, then, is that children with ASD, who are most likely to have social skill deficits, may be drawn to peer groups that engage in antisocial behaviors. Thus, it is not only important to know that these children are likely to have friends, but knowing who their friends are is essential in developing an understanding of their social competencies. Further, this study expands on the use of SCM as a tool to examine the social-cognitive abilities of children with ASD in their perceptions of group membership and behavioral and how these children relate to their classroom's social structure.

### III. METHODOLOGY

#### Study Overview

This study used data that were gathered as part of a larger study, The Friendship Project (Grant H023A50033), supported by the Office of Special Education Programs, U.S. Department of Education and in part by the National Institute of Mental Health (Grant MH52429) to the Center for Developmental Science, University of North Carolina at Chapel Hill, conducted by Rodkin, Farmer, Pearl, and Van Acker in 2006. The Friendship Study explored the general question of homophily, the tendency for individuals to choose friends and associates who have social and demographic characteristics that are similar to their own (Cohen, 1977; Farmer & Farmer, 1996; Kandel, 1978; Kandel, Davies, & Bayder, 1990; Neckermann, 1990), in classroom social relations to determine (a) if students with EBD associated with peers in mainstream classrooms and (b) the characteristics of the peer associates of students with EBD (see Rodkin, Farmer, Pearl, & Van Acker, 2006). The present study shifts the analysis from a focus on students with EBD to a focus on those students identified with ASD. This shift provides a starting point for examining the social networks of children with ASD in the inclusive classroom.

The extant database that was employed in the current study was coded in such a way that the current researcher did not have access to identifying personal information as all data had been recoded using a variety of numerical values. For example, student names had been recoded to 4 digit numerical values, gender a one digit code, etc. A sample line of data read as:

Student ID	Ethnicity	Disability	Gender	Teacher	School	SES	Shy1	Shy2	Shy3	Leader 1...
0432	1	12	1	14	3	1	3242	3241	6532	4356

The Office for the Protection of Research Subjects (OPRS) at the University of Illinois at Chicago made a determination that the de-identified database "DOES NOT meet the definition of

human subject research as defined by 45 CFR 46.102 (f)" and that this research can be conducted "without further submission to the IRB (Internal Review Board)." A copy of the OPRS' Notice of Determination of Human Subject Research can be found in Appendix A. The means of data collection performed by the original investigators of the Friendship Project can be found in the methodology section. The author of this paper did not assist in any part of the data collection or procedures described in the methodology section.

### **Participants and Setting**

The data set employed consisted of 14 classrooms in 6 schools located in a mid-sized suburban school district in a large Midwestern city. At the time of data collection, the district served approximately 8000 students of which approximately 13.8% of the students qualified for special education services; 5.9% of the children were identified with speech and language impairments, 3.1%, with learning disabilities, 1.0% with emotional and behavioral disorders, 0.9% with cognitive disabilities and 2.9% with other disabilities. The ethnic breakdown of the student population was approximately 81% White, 3% African-American, 10% Asian, 1% American Indian, 4% Hispanic/Latino(a), and 1% other. Of this, approximately 18% of the students were recipients of the free/reduced lunch program. The school district was chosen because it has an established reputation of doing exceptional work with the inclusion of students with special needs, including those students with autism.

Students with ASD that were included in this study were formally identified per American Psychological Association (APA) 2000 criteria with confirmed clinical diagnoses of high-functioning autism or Asperger syndrome. According to school administration, classroom teachers, related support personnel, observations and other diagnostic measures, students with ASD that were included in the regular education settings exhibited fewer challenging behaviors



(e.g., physical aggression), had the ability to interact with peers, and could participate in grade level academic tasks with little support, as compared to those students with ASD that were served in self-contained settings. The 14 classrooms chosen for the purpose of this study were selected as they contained at least one student formally identified with a primary disability of autism per their Individualized Education Program (IEP).

The subjects were considered to be included in the regular education setting only if they received educational instruction in the general education classroom for at least 60% or more of the school day and attended lunch and recess with their general education peers. The selection pool was limited to include only those students with ASD who had been in their inclusive placements for at least 4 consecutive months prior to data collection and had to be communicative and have the ability to interact with their peers, as assessed by the classroom teacher and social worker. With such intact classrooms, researchers have found evidence of relative stability in friendships over the course of the school year, following initial formation early in the fall (Berndt & Hoyle, 1985). The 3<sup>rd</sup>, 4<sup>th</sup>, and 5<sup>th</sup> grade levels were selected because students typically stayed with one classroom group all day and were of an age where sufficient reading and writing skills were present to be able to understand and complete the surveys used to collect data in the present study.

The total sample included 359 students served in 14 participating classrooms. Appendix B, Table 1 shows the demographical information for the total student population. The classrooms consisted of 4 third grades, 5 fourth grades, and 5 fifth grade classrooms across six rural area public schools in a large Midwestern city. Information on educational classification was available for all of the 359 students. Of the total students, 20 (5.6%) were classified with autism spectrum disorders (ASD), 8 (2.2%) with speech and language impairments (S/L), 6

(1.7%) with cognitive disabilities borderline (CDB), 10 (2.8%) with specific learning disabilities (SLD), 5 (1.4%) with other health impairments (OHI), 3 (.8%) with emotional behavior disorders (EBD), and 307 (85.5%) as children without disabilities (REG).

Two hundred and eighty of the 359 students (78%) participated in the interviews (see Appendix B, Table 2 for demographical information). To participate in the interview, written parental consent had to be obtained. Students who participated in the interviews are referred to as "full participants" or "fully participating" from this point forward. Of the students with ASD included in the six schools, fifteen (12 males and 3 females) obtained the correct permission to fully participate. Children with other identified disabilities that had obtained proper consent ( $n = 19$ ) were also included in the data analyses. This population of children consisted of students formally identified with CDB ( $n = 2$ ; 2 males; .07%), EBD ( $n = 2$ ; 2 males; .07%), S/L ( $n = 6$ ; 2 females, 4 males; 2.1%), SLD ( $n = 6$ ; 3 females, 3 males; 2.1%) and OHI ( $n = 3$ ; 1 female, 2 males; 1.1%). The 3 students that were identified with OHI were diagnosed with attention deficit/hyperactive disorder (ADHD). Identified disability statuses were obtained from active individual student records (IEPs). There were students ( $n = 7$ ) that were included in the study that initially had unknown statuses, but were later confirmed as having no disabilities according to past school records and current teacher reports. Overall, a total of 280 students fully participated and were included in all analyses.

The students ( $n = 79$ ) who did not obtain parental consent and/or did not assent, were not analyzed in the interview portion of the study, however, because they were part of the larger classroom social network, peers could still nominate them for behavioral and social network groupings. Of these seventy-nine individuals, 5 (6%) were identified with ASD, 4 (5%) with CDB, 1 (1%) with EBD, 2 (3%) with OHI, 2 (3%) with S/L, 4 (5%) with SLD and 61 (77%) with

no disabilities (REG). The peer nominations of this population of individuals were used in identifying peer groups and analyzing behavioral attributes, as omission of this data would not provide an accurate assessment of social networks.

### **Measures**

**Social cognitive mapping.** Cairns and his colleagues (Cairns, Garipey, & Kinderman, 1990; Cairns, Perrin, & Cairns, 1985) developed SCM as a means of examining the social networks among children using peer reports. SCM yields information not only about existing social groups within a classroom, but also an overall index of acceptance of individual children and the correlation between individual children's reports of peer group identification in their classrooms with the reports of their peers' (Farmer & Farmer, 1996).

To obtain SCM data, students were given a survey (Appendix C) and were asked to provide a response to a singular question, "Are there some kids in your classroom who hang around together a lot?" Students were then told to circle "no" on the form if they could not think of any groups. If students could name groups, they were asked to circle "yes" and then instructed to write the names of the students that they identified. Spaces were provided to list up to six groups with an additional statement at the bottom of the page instructing students to use the back of the survey to list any additional groups. Students were reminded to list themselves as a group member when applicable. This survey and the procedures followed the protocol developed by Cairns and his colleagues (Cairns, Garipey, & Kindermann, 1990; Cairns et al., 1985) and have been used in numerous other social network studies (e.g., Estell et al., 2008; Farmer et al., 2003; Farmer, Van Acker, Pearl, & Rodkin, 1999; Gest, Graham-Bermann, & Hartup, 2001).

Numerous social-cognitive measures can be extrapolated from peer reports as well. Derivation of measures begins with analyzing student responses using the principles of the MORENO procedure (see Cairns, Garipey, & Kindermann, 1990) with computations done in R package version 2.12.1. This procedure is used to identify distinct peer clusters of students by correlating the frequency in which each pair of students is named as affiliating with each other and every other classmate. Distinct peer groups are then identified within the classroom social network by constructing recall, co-occurrence, and correlation matrices to compare the affiliative profiles (the correlation) of each student with each other student in the classroom and secondly, to identify the centrality (acceptance) level of students within the classroom social structure from the frequency of nominations received.

The recall matrix (Figure 1) simply lists the clusters of students named by each participant while the co-occurrence matrix (Figure 2) lists the frequency in which each student is paired with another peer in the class. A correlational matrix (Figure 3) is then derived from the correlations between all paired groupings of children in a classroom that reach a criterion value of .40 (whereas the correlation indexes the consistency with which paired groups of children appear in their classmates' recall of social groups). Students whose profiles are correlated at .45 or above, with at least 50% of the other identified members in a group are considered to be in that named social group. It is important to note, that while a pair of children may be named as associating with one another, it is the criterion value that is used to determine whether those named students actually affiliate with one another. This computation has been used vastly in previous research studies and has an established reliability level that will be discussed in further detail later.

Figure 1

*Recall Matrix*

		NOMINEE							
		S-1	S-2	S-3	S-4	S-5	S-6	S-7	S-8
RESPONDENT	S-1	A	A	A	A, B	B, C	D	D	C
	S-2	A	A	A	A	A	B	B	B
	S-3	A	A	A	B	B	B	B	B
	S-4	A	A	A	B	B	B	B	B
	S-5	B	B		A	B	C	C	
	S-6								
	S-7	A	A	B		B	C	C	
	S-8	A	A		B	B	C		C

*Note.* After all of the subjects are interviewed, a social network recall matrix is generated by listing all the groups named by each of the respondents. Letters are used to identify the specific groups named by the subject. All of the members of the first peer group named by the subject (respondent) are designated with an A in their respective column under the heading Nominee. The peer group that is named second is designated with a B, and so on until all groups named by the subject are listed on the matrix. For example, respondent S-1 named four groups: The first group (Group A) consisted of S-1 (self), S-2, S-3, and S-4; the second group (Group B) consisted of S-4 and S-5; the third group (Group C) consisted of S-5 and S-8; the fourth group (Group D) consisted of S-6 and S-7. S-4 and S-5 have two letters in their column. This is because S-1 named each of them to two peer groups. There are no letters in the columns for the row listed as S-6 because this respondent did not name any peer groups.

Figure 2 is a demonstration of how a social network co-occurrence matrix is constructed.

This matrix differs from a recall matrix as it identifies pairs of students with whom peers have identified as affiliating with one another.

Figure 2

*Social Network Co-Occurrence Matrix*

		NOMINEE							
		S-1	S-2	S-3	S-4	S-5	S-6	S-7	S-8
RESPONDENT	S-1	7	7	4	2	1	0	0	0
	S-2	7	7	4	2	1	0	0	0
	S-3	4	4	5	2	2	0	0	0
	S-4	2	2	2	7	6	2	2	2
	S-5	1	1	2	6	8	2	2	2
	S-6	0	0	0	2	2	6	5	4
	S-7	0	0	0	3	3	5	5	3
	S-8	0	0	0	2	2	4	3	5

*Note.* The social network co-occurrence matrix is symmetrical, such that going down a row or across a column will indicate how many times a subject is named to a peer group with each of the cross-referenced subjects. Therefore, these columns and rows are called co-occurrence profiles because they list the number of times a subject "co-occurs" in a peer group with every other subject. For example, going down the column for S-1 indicates that this subject was named in a peer group a total of seven times (cross-referent: S-1, S-1). Of the seven times the subject was named, she "co-occurred" seven times with S-2 (S-1, S-2); four times with S-3 (S-1, S-3); two times with S-4 (S-1, S-4); one time with S-5 (S-1, S-5); and zero times with S-6 (S-1, S-6), S-7 (S-1, S-7), and S-8 (S-1, S-8). Notice that S-1 and S-2 have the same co-occurrence profile. This is because they were always named together in a peer group.

Figure 3 demonstrates the construction of a social network correlational matrix which extends upon the previous matrices in that it assigns a criterion value to the pairs of students whom have been named as affiliating with one using predetermined frequency rates.

Figure 3

*Social Network Correlational Matrix*

		NOMINEE							
		S-1	S-2	S-3	S-4	S-5	S-6	S-7	S-8
RESPONDENT	S-1	1.00	1.00	.87	.22	.39	.87	.87	.88
	S-2		1.00	.87	.22	.39	.87	.87	.88
	S-3			1.00	.04	.14	.95	.94	.95
	S-4				1.00	.93	.10	.04	.00
	S-5					1.00	.02	.08	.12
	S-6						1.00	.99	.90
	S-7							1.00	.85
	S-8								1.00

*Note.* A third matrix, the social network correlational matrix, is derived from the co-occurrence matrix. This Table is constructed by correlating the co-occurrence profiles of each pair of students. Peer clusters are determined from these correlations. To be considered a member of a cluster, a student's co-occurrence profile must correlate with the profiles of at least 50% of the members in the cluster at  $r \geq .45$ . The lines on the correlational matrix indicate that three distinct peer clusters were identified in this classroom: Cluster A (S-1, S-2, and S-3), Cluster B (S-4 and S-5), and Cluster C (S-6, S-7, and S-8). Notice that S-1 and S-2 have a correlation of  $r = 1.00$ . This is because they were always named together. Therefore, their co-occurrence profiles were perfectly correlated.

Further analyses of the responses to SCM probes provide information beyond that of simply determining the composition of peer groups within the classroom. How salient, or the relativity of a peer group within the class and each student's social network centrality (SNC) or his or her overall saliency, in the classroom can be determined as well. To determine the

centrality of each peer cluster in a social network, a centrality index (CI) is calculated by averaging the number of nominations received by the two most frequently nominated members of the cluster that contains the most salient peer in the classroom ( $ng$ ). The cluster for which the CI is the highest is identified as the most central cluster in the classroom. Students are classified as Nuclear (high centrality) in the cluster if the student's frequency of nominations are greater than or equal to  $.70(ng)$ , Secondary (medium centrality) in the cluster if the frequency of nominations fall between  $.30(ng)$  and  $.70(ng)$  or Peripheral (low centrality) in the cluster if the frequency of nominations  $< .30(ng)$ . A student's social network centrality or their overall salience within the classroom is determined by combining the centrality an individual student's peer group with his or her centrality within that group. Classifications of social network centrality are based on the following decisions:

1. Students that have high centrality in a high-centrality group are classified with nuclear social network centrality.
2. Students that have either medium centrality in a high-centrality group, of high or medium centrality in a medium-centrality group are classified as having secondary social network centrality.
3. Students that have low centrality in a high or medium-centrality group, or are members of a low-centrality group are classified as peripheral.
4. Students with whom are not recognized as members of any peer group are classified as isolated.

Data supporting the reliability and validity of the SCM technique are strong. Cairns, Leung, Buchanan, Woodbury, and Cairns (1990) found that three-week test-retest investigations yielded high stability of "central" children and "central" clusters, as students with nuclear



centrality at one assessment were more likely to have the same centrality level at the follow-up assessment. The test-retest procedures also indicated correlations between total nominations ranged from .70 to .90 per classroom. Additionally high, stable test-retest reliability coefficients (e.g., .74-.84) for both peer and peer group classifications that were based on an additional set of two SCM administrations over a three-week period were found by Cairns, Leung, Buchanan, and Cairns (1995). Numerous investigations have also documented the concurrent, predictive, and construct validity of these procedures (see Cairns, Garipey, & Kindermann, 1990).

The validity of social information is yielded from SCM procedures also has been documented through its correlation to observational and survey data. For example, Farmer, Stuart, Lorch, and Fields (1993) showed that students were more likely to interact with other peers who have been identified as members of the named group resulting in a substantial overlap between self-identified friendships and SCM assignment of children to peer groups (Cairns et al., 1995). Researchers such as Leung (1996) have also identified a strong consensus among children in the naming of peer groups in which they self-identify.

**Social-cognitive accuracy.** The measure of social-cognitive accuracy used in the present study was derived from information gained through SCM. In the present study, consistent with Leung's (1996) earlier SCM research, to examine the accuracy level in which students with ASD were able to identify peer groups as named by their peers, a social-cognitive accuracy method proposed by Leung (1996) was utilized. Social-cognitive accuracy is essentially obtained by calculating the proportion of overlap between an individual's reporting of peer groups and the consensus report by all peers in the class. Two indices or proportions are calculated. The first, called  $OVERLAP_{self}$  (calculated by  $NUM_{both}/NUM_{self}$ ) is the proportion of children with whom an individual child names to a group and who are also identified by SCM. Specifically,

$OVERLAP_{self} = NUM_{both}/NUM_{self}$ , whereas  $NUM_{both}$  is the number of common members found by both methods, and  $NUM_{self}$  is the number of members reported by the individual student.

The  $OVERLAP_{self}$  index indicates the degree to which a child is accurate in naming the same children to a group as compared to the consensus naming of his class. However, this index does not take account for the number of children with whom an individual child names who are not also in the group consensus naming. For example, it is possible for a child to name many of the same peers to a group as the rest of the class names, yet also identifies other children that have not been identified to be in the group according to the consensus naming. Therefore, this inaccuracy of the child's over-inclusiveness would not be reflected in  $OVERLAP_{self}$ .

Therefore, Leung (1996) proposed a second index,  $OVERLAP_{scm}$  (calculated by  $NUM_{both}/NUM_{scm}$ ), which determines the degree to which a child misses or falsely names children who have not been identified to be in that group by the consensus reporting of the class.  $OVERLAP_{scm}$  is simply defined as the fraction of members identified by SCM who also are named by the self. In this case,  $OVERLAP_{scm} = NUM_{both}/NUM_{scm}$  where  $NUM_{both}$  is the same as in the previous formula, and  $NUM_{scm}$  is the number of members identified by SCM. The possible range for both of these indices is from 0.00 to 1.00. Higher values indicate greater overlap between self-reports and peer consensus on social groups. The present investigation averaged the two social-cognitive accuracy scores from both of these indices into one social accuracy score for every child as both of these indices combined provide for a more comprehensive picture of a child's overall social cognitive accuracy.

**Decision rules.** Some modifications had to be made in computing the overlap calculations that compared self and peer group consensus reports. In the present study, decision rules had to be made to take into account children who did not name themselves to a group or if they self-

identified them to two or more groups. In cases where this conflict existed, the following rules for determining which peer group to use for the overlap analyses were implemented:

1. In cases where children named themselves to a single peer group, then that named group was used to compute in the overlap calculations.
2. In cases where children named themselves to two peer groups then the first peer group in which they named was utilized in the overlap calculations.
3. In cases where children did not self-identify to a peer group but listed a group that was similar to the SCM consensus naming, then that consensus naming group was used for calculation purposes.
4. An accuracy score of 0 was given if children did not self-identify to a peer group and none of the other groups they named were similar to the SCM consensus reports.
5. In cases where a child self-identified him or herself as a member of one peer group but were identified in two SCM groups, then the group in which the child self-identified membership was used for calculations.
6. In cases in which children named themselves to one peer group and the SCM grouping they were identified to were completely different, overlap calculations were still performed.

**Peer assessments.** Peer assessments were used to determine classmates' perceptions of peers' social and behavioral characteristics. To gather this information, students were given a two-page survey and were instructed to write the names of children in their own classroom that fit thirteen descriptors. Children were told that they could nominate self, no one, one, two, or three students for whom they felt best fit the specified descriptors and accompanying descriptive sentences. A total of 13 descriptors and descriptive sentences that defined each descriptor were used (see Appendix C).

The descriptors used were similar to those employed in other SCM research (e.g., Cantrell & Prinz, 1985; Coie, Dodge, & Coppotelli, 1982; Farmer et al., 2003; Masten, Morison, & Pellegrini, 1985; Newcomb & Bukowski, 1984; Rodkin, Farmer, Pearl, & Van Acker, 2000). The descriptors used in these studies were based on original items used in the Bower Class Play (Bower, 1960). However, Coie (1990) proposed a modification to these descriptors so that children could match a peer to a behavioral description using child friendly statements. For example, one item in the Bower Class Play read “starts fights,” was written by Coie (1990) to read, “This person starts fights. He or she says mean things to other kids, and pushes and hits them” (p. 559). Statements were further reworded to minimize inferences made by children while reading the descriptors (Rodkin, et al. 2006). For example, statements became neutral in gender and contained the word *or* instead of *and* so that children understood that a child who fights does not have to fit all three components of saying mean things to others, pushing, and hitting others. For example, when utilizing the “starts fights” descriptor, the new statement would read: “This person starts fights. This person says mean things to other kids or pushes them, or hits them.” The revised descriptive statements are employed in the present study and are the same that have been utilized in numerous other studies (e.g., Farmer & Hollowell, 1994; Farmer & Farmer, 1996; Farmer et al., 1999; Rodkin et al., 2006).

Farmer and Hollowell (1994) further assert that it is not uncommon for researchers to choose and/or develop peer assessment items that fit the purpose of a specific investigation (Hymel & Rubin, 1985). They claim that tailored assessments tend to maintain adequate internal consistency and test-retest reliability and that various peer assessment instruments appear to yield similar behavioral profiles (McConnell & Odom, 1986). The implication is then that common behavioral constructs, such as those used in the current study, are statistically strong

regardless of the exact wording of the descriptors that are associated with the peer assessment items (Hymel & Rubin, 1985). In general, moderate to high test-retest reliability has been found for peer assessments (Coie et al., 1982). Using Pearson Product-Moment Correlations, Coie and his fellow researchers found that 12-week correlations ranged between .46-.88 with a median of .65 in test-retest reliability. These reliabilities were similar to those found by Roff, Sells, & Golden (1972). Besides being reliable, peer assessments are a viable indicator of measuring social preference.

**Social preference.** As pertinent to this study, *Popular* students are those children who receive higher rates of nominations on the peer behavioral assessment in the attributes of being cool, popular, leader and/or athletic and lower nominations for starts fights, disruptive and gets in trouble. *Rejected* students are those students that are highly disliked by their peers. They receive higher nominations for starting fights, disruptive and gets in trouble. *Average* students are those that tend to receive higher nominations in cooperative, friendly and good student. Students who identify as *Neglected* are those that are neither liked nor disliked by their peers. These students are identified through high nominations in the attributes of being shy, sad, and seeks help. *Controversial* is a term that is used to denote those children that are equally liked and disliked by their peers. Their nominations are equal to those of the popular students as well as the number of nominations of the rejected group.

## **Procedures**

The SCM data that were used in the present study was part of a larger study conducted by Rodkin, Farmer, Pearl, and Van Acker in 2006. The principal investigator had trained graduate research assistants to administer the written surveys in a group format to all classroom participants. The original survey form consisted of a cover page containing identifying

information, the social network assessment and the peer behavioral assessment. Written and verbal instructions were given, and each question was read aloud to the students by the examiner. Before the administration of the interview, students were assured that their answers would be kept confidential and while participating, answers should be covered. Students also were instructed that their participation was voluntary and that they could withdraw participation at any time.

After introducing the survey to the class, the administering research assistant guided students' attention to the first question and asked the students: "Are there some kids here in your classroom who hang around together a lot?" Students were instructed to write "no" if they could not think of any groups and were reminded to include themselves in groups that they belonged to. If students could identify groups, they were told to list as many groups as they desired and/or recognized within their respective classroom. If groups were identified, the names of all students and self, if applicable, were to be written on the response sheet. If a student's disability warranted (such as a child who had deficits in fine motor skills that affected her ability to write), photographs of student were available and the student could select and group students accordingly while a second research assistant wrote the names of the grouped students on the interview sheet. To gain demographic data on the subjects, the classroom teacher completed an information sheet with student's legal names, nicknames, race, gender, and special education classification. Students who were not participating in the study remained in the classroom and completed an alternative pencil and paper activity. The entire interview process took approximately 25 minutes to complete in each classroom.

## IV. RESULTS

This chapter describes the data analysis procedures and the results for the research hypotheses presented the preceding chapter. First an overview of the data analyses procedures are presented, then the results for each question of inquiry are discussed.

### **Data Analysis Procedures**

Upon compilation of surveys, data were coded into a Microsoft® Excel® file using the following formats: school names were given an alphabetic character between A-F, teacher names were assigned a numerical value between 1-14, and student names were changed to a 4 digit numerical number. For the simplicity of data analysis, other student demographic information such as whether the child was a recipient of the free/reduced lunch program was given a numerical value, as was racial identity. The gender of the student was simply coded with a numerical code of 1 for male and 2 for female. In short, all identifying information was recoded, thus no school, teacher, or student could be individually recognized through the secured data set.

The data analyses were conducted in two main stages. First, descriptive statistics such as frequency counts, percentages, and means and standard deviations were computed so as to obtain overall information on the sample with respect to the four main variables of interest: acceptance social preference, social network affiliation, and social cognition. Second, inferential statistics were computed to determine the nature of the relationships among these variables and, ultimately, whether children with ASD were finding their way into classroom social networks, the nature of those affiliations if they existed, and the accuracy in which they were able to identify self and group memberships in their classroom social circles.

### **Hypotheses**

**Hypothesis 1.** Hypothesis 1 asserts that there would be no significant difference between children with ASD and their peers without ASD in self-identifying membership in a peer group. In order to test this, the responses that students gave on the SCM questionnaire, “Are there some kids in your classroom who hang around together a lot?” were reviewed. If students named themselves at least once to any of these recalled groups it was acknowledged that they self-identified as a member of a social group in their classroom.

A bootstrapped Chi-Square procedure based on 2000 replicates was employed to test for statistical significance between the variables of educational classification and rates of self-nominations. Results of the Chi-Square analysis  $X^2(2, N = 2000) = 31.60, p = .002$  indicated statistical significance between these variables, thus rejecting the null hypothesis. Manual assessment of summary statistics revealed that students with ASD were able to name themselves to peer groups but did so at a lower rate than their peers without ASD. As Table 2 shows, students with ASD named themselves to an average of .33 groups while students without disabilities averaged self-identification in 1.16 groups; a rate that was more than three times greater. Children with disabilities (DIS), exclusive of those students with ASD, self-identified group membership more than twice the rate ( $M = .89$ ) than their peers with ASD.

More specifically, 5 of the 15 children with ASD self-identified their membership in at least one social group in their class. It is noted that one additional data point, given by a child with ASD, was omitted due to the vagueness of the student’s response, “Me and other children.” Of the children with other disabilities, 17 of 19 children self-identified as being a member of a peer group. Children without disabilities,  $n = 207$  (out of a total of 280 students), named themselves as a member of at least one peer group. Overall, children with ASD were found to



have a significantly lower rate of self-nominating to a peer group as compared to their peers with other disabilities and their peers with no identified disabilities.

Table 2

*Self-Identification as a Group Member by Educational Classification*

Educational Classification	Total Students *	Students Self-Identifying group membership	Mean	SD	Min	Max
ASD	15	5	0.33	0.49	0.00	1.00
DIS	19	17	0.89	0.74	0.00	4.00
REG	246	207	1.16	0.96	0.00	6.00
Total	280	229	0.78	0.72	0.00	6.00

*Note.* \* Included only students who fully participated in the study.

**Hypothesis 2.** Hypothesis 2 posits that students with ASD will find their way into the social networks in their inclusive class. Specifically, the inquiry was two-folded. The first part of the inquiry (a) sought to examine whether peers, regardless of educational classification, were nominating students with ASD as group members when they responded to the SCM question, “Are there some kids in your classroom who hang around together a lot?” and (b) whether students with ASD were receiving peer nominations at frequency levels that were high enough to allow for peer group entry. It was hypothesized that there would be no significant statistical differences between students with ASD and their peers without ASD in the frequency of peer nominations received or rates of entry into a peer group.

**Hypothesis 2a.** Through summary statistics, it was revealed that students with ASD received lower rates of group nominations ( $M = 2.55$ ) as compared to DIS and REG. Students without disabilities ( $M = 8.88$ ) received more than three times the number of nominations than did students with ASD. On average, students with other disabilities ( $M = 4.81$ ) received more than 1.5 times the number of group nominations than did students with ASD (see Table 3).

Table 3

*Group Nominations as Reported by Peers*

Educational Classification	Total Students	Total Students who received $\geq 1$ nomination	Mean	SD	Min	Max
ASD	20	14	2.55	2.82	0	10
DIS	32	29	4.81	4.59	0	17
REG	307	296	8.88	5.22	0	21
Total	359	339	8.17	5.36	0	21

An in depth analyses of the data further indicated that the majority of children in the 14 classrooms were nominated by their peers as “hanging around” with one or more peers. Of the total students with ASD ( $N = 20$ ), fourteen (70%) were named by their peers (including other students with ASD) as associating with at least one social peer group. Five children with ASD named at least one other peer as being a member of the same group as themselves. It is important to note, that while children may have received nominations by their peers, these

nominations *are not* indicative of whether they are actually members in a peer cluster (this will be addressed further in hypothesis 2b).

***Hypothesis 2b.*** It was hypothesized that there would be no statistical difference between children with ASD and other educational classifications in receiving peer nominations at levels of frequencies that allowed for entry into a peer group (see Measures section for review of procedures). As discussed previously, peers could nominate students as group members (as they did in Hypothesis 2a) but these nominations *are not* indicative that children *are* actually a part of a peer group, as that determination depends on averaging individual nominations to the overall nominations for the class. Therefore, in order to determine if a child is a member of a peer group, a correlational matrix is configured.

Based on results from the correlational matrix (see Methods section for more details on this procedure), a total of 64 peer clusters were identified within the 14 classrooms. The number of clusters per classroom ranged from three to seven ( $M = 4.50$ ), with the size of the clusters ranging from 2 to 10 children ( $M = 4.00$ ,  $SD = 2.62$ ). Forty-four clusters had high social centrality, 16 had medium and 4 had low. Forty-two percent ( $n = 27$ ) of the clusters were composed of all girls, twenty-eight percent ( $n = 18$ ) were boys, and thirty percent ( $n = 19$ ) were mixed gendered. Overall, eighty-two percent of the boys ( $n = 145$ ) and 91% of the girls ( $n = 167$ ) were identified as members of peer groups. Of the children identified as members of a peer group, 9 were children with ASD, 22 were identified with other disabilities, and 280 were children without disabilities.

A bootstrapped Chi-Square analysis was employed to test for statistical significance in the rates of nominations received between the three educational groups. Statistical significance was found among the classifications,  $X^2(2, N = 2000) = 7.19$ ,  $p = .007$ ; rejecting the null

hypothesis as students with ASD were significantly less likely to have peer nomination rates that allowed peer group entry as compared to DIS and REG peers.

**Hypothesis 3.** Hypothesis 3 delved into an exploration of the social networks of children with ASD, the peers with whom they affiliate, as well as the nature of peer groups that they were named as members. Specifically, it was postulated that there would be no statistically significant differences between children with ASD and their peers without ASD in terms of: (a) social preference, (b) social network centrality, and (c) the composition of their peer group affiliations.

*Hypothesis 3a.* It was hypothesized that there would be no statistically significant difference between children with ASD and their peers without ASD in social preference. Peer assessments were examined to determine whether specific social characteristics were associated with individual educational classifications. Bootstrapped Wilcoxon rank-sum tests were conducted to evaluate statistical significance between each of the three educational groups (ASD, DIS, and REG), and across the thirteen social descriptors: Cooperative, Disruptive, Shy/Withdrawn, Starts Fights, Seeks Help, Leader, Athletic, Trouble, Good Student, Cool, Sad, Popular, and Friendly.

Results of the analyses indicated statistical significance among several of the social descriptors. Specifically differences were found among the groups for Cooperative,  $X^2(2, N = 2000) = 29.29, p = .04$ , Disruptive,  $X^2(2, N = 2000) = 73.40, p = 6.16e-06$ , Sad,  $X^2(2, N = 2000) = 57.39, p = 1.43e-06$ , Seeks Help,  $X^2(2, N = 2000) = 43.19, p = .004$ , Shy,  $X^2(2, N = 2000) = 59.37, p = .00008$ , and Trouble,  $X^2(2, N = 2000) = 57.63, p = .004$ .

An analysis of the means (See Appendix D, Table 1) for the three educational groups indicated that children with ASD were significantly more likely to be perceived by their peers as being Disruptive ( $M = 2.35$ ), Sad ( $M = 2.10$ ), Seeks Help ( $M = 2.05$ ), and Trouble ( $M = 3.45$ )

than DIS and REG peers. Students with ASD ( $M = 2.30$ ) and students with DIS ( $M = 2.38$ ) were significantly more likely to be perceived as Shy than REG students ( $M = 1.06$ ). Additionally, students with ASD were significantly the least likely group of students to be perceived as Cooperative ( $M = .70$ ) than REG ( $M = 2.20$ ) or DIS ( $M = 1.09$ ).

Using a classification system similar to that of Coie et al. (1982), students were classified into one of five status categories; Popular, Rejected, Neglected, Controversial and Average, as according to procedures discussed in Chapter II. By weighting the nominations received by peers in each of the 13 behavioral attributes, averages were summed in order to classify students into one of the five peer acceptance status groups.

Table 4

*Peer Nomination Status by Educational Classification*

Educational Classification		Status					Total	
		0	1	2	3	4		5
ASD	Count	1	13	3	0	3	0	20
	% within Disability	5.0	65.0	15.0	0	15.0	0	100
	% of Total	0.3	3.6	0.8	0	0.8	0	5.5
DIS	Count	0	11	9	1	8	3	32
	% within Disability	0	34.4	28.1	3.1	25	9.4	100
	% of Total	0	3.1	2.5	0.3	2.2	0.8	8.9
REG	Count	3	62	44	15	93	90	307
	% within Disability	1.0	20.2	14.3	4.9	30.3	29.3	100
	% of Total	0.8	17.3	12.3	4.2	25.9	25.1	85.6
Total	Count	4	86	56	16	104	93	359
	% of Total	2.1	7.5	9.7	4.2	36.1	40.4	100

*Note.* 0 = Uncategorized; 1 = rejected; 2 = neglected; 3 = controversial; 4 = average; 5 = popular

Results from this procedure indicated that 65% ( $n = 13$ ) of the children with ASD were identified as rejected. In the case that a student's average qualified him or her for two different status levels but none that fit the criteria for the "controversial" group, then that child was recognized as "average" which followed the same procedures used by Oden and Asher (1977). One student with ASD was considered as "unclassified" as he did not meet the qualifications for any of the 5 status categories as he received no peer nominations.

In general, within disability groupings (see Table 4), students with ASD were most likely to be identified with rejected/neglected status (85%,  $n = 16$ ) when compared to students with other DIS (52.5%,  $n = 20$ ), or REG students (34.5%,  $n = 106$ ). The comparison with disability suggests that having ASD is relative to status level. As Table 4 indicates, students with ASD had the lowest acceptance rate in the inclusive classroom as compared to students with other disabilities and students with no disabilities. Bootstrapped Chi-Square statistics (based on 2000 replications) confirmed that students with ASD were the significantly least likely group of children with whom others would choose to affiliate,  $X^2(2, n = 2000) = 49.28, p < .05, p = 9.16e-07$ .

**Hypothesis 3b.** To begin to understand the centrality levels of children with ASD, a general exploration of classroom social structures and analysis of the social network assessment was conducted. Based on the frequency of peer nominations received, individual social network centrality was calculated using the SNA procedures that have been previously discussed. Summative results indicated that forty-seven percent of the boys ( $n = 68$ ) and 67 percent ( $n = 92$ ) of the girls were classified as having nuclear centrality in their classrooms' social structure, 41% ( $n = 59$ ) of the boys and 19% ( $n = 57$ ) of the girls were classified with secondary centrality, and 12% ( $n = 18$ ) of the boys and 6% ( $n = 18$ ) of the girls were peripheral. Eighteen percent ( $n = 31$ )

of the total population of boys ( $N = 176$ ) and 9% ( $n = 16$ ) of the total population of girls ( $N = 183$ ) were not nominated at frequency levels that allowed group entry, thus they were classified as isolated. As well, children who did not receive any group nominations, three boys (10%) and one girl (6%), were classified as isolated.

Table 5 summarizes students' social network centrality by educational classification. Because of the low number of female subjects in various educational categories, results were not further divided by gender.

Table 5

*Students Social Network Centrality by Educational Classification*

Educational Classification		Nuclear	Secondary	Peripheral	Isolate	Total
ASD	Count	0	5	4	11	20
	% Within Disability	0	25	20	55	100
	% of Total	0	1.4	1.1	3.1	5.6
DIS	Count	8	10	5	9	32
	% Within Disability	25	31.3	15.6	28.1	100
	% of Total	2.2	2.8	1.4	2.5	8.9
REG	Count	152	101	27	27	307
	% Within Disability	49.5	32.9	8.8	8.8	100
	% of Total	42.3	28.1	7.5	7.5	85.4
Total	Count	160	116	36	47	359
	% of Total	44.6	32.3	10.0	13.1	100

Of the students with ASD, none were nuclear, 25% ( $n = 5$ ) were secondary, and 20% ( $n = 4$ ) were peripheral. Fifty five percent ( $n = 11$ ) of students with ASD were isolated and therefore not identified as a member of a classroom peer group. Overall results show that 45% of the students with ASD were achieving some level of centrality in their classrooms' social structure.

However, students with ASD were the most likely group of students to be identified by peers as isolated (55%,  $n = 11$ ) when compared to students with DIS (28.1%,  $n = 9$ ) and REG (8.8%,  $n = 27$ ).

Of particular interest to this study was whether students with ASD were significantly less central to their classrooms' social structure than were other students. Because of low cell sizes and frequencies, a Chi-Square analysis with a bootstrapping method was employed based on 2000 replications stratified by classroom. The analysis produced a significant relationship between these variables  $\chi^2(18, n = N/A) = 54.02, p < .05, p = 7.32e-10$ . With a significance level such as this, there was strong evidence that supported a relationship between disability category and network centrality.

**Hypothesis 3c.** This hypothesis posits that there will be no statistical significance in peer group affiliations between children with ASD and their peers without ASD. Summary analysis of the data indicated that 9 students with ASD were members of a peer group and that those 9 students were spread out among a total of 6 peer clusters. When all of these clusters were combined, a total of 45 students without ASD also were members in these six clusters. While each of these six clusters contained at least one child with ASD, one cluster consisted of a dyad of 2 male students with ASD. Based on gender, 7 of the boys with ASD affiliated in male only clusters, while 1 boy with ASD was the only male group member in an otherwise all female cluster with 7 girls. One girl with ASD was peripherally connected to the only boy (a child with no disabilities) in a cluster of 7 girls. Group sizes ranged from 2 – 8 students with an average of 6.2 students. In addition, 6 of the children with ASD affiliated in groups that contained at least one other student with an identified disability (This total included the dyad of the boys with ASD).



To examine the level of similarity among cluster mates for each of the 13 peer-assessed social characteristics, correlations were calculated. All of the clusters were included in the analysis regardless of the cluster's centrality in the social network. Twelve of the thirteen assessment items resulted in significant intraclass correlations ( $p < .05$ ): Cooperative ( $r' = .18$ ), Shy ( $r' = .24$ ), Fights ( $r' = .16$ ), Leader ( $r' = .06$ ), Athletic ( $r' = .28$ ), Trouble ( $r' = .14$ ), Good Student ( $r' = .16$ ), Cool ( $r' = .12$ ), Sad ( $r' = .28$ ), Popular ( $r' = .10$ ), Friendly ( $r' = .18$ ), and Seeks Help ( $r' = .14$ ).

The results of the intraclass correlations indicated that students in the total sample tended to affiliate in peer clusters with classmates who were similar to them on salient social characteristics. However, to fully identify the social characteristics that distinguished the peer clusters containing students with ASD from the clusters that did not contain these students, a more direct analysis was conducted. Because of non-normal distributions, Wilcoxon rank sum tests, based on 2000 replicates, were conducted to compare each of the 13 social characteristics of the members of clusters containing one or more students with ASD (hereafter referred to as "ASD clusters") versus those clusters not containing a student with ASD (hereafter referred to as "nonASD clusters"). Significant scores were yielded from the analysis that were indicative that students with ASD tended to affiliate in peer clusters that could be distinguished by specific social attributes (see Table 6). Students in ASD clusters were statistically significantly more likely to be named by peers as being shy, seeks help, and sad, but were significantly less likely to be identified with the behavioral attributes of Cooperative and Leader.

Table 6

*Comparisons of ASD and NonASD Clusters on Social Characteristics*

Peer Assessments	Z-Score	p-Value
Cooperative	2.03	0.04*
Disruptive	-1.37	0.17
Shy	-2.13	0.03*
Starts fights	-0.12	0.90
Seeks help	-2.24	0.03*
Leader	2.06	0.04*
Athletic	1.16	0.24
Trouble	-1.80	0.07
Good student	1.77	0.08
Cool	0.94	0.34
Sad	-3.10	0.002**
Popular	1.86	0.06
Friendly	1.74	0.08

\* Significant at  $p < .05$  \*\*Significant at  $p < .01$

The previous conducted analysis included all members of the ASD cluster (i.e., both the student with ASD and his/her peers without ASD). It was plausible that the students with ASD alone were responsible for the differences between the ASD and nonASD clusters. To test for this, students with ASD were removed from the sample and a second analysis was conducted, again using Wilcoxon rank sum tests. Results (see Table 7) indicated that cluster mates of

students with ASD were significantly lower than other students on the cooperative, good student, sad, and friendly assessment items.

Table 7

*Comparisons of ASD and NonASD Clusters on Social Characteristics*

(Students with ASD Removed)

Peer Assessments	Z-Score	p-Value
Cooperative	1.93	0.05
Disruptive	-0.87	0.39
Shy	-1.25	0.21
Starts fights	-0.14	0.88
Seeks help	-1.42	0.16
Leader	1.86	0.06
Athletic	0.95	0.34
Trouble	-1.76	0.08
Good student	1.95	0.05
Cool	1.22	0.22
Sad	-1.85	0.06
Popular	1.37	0.17
Friendly	1.89	0.06

The removal of children with ASD from these clusters resulted in significant decreases in the z-scores for shy (.88), seeks help (.82) and sad (1.25). With the drop in these scores, there was no longer a significant difference between the ASD and nonASD clusters for shy ( $Z = 1.63$ ,  $p > .05$ ,  $p = 0.10$ ), and seeks help ( $Z = 1.32$ ,  $p > .05$ ,  $p = 0.11$ ). This suggests that students with ASD may be responsible for these significant differences. The scores for the items pertaining to shy and seeks help for the cluster mates of students with ASD were higher than, but not significantly different than those students who were not in ASD clusters. The higher, but insignificant, scores of these students' cluster mates further suggest that students with ASD affiliate with peers who tended toward being shy, leader and seeks help. However, students with ASD also tended to be among the most salient members in their respective clusters for these characteristics with the exception of leader.

The social network centrality, social characteristics and demographics of all students are summarized and described by peer clusters in Appendix E Tables 1 (Classroom 1), Table 2 (Classroom 3, ... etc.) and in Appendix F, mappings of each of the fourteen classroom social structures (Figure 1 (Classroom 1), Figure 2 (Classroom 2), Figure 3 (Classroom 3, ... etc.)). For each Table in Appendix E, the clusters and students are arranged in descending order, with the highest centrality clusters and students named first. And for each peer-assessed cluster, the mean numbers of nominations for each of the thirteen descriptors are provided for each cluster mate by centrality level (e.g., for members with nuclear centrality, members with secondary centrality, etc.).

**Hypothesis 4.** This inquiry sought to obtain information on the social-cognitive abilities of students with ASD in regards to social accuracy. Specifically, data was analyzed to assess the how accurate children with ASD were in (a) naming peer groups in which they self-identified as

members, (b) naming peer groups in which they did not self- identify as members, (c) identifying the behavioral characteristics of self, and (d) identifying the behavioral characteristics of others.

**Hypothesis 4a.** This hypothesis explored the accuracy of children with ASD and their peers without ASD in reporting the social networks in their classrooms in which they did *not* self identify as a member. The two indices of Overlap were once again calculated after extracting the peer groups in which children with ASD named themselves as a member. With the removal of these peer groups, results yielded a mean OVERLAP<sub>self</sub> index of 0.89 and an OVERLAP<sub>scm</sub> index of 0.56.

**Hypothesis 4b.** The second part of the hypothesis explored whether students with ASD were able to accurately identify *their* own membership in peer groups in which they self- identified as a member ( $n = 5$ ) and in peer groups that the consensus of their classmates have nominated them as members ( $n = 6$ ). This measurement was done to determine if students with ASD were able to recognize their own membership in a peer group and to what level of accuracy if such a connection existed. The overlap indices were again calculated using only the selected reports. Results indicated an OVERLAP<sub>self</sub> index of 0.47 and an OVERLAP<sub>scm</sub> index of 0.27.

Qualitative analysis sought to further examine the low correspondence in overlap indicies. It was noted that five of the fifteen students with ASD listed themselves as a member of a peer group. Four students with ASD named themselves to a peer group with some correlation to the groups identified through SCM. For example, one student was able to accurately identify self and 3 other peers of a 7 member cluster to which he was named ( $r = .56$ ). A second student was able to identify self and 1 peer of a 5 member cluster ( $r = .40$ ), while a third student was able to name self and two peers in his 9 member peer cluster ( $r = .33$ ). A fourth student was able to name self and one peer of his 7 member cluster ( $r = .29$ ). A fifth student named self and 4 other

peers as belonging together in a peer group, whereas SCM indicated that this child was an isolate and therefore, was not a member of a peer group. Two other students did not self identify as a member of a group, whereas SCM reports indicated that the child was a member of a peer group.

**Hypothesis 4c.** A review of peer assessments was conducted to examine if a significant relation existed between the behavioral descriptors that children with ASD self-identified as compared to peer consensus reports. A modified version of Leung's overlap procedure was applied to calculate indices that represented the level of correspondence (overlap) between the attributes that children with ASD self identified and an index that represented peer given attributes. The possible range of these indices is from 0.00 to 1.00 with higher numbers indicating greater overlap between the two reports.

Results indicated that of the 15 children with ASD who responded to the peer assessment survey, 14 of listed themselves under one or more behavioral categories. Students with ASD totaled 41 self nominations. Of the 41 nominations, there was a match with peer consensus reports on 22 of those nominations ( $r = .54$ ). However, a second index was calculated to control for overidentifying or underidentifying behavioral traits as named through SCM. Results indicated that peer reports matched the self-reports of children with ASD with low rates of overlap ( $r = .23$ ).

A qualitative investigation was conducted to see if there was a pattern in not being able to accurately identify behavioral traits. Generally, there were a number of behavioral characteristics that were significantly correlated between self-reports of children with ASD and peer consensus reports. However, there were behavioral attributes that were not correlated. Interestingly, of the many attributes that were not correlated between these two groups were in categories in which students with ASD received the most number of nominations. For example,

a student with ASD identified himself as being cooperative and cool. Of the 17 classmates who nominated this child to categories on the peer assessment, 13 identified him as being disruptive while another 15 nominations were given to him for trouble.

Another analysis was performed that summed individual nominations and percentages to gain information on the specific behavioral characteristics that students with ASD were self-identifying and the behavioral attributes that peers used to describe these students' behaviors.

Table 8

*Self Nominations of Students with ASD by Peer Nominations Received*

Behavioral Attribute	Self-Nominations of Students with ASD (% of total nominations casted)	Number of Peer Nominations Received (% of nominations casted)
Cooperative	4 (36%)	7 (64%)
Disruptive	1 (3%)	33 (97%)
Shy	5 (11%)	39 (89%)
Starts Fights	3 (20%)	12 (80%)
Seeks Help	2 (6%)	30 (24%)
Leader	2 (40%)	3 (60%)
Athletic	1 (25%)	4 (75%)
Gets in Trouble	2 (5%)	36 (95%)
Good Student	7 (29%)	17 (71%)
Cool	6 (67%)	3 (33%)
Sad	4 (14%)	24 (86%)
Popular	0 (0%)	1 (100%)
Friendly	4 (31%)	9 (69%)

As Table 8 indicates, students with ASD tended to differ significantly in how they perceived their own behaviors when compared to how peers perceived them. For example, of the total nominations received for disruptive, only one student with ASD self-identified as being disruptive, while 33 of their peers saw them as being disruptive. Similar differences were found for the behavioral characteristics of being shy, seeks help, gets in trouble, and sad. Therefore, it appears that students with ASD have quite different perceptions of their own behaviors when compared to how peers viewed their behaviors.

Data was then dichotomized into two categories: Prosocial attributes and antisocial attributes. The prosocial category included the descriptors: cooperative, leader, athletic, good student, cool, popular, and friendly. The antisocial category included the descriptors: disruptive, shy, starts fights, seeks help, trouble, and sad. Sums for each category were calculated based on the number of nominations for each descriptor as nominated by students with ASD and peer assessments. Averages for these groups were computed and their means compared. Results indicated that students with ASD ( $n = 9$ ) casted a total of 30 self-nominations in prosocial attributes ( $M = 4.29$ ) versus peers who identified students with ASD with 41 prosocial nominations ( $M = 5.89$ ). The closeness in means between the two groups (students with ASD and peer reports) were correlated at  $r = 0.73$  which suggests that a number of students with ASD were aware of their own positive behaviors as matched by peer consensus reports. In the antisocial category, students with ASD identified themselves with 17 total nominations ( $M = 2.80$ ) while peer assessments consisted of 174 antisocial categorical nominations ( $M = 9.00$ ). The group of antisocial traits were calculated in the same manner, yielding an overlap of  $r = .10$ , which suggests that, as a group, students with ASD were highly unlikely to be aware or identify their own antisocial behaviors.



**Hypothesis 4d.** This inquiry explored the correlation of accuracy in the perceptions of students with ASD on the behaviors of their peers as compared to classroom peer behavioral consensus reports. Using the same dichotomized categories as defined above, students with ASD nominated 60 different peers to various antisocial attribute categories ( $n = 87$ ,  $M = 1.45$ ). These nominations included 7 fellow peers with ASD. Another 145 prosocial nominations were given to 58 different peers ( $M = 2.50$ ), which included 34 nominations to 12 students with ASD ( $M = 2.83$ ). The overlap between the reports of children with ASD and peer consensus reports was calculated at  $r = .33$  for the category of antisocial behavior. The overlap between these two reports were at  $r = .29$  which suggests that students with ASD are not accurately perceiving their own behaviors as well as the behaviors of their peers.

An additional Overlap calculation was performed that did not include the nominations given to children with ASD. Therefore, the peer assessment reports of children with ASD were compared to peer behavior consensus reports that included the educational classifications LD, S/L, SLD, EBD, CDB, OHI, and peers without disabilities. With the removal of the ASD population, the overlap in the two reports ( $r = .25$ ) for prosocial behaviors decreased. However, the overlap between the reports increased ( $r = .50$ ) in the antisocial category, which is suggestive that children with ASD were more likely to perceive prosocial behaviors with more accuracy than they did antisocial behaviors.

## Chapter V. DISCUSSION

It has been shown that children with ASD often exhibit difficulties in social competence, which is likely to be demonstrated in their inability to develop and maintain peer relationships. As well, studies using sociometric procedures have consistently found that children with ASD are significantly more likely to be rejected by their peers than children without ASD. However, sociometric procedures are limited in that they do not reveal information about actual peer affiliations. The present study is one of only a few existing studies that have made use of social-cognitive mapping and peer behavioral assessments, rather than sociometric ratings, to gain a better understanding of the social functioning of these students with their inclusive peers.

The present study employed SCM procedures that combined the perceptions of multiple participants to explore how children with ASD perceive their own social connections within classroom social structures and how their peers perceived their relations. The congruency of the perceptions of students with ASD was examined in light of the reported perceptions of their peers. The results that are yielded from conjoining these methods allows for a look into the various dynamics of social relations such as peer acceptance, peer preference and social network affiliations (Cohen, 1977; Kandel, 1978; Neckerman, 1990). This study is further unique in that it extends upon the use of SCM within a SCT framework to explore the social cognitions of children with ASD, specifically in their accuracy in naming peer groups and in social characteristics of themselves and their peers.

The present study sought to identify if students with ASD differed from their peers without disabilities on the three social integration constructs of peer acceptance, social preference, and social network affiliation. In addition, this study used social cognition as a fourth construct to determine if there were differences between how children with ASD were in

perceiving their own and others' peer affiliations and social characteristics. The scores of students with ASD, in each of these four constructs, were analyzed in terms of differences from peer consensus reports. Specifically, this study was designed to: (a) explore whether students with ASD were finding their way in the social networks that existed in their classrooms, (b) determine whether students with ASD were able to identify themselves as members of a social group in their inclusive classrooms, (c) explore the nature of the social groups in which students with ASD were affiliated and, (d) determine if students with ASD were able to accurately name the same peer groups in which they did and did not self identify as a member, and their accuracy in identifying the behavioral characteristics of self and others.

### **Hypotheses**

**Hypothesis 1.** Hypothesis 1 predicted that there would be no statistical significance in the rates between children with ASD and their peers without ASD in the ability to identify themselves as a member of a peer group in their inclusive classroom. Previous research has reported mixed findings related to the ability of students with ASD to recognize their own participation within the social structure of the classroom. One body of research reported that children with ASD were able to identify connections with at least one peer at rates that were similar to their peers without disabilities (e.g., Bauminger et al., 2008; Bauminger & Shulman, 2003; Bauminger & Kasari, 2000; Green et al., 2000). The present study found that children with ASD reported either having no friends or the rates in which they named themselves to be associated with another peer were significantly lower than their peers without disabilities which has been supported through another body of research (e.g., Howlin, Mawhood, & Rutter, 2000; Marks, Schrader, Longaker, & Levine, 2000; Orsmond, Krauss, & Seltzer, 2004).

It is possible that these two research bodies are at odds with one another based on the sampling populations and methodological procedures employed. For example, in Chamberlain, Kasari, and Rothram-Fuller's (2007) study, all 17 of their subjects with ASD identified as having at least one peer relation in their inclusive classroom setting. However, unlike the present study, Chamberlain and colleagues only included targeted students with ASD who had IQs in the normal range (Mean IQs: Verbal = 107.3, Performance = 105.2, Full Scale = 107.3, Full Scale range: 89 - 129). Previous research has shown that children with ASD that have verbal IQs in the normal range do not necessarily experience the same social difficulties that low verbal students with ASD (e.g., Barnhill, Hagiwara, Myles, & Simpson, 2000; Bauminger, Shulman, & Agam, 2004; Bauminger, Solomon, & Rogers, 2010).

Further in Bauminger and Kasari's (2000) investigation on the peer relations of children with ASD, they noted that all 22 of their participants with high-functioning ASD reported having at least one friend. To gather this data, the researchers administered *The Friendship Qualities Scale* (Bukowski, Boivin, & Hoza, 1994). This measurement is a self-report that assesses children's perceptions of their friendships with a best friend. A child is asked to name his or her best friend. After the child writes the name of the friend, then a series of questions about that friendship are asked. The manner in which this assessment is introduced assumes that a child has a best friend as it does not provide for a negative answer to be given. It is possible that the 22 participants simply provided any name to satisfy answering the question. With this assessment, it is not possible to determine the accuracy of the student's response without additional data (e.g., asking a parent, observations, peer reports).

In addition, Bauminger and Kasari (2000) also administered the *Loneliness Rating Scale* (Asher, Hymel, & Renshaw, 1994) which is a standardized self-report that assesses children's

feelings of loneliness. The questionnaire contains 24 items rated on a 5-point scale from not true at all (1) to always true (5). Of the items, one asks students to rate the statement "I don't have any friends in class." The researchers used the responses to this statement to determine if children self-identified as a member of a peer group. Again, it is possible that the scores provided were inflated as research has shown that children with ASD often have a different definition of what constitutes a "friend" (e.g., naming a babysitter, a mailman). With these assessments geared toward individual students, the examiner is not always able to determine if the "friend" that the examinee has identified is an actual student in the examinee's classroom.

The present study found that students with ASD were significantly lower in the rates in which they identified as being a member of a peer group. It is possible that SCM yielded more accurate results than the above studies in that all students who were in inclusive classrooms were included as subjects and were not restricted to just those students with high verbal IQs. It is possible that the use of SCM may have also influenced findings. For example, in this study, students with ASD were limited to naming peers in their classroom as possible group-mates. In SCM, groups were identified by asking students to write down the names of peers who "hang around together a lot" in their classroom. An oral instruction is given to remind children to include themselves in groups if they are also members. Children list groups from free recall. In administering SCM measures, information provided by the child with ASD could be verified by comparing answers to peer response reports.

However, it is also possible that SCM measures had the reverse impact on students with ASD, as this procedure is new in its application to this population of students. For example, students with ASD may have only followed the written instructions and ignored the oral instruction, therefore inadvertently omitting their name to peer groups in which they affiliate.

Support for this theory comes from cognitive research that has demonstrated that individuals with ASD often have impairments in auditory processing and in comprehending verbal directives (e.g., Bauman & Kemper, 2006; Rohde & Thompson, 2007; Tsai, 2004).

Further, because the current study used a subset of extant data from another project gathered by different researchers, it is not possible to know if students with ASD fully understood what was being asked of them or whether they did in fact only follow the written instruction. In their review of peer assessment measures, Yugar and Shapiro (2001) state that some researchers have used follow-up questions to ensure comprehension. For example, if students failed to nominate themselves, then they were individually asked, "What about you? Do you hang around together a lot with a group?" and possibly "Are there any children that do not belong to groups?" While these are plausible discrepancies, the current study attempted to control for these errors through teacher reports that asked if comprehension might impede their students from providing an accurate answer. None of the teachers seemed to think that this was an issue.

**Hypothesis 2.** Hypothesis 2 predicted that there would be no significant differences in the rates to which students with ASD were nominated as members of peer groups and the frequency of those nominations in allowing for peer group entry as compared to their peers without ASD. The null hypothesis was not supported as significant statistical differences were found between children with ASD and their peers without ASD in the low rates of peer group nominations received. There were 19 children with ASD who received at least one peer nomination as being a member of a group. Of these children, only 9 students (8 boys and 1 girl) received nominations at frequencies that allowed for peer group entry.

The current study's findings suggest that students with ASD, despite being in inclusive classroom settings, continued to have deficits in social competence that is reflective in the low rates of social integration into peer groups. However, with the exception of one student who did not receive any peer group nominations, students with ASD seemed to have some level of visibility in their classrooms as at least one of their peers perceived them to be a member of a peer group. While not statistically significant, this is an important finding as these children have often thought to be invisible in the inclusive classroom setting (Anderson, Moore, Godfrey, & Fletcher-Flinn, 2004; Harrower & Dunlap, 2001; Kamps et al., 2002). In receiving at least one peer nomination, it is possible that these students are not as isolated as once thought. These findings should be further explored, particularly in terms of assessing the social competencies of those children with ASD that were named as members of peer groups. They may possibly hold the key to understanding why other children with ASD are not able to gain peer group entry.

Of the few studies that currently exist, some have found that children with ASD are finding their way into peer social groups in the inclusive classroom and at the same rates as their peers without disabilities. For example, Boutot and Bryant (2005) conducted a mixed method study to assess the social integration of students with disabilities in various inclusive classrooms. Their results suggested that the ten students with ASD in their sample were no different in terms of the frequency of peer nominations received than their classmates without disabilities. As well, a study by Locke, Ishijima, Kasari, and London (2010) found that all seven of their subjects with ASD were nominated to and gained entry into classroom peer groups despite having low rates of peer nominations. On the other hand, the findings of the current research also have been well supported through prior investigations that have found that students with ASD were inclined to receive significantly lower rates of peer nominations by their classmates without disabilities and

are more likely not to have peer group affiliations (e.g., Howlin et al., 2000; Konig & Magill-Evans 2001; Locke, Ishijima, Kasari, & London, 2010; Orsmond, Krauss, & Seltzer, 2004).

The differences in the bodies of literature may be attributed to a number of factors. For example, in Locke, Ishijima, Kasari, and London's (2010) research, all 7 of their adolescent subjects with ASD were embedded in their inclusive classroom's social structure. However, it must be noted that all seven of these adolescents spent more of their school day in a self-contained program designed for children with ASD that used a narrative curricular structure that emphasized social coherence and understanding via non-traditional techniques such as drama, film, and experience-based exercises. An inclusive drama classroom served as this study's setting. This classroom contained all seven of the students with ASD and 13 students without disabilities. While the researchers found that all of the students with ASD were socially integrated, it is noted that all seven were integrated in different peer groups with one another. Further, these groups did not contain other students without disabilities

**Hypothesis 3.** Hypothesis 3 delved into an exploration of the social networks of children with ASD, the peers with whom they affiliate, as well as the nature of the peer groups that they were named as members. Specifically it was postulated that there would be no significant differences between children with ASD and their peers without ASD in terms of (a) social preference, (b) social network centrality, and (c) the composition of their peer group affiliations.

**Hypothesis 3a.** Hypothesis 3a predicted that there would be no significant statistical differences between children with ASD and their peers without ASD in terms of social acceptance. The null hypothesis could not be supported as findings indicated that children with ASD had significantly lower rates of social acceptance as compared to their peers without ASD. The current study found that 80% ( $n = 16$ ) of the students with ASD were not socially accepted



by their peers. Sixty-five percent ( $n = 13$ ) of these students were classified as socially rejected, 15% ( $n = 3$ ) as neglected, and one child (5%) was unclassified, as he did not receive any peer nominations on the behavioral attribute survey. Of the 3 (15%) children that were peer accepted, they were classified as average. The findings are indicative that children with ASD are significantly more likely to be the least socially accepted group when compared to peers without ASD; suggesting that they are the least likely group of children with whom peers would choose to affiliate. These findings are supported through previous studies, which have found that children with ASD tend to have lower social preference when compared to other educational classifications (e.g., Chamberlain, Kasari, & Rotheram-Fuller, 2007; Church, Alisankski, & Amanullah, 2000; Sasso & Rude, 1987; Venter, Lord, & Schopler, 1992).

The low social preference of students with disabilities has been well documented (e.g., McConnell, 2002; Frea et al., 2001; Sabornie et al., 1990). Pearl et al. (1998) conducted one of the first in-depth investigations where SCM was employed to assess the peer acceptance levels of children with mild disabilities. Results found, that when compared to peers without disabilities, children with mild disabilities tended to receive fewer nominations on peer assessments for leader, athletic, and cool. High nominations for this population were received for seeks help and shy/withdrawn. They also noted that boys with mild disabilities were nominated frequently for antisocial behavioral items than were boys without disabilities.

Likewise, the present study found that students with ASD were more likely to receive nominations in the antisocial traits of trouble, disruptive, sad, starts fights, and shy/withdrawn. They tended to receive fewer or no nominations on peer assessments for prosocial attributes as cooperative, athletic, good student, and friendly. The few students with ASD who were able to find their way into a peer group were more likely to be perceived as disruptive, seeks help, starts

fights, and gets into trouble. Children with ASD who were not members of peer groups tended to be the recipients of high nominations for being sad and shy.

The current findings lead to several implications that warrant further exploration. For example, children that were perceived by their peers as shy and sad were more likely to be excluded from peer groups. While this finding was not just specific to children with ASD, it seems to render the emergency of cognitive based interventions so that these children can enjoy peer acceptance. It also renders the question of whether this population of students are shy and sad because they have the skills and desires to want friendships but don't know how to use those skills or whether they lack social cognitive competencies. In studies discussed prior in this paper, if intervention is not provided for these students, then they face a higher risk of negative life trajectories, specifically loneliness and depression (Parker & Asher, 1987).

On the other hand, there are some issues raised concerning the students with ASD who were able to find their way into peer groups as they tended to be socially preferred by their peers for their external anti-social behaviors (e.g., disruptive, seeks help, starts fights, and trouble). As Farmer (2000) notes, children with antisocial behaviors often associate with peers who assist or reinforce their antisocial behavior. Since peer groups tend to be stable over time, it is highly likely that the students with ASD who exhibit these behaviors have a propensity to affiliate with similar peers who may help maintain these socially inappropriate behaviors. Studies have shown that the stability of these characteristics often manifest themselves in future maladjustment such as continued association with deviant peers, substance abuse, school dropout, and criminal behaviors (Cairns & Cairns, 1994). It is therefore important to look at ways to intervene in the social dynamics of the classroom as a way of disrupting this negative cycle.

**Hypothesis 3b.** Hypothesis 3b predicted that there would be no statistical significant differences between children with ASD and their peers in their social positions within the classroom. The null hypothesis was rejected as findings indicated that children with ASD were significantly lower in social status than their peers without ASD. Of the forty-five percent ( $n = 9$ ) of the children with ASD who were named as a member of a peer group, none had nuclear centrality, 20% ( $n = 5$  boys) had secondary centrality; and 20% ( $n = 3$  boys, 1 girl) were peripherally connected to peer groups. Eleven students, 8 boys and 3 girls, (55%) were isolated and were not connected to any peer group. The results of the present study further support the notion that children with ASD are not well integrated socially within their classroom's social structures.

Support for the present findings can be found in studies such as that of Locke, Ishijima, Kasari, and London (2010) who studied the social networks of adolescents with ASD that were members of the same inclusive classroom. They found that children with ASD were either isolated or on the periphery of their classroom's social structure. Chamberlain, Kasari, and Rotheram-Fuller (2007) examined the social network centrality of 17 children between the 2<sup>nd</sup> and 5<sup>th</sup> grade levels. They also discovered that students with ASD scored significantly lower in SNC than a matched group of peers without disabilities. Among their sample of children with ASD, 35% were peripheral, 47% secondary, and 18% nuclear as compared to matched peers without disabilities who were classified as 6% peripheral, 47% secondary, and 47% nuclear. No isolates were found in either group.

Not all previous research however supports the findings reported here. For example, Boutot and Bryant (2005) conducted a study in which they examined the integration of 10 students who had diagnoses of either ASD or Pervasive Developmental Disorders-Not Otherwise

Specified (PDD-NOS) in inclusive settings. Their findings indicated that all of the children with ASD or PDD-NOS were as equally affiliated in classroom social structures as their peers without diagnoses of ASD or PDD-NOS. However, different than the present study's methodologies, Boutot and Bryant (2005) dichotomized how they assessed and categorized social network affiliations. For example, in their study, children were classified in one of two categories; affiliated with a network and not affiliated with a network. Seventy percent of the children with ASD were identified as being affiliated with a network while 83% of students with no disabilities were affiliated. Children with ASD were also identified with a 30% rate of not being affiliated with a network compared to 17% of their peers without disabilities. Specific centrality levels were not given; therefore no information was given as to how many children were identified with nuclear, secondary or peripheral status. This missing information makes comparisons to other studies difficult as well as giving an incomplete understanding of how prominent affiliated children are in their classrooms.

However, unlike the results of Chamberlain, Kasari, and Rotheram-Fuller (2007), the current study found that children with ASD were even less embedded in their classroom structure as no children with ASD emerged as nuclear while eleven students were classified as isolates. Although Chamberlain, Kasari, and Rotheram-Fuller used peer matches, they did note that only six of the 381 children in the all-peers group (less than 2%) emerged as isolated which is still significantly discrepant as compared to the present study. There are several hypotheses as to why these differences existed. First, the subjects in Chamberlain, Kasari, and Rotheram-Fuller's study came from primarily upper-middle class schools, thus parents may have more financial accessibility to provide additional outside support services for their children (social skills therapy,

speech and language therapy, etc.) which would give these children access to more direct skill teaching and opportunities to practice those targeted skills.

Second, the body of students with ASD used in their study only included students with ASD that had I.Q. scores in the normal range and had permission from their parents and teachers, and who were recommended for the study by school principals and inclusion facilitators. Thus, selection criteria may have eliminated those children who were more problematic. In the current study, I.Q. scores were not available, as the schools did not use I.Q. scores as part of its determination in placing children with ASD in inclusive settings. It has been shown that students with ASD that exhibit higher academic cognitions also tend to have higher social cognitions (DuPaul & Eckert, 1994; Jackson et al., 1987; Sisterhern & Gerber, 1989; Strain & Odom, 1985). Thus it is possible in the present study that academic cognition was a factor in determining which students were socially successful.

Third, it is possible that because a majority of the subjects came from affluent homes, that they were more likely to attend the same school for several years which may afford more opportunities to associate with the same peers both in school and in neighborhood activities. According to the U.S. Government Accountability Office report (2010, December), children that were from low income homes were more likely to have changed schools four or more times between the grades of K-8, whereas children from more economically advantaged households moved on average once during the K-8<sup>th</sup> grades (Publication No. GAO-11-40). In the present study, over 25% of the students that fully participated were from low income families suggesting that mobility might have an impact on students' abilities to make friends. The mobility rates for children were not available to determine if such a relation existed.

*Hypothesis 3c.* Hypothesis 3c predicted that there would be no statistical differences in the patterns of peer and peer group affiliative patterns between children with and without ASD. Specifically, it was hypothesized that children with ASD would affiliate with peers with social characteristics that were similar to their own at comparable rates of children without ASD.

As expected, and as other researchers have found (e.g., Bauminger et al., 2008; Farmer & Hollowell, 1994; Sabornie & Kauffman, 1985), the majority of the fourteen classrooms in the current study displayed well-defined social structures. These social structures were not randomly formed as students tended to affiliate with others who were similar to them on salient personal or social characteristics. Because of this tendency for similar students to hang around together, many (85%) of the identified clusters in the present study could be described by the dominant peer-assessed characteristics of their members (e.g., the cluster of popular girls, the cluster of aggressive, athletic boys, etc.). Similarly, Sabornie and Kauffman (1995) found that students with EBD were attracted to peers who had social characteristics similar to their own. This is consistent with the current study's intraclass correlation analyses of the peer assessments that suggest that student with ASD affiliate with peers who support and complement their own social characteristics.

Further, there was a failure to reject the null hypothesis as findings indicated that students with ASD, who were members of peer groups, associated with similar peers who had lower levels of peer-assessed positively valued social characteristics. That is, students with ASD and their cluster mates were significantly less likely to be characterized by peers in groups that did not contain a child with ASD, as cooperative, athletic, friendly, and good students but were more likely to be perceived as shy, seeks help, and sad. This supports the view that children with ASD tended to affiliate with cluster mates that had similar behavioral characteristics, specifically

students that were shy, seeks help, and sad. Despite these common affiliations, children with ASD were among the most salient sad and shy members in their peer groups. Further, the members of ASD clusters were not significantly different from the members of other clusters for the peer-assessed descriptors for starts fights, leader, trouble, cool, and popular.

Additionally, students with ASD tended to affiliate with other group members in gender specific clusters, which is similar to previous studies (e.g., Cairns et al., 1985; Eder, 1985; Farmer, 2000b; Farmer et al., 1999; Farmer & Farmer, 1996; Farmer & Stuart, 1993; Hallinan & Smith, 1989). Consistent with this research, students with ASD who were members of groups were primarily associated in clusters of same gendered peers (one exception was a male child with ASD who associated with an all female peer cluster). One classroom contained three students with disabilities, 1 student with SLD and 2 students with ASD. In this classroom, the two students with ASD formed a dyad together where both students were identified as neglected through peer assessment reports. In another classroom, of six students identified with a disability, five of them were members of the same peer group. This peer group was characterized as average and problematic; again lending support to students affiliating with like peers.

As a note, five students did not participate in the survey due to lack of proper consent. All five of these students were isolates, 3 were not listed under any behavioral categories, one student was identified as shy (5 peer nominations) and seeks help (3 nominations), and the other student was perceived as being disruptive (14 peer nominations), gets into trouble (15 peer nominations), seeks help (8 nominations) and starts fights (6 nominations). It is possible that consent was not obtained as parents were aware of their child's lack of peer relations and/or problem behaviors.

**Hypothesis 4.** Hypothesis 4 explored the social-cognitive accuracy of children with ASD using peer group nominations and peer behavioral assessments. Specifically, this investigation was guided by the examination of how accurate students with ASD were, as compared to peer consensus reports in: (a) naming peer groups in which they self-identified as members, (b) naming peer groups in which they did not self-identify as members, (c) identifying the behavioral characteristics of self, (d) identifying the behavioral characteristics of others.

*Hypothesis 4a.* Hypothesis 4a predicted that children with ASD would be as accurate in identifying peer groups in which they self-identified as a member when compared to those groups identified through peer consensus reports. Accuracy, as determined by the overlap between an individual's report of perceived peer groups in his or her class and the consensus reports by the class, were compared. The findings indicated that there was a difference in the accuracy levels between children with ASD and peer consensus reports, indicating that students with ASD were able to name some peers with whom they were nominated as being associated but not at a level of significance. For example, only 4 students with ASD nominated themselves as members of peer groups. One student listed himself and 4 other students in his group correctly but failed to name two other students who were in that group. A second student listed himself accurately as a member of a group and 4 others (3 of the 4 students in the group were correctly identified), but six other students were not named though they belonged to the group. The third student listed himself and 4 others as a member of a group but this child was an isolate. A fourth student accurately self-identified as being a member of a dyad.

As stated previously, students with ASD tended to name peers who were not part of their peer groups, and failed to name a number of children who were identified as peers in that group. This is suggestive that children with ASD are generally not as aware of their peer group



membership or the peers in which they associate. In addition, there were two students who did not identify their membership to a peer group, when in fact, SCM analysis indicated that they were members.

**Hypothesis 4b.** This hypothesis predicted that there would be no difference in the naming of peer groups in which children with ASD did not self-identify as a member when compared to peer consensus reports. Interestingly, results indicated that, when compared to peer consensus reports, children with ASD were 56% accurate in identifying the same groups as their peers. Though this level is not significant, the finding is mildly suggestive that a number of students with ASD are more accurate in identifying peer groups in which they did not self-identify as a member.

The failure to support hypotheses 4a and 4b may be explained by the deficits that are inherent in most children with ASD, specifically difficulties in processing subtle nonverbal and verbal social cues (see Campbell et al., 2004; Carrington, Templeton & Papinczak, 2003). It is possible that accuracy in identifying the peer networks in one's class may be a low demand social-cognitive task. That is to say, that peer networks that exist within a student's classroom may be so salient that almost all children can accomplish the task easily. Previous research examining children's social perceptions has used tasks that required the ability to process more subtle nonverbal and verbal social cues (Jackson et al., Saloner & Gettinger, 1985). Perhaps it is these harder tasks that differentiate between children with and without ASD. This interpretation would suggest that social-cognitive tasks mediate the relationship between lowered social status and ASD, but that it is proficiency at these harder social-cognitive tasks that are more closely associated to the level of how well children with or without ASD are embedded within their

classroom social structure. If this explanation were true, accuracy in naming peers would not be related to social network centrality which the current findings support.

Another related possibility is that cognitive accuracy in identifying peer relationships within one's classroom is an ecologically valid task. As such, interpreting subtle and nonverbal social cues and verbal social information is important for engaging in social interactions (Konig & Magill-Evans, 2008). It may be, however, that within the classroom setting, knowing who "hangs out" with whom is a more viable indicator of the social-cognitive accuracy of children with and without ASD. The awareness of one's own relationships and the relationships of other peers in the classroom requires that ability to perceive that an appropriate give and take interaction is occurring between them. However, significant difference in the social-cognitive accuracy scores of children with ASD and their peers without ASD were found in the current study. It is possible that deficits in ToM may account for these differences, particularly in regards to being able to take a self-other perspective. Children with ASD may be able to observe who "hangs out" because it is a low demanding cognitive task, yet being able to self-identify may be a result of ToM deficits. One direction for future research would be to further explore this relation.

***Hypothesis 4c.*** Hypothesis 4c predicted that children with ASD would be as accurate in identifying their own behavioral characteristics when compared to peer consensus reports. The null hypothesis was rejected in that results found that, when peer assessment reports were analyzed, children with ASD had significantly lower rates of identifying their own behaviors when compared to the consensus of peer nominations ( $r = .23$ ). Upon further analysis, children with ASD were able to name their positive behaviors with 73% accuracy when compared to peer reports but were only 27% accurate in identifying their negative behaviors.

The current findings are in line with previous studies. For example, Konig and Magill-Evans (2001) and Knott et al. (2006) found that children and adolescents with ASD assessed themselves as possessing greater levels of social skills or competence than reported by others. Similarly, Green et al. (2000) found that many children with ASD in their study underestimated their degree of "disability." The current research findings are similar to data that have been published with respect to the Positive Illusory Bias that has been reported in children with Attention-Deficit Hyperactivity Disorder (ADHD) (e.g., Owens, Goldfine, Evangelista, Hoza & Kaiser, 2007; Vaughn, 2007). In these studies, despite the fact that children with ADHD experienced difficulties across a number of domains of functioning (e.g., academic, social and behavioral), they often rated their own competence in these areas very highly (Owens et al., 2007). The results presented in the current study suggest that children with ASD may also be prone to a positive illusory bias, at least with regard to their behavioral attributes.

The results described above have important implications for understanding ToM deficits in children with ASD. As indicated earlier in the paper, although most research on ToM in ASD has focused around impairments in knowledge of others' minds, some researchers (e.g., Frith & Happé, 1999) have posed the theory that self-knowledge may also be affected. Therefore, it is possible that the discrepancies between self- and peer-reports of behavioral attributes are consistent with the notion of an impaired "theory of own mind" in children with ASD. If this indeed is the case, intervention should focus on social cognitive based tasks that assists these students in being able to recognize their negative behaviors as a way of increasing social competence, specifically in relation to developing positive peer relations.

***Hypothesis 4d.*** Hypothesis 4d predicted that the reports of children with ASD would be as accurate as peer consensus reports in identifying the behavioral characteristics of their peers.

This hypothesis was rejected, as children with ASD were less accurate in their perceptions.

There was a significant correlation ( $r = .88$ ) between the reports of the two groups when prosocial behaviors were assessed. However, there was no significance ( $r = .23$ ) when antisocial characteristics were assessed. These results suggest that children with ASD are more competent in perceiving prosocial behaviors both in self and others, but are generally not aware of antisocial behaviors, especially their own.

Children with ASD were not particularly aware of their own membership within their classroom social network despite the fact that a number of them were able to gain entry as a group member. Past studies have indicated that children with ASD have the desire for friendships and often can identify having at least one friend (Bauminger & Kasari, 2000; Bauminger, Shulman, & Agam, 2003; Bauminger, Solomon, Aviezer et al., 2008; Konig & Magill-Evans, 2001; Locke, Ishijima, Kasari, & London, 2010; Orsmond, Krauss, & Seltzer, 2004). However these friendships often are not reciprocated (e.g., Bauminger & Kasari, 2000; Kasari, Locke, Gulsrud, & Rotheram-Fuller, 2001). Bauminger and Kasari (2000) noted that most of the 60 adolescents with ASD in their study were able to identify having a friend from their school. However, there were a number of children that identified tutors, school assistants, and stepdads as their "friend." Similarly, Chamberlain et al. (2007) found that many of their subjects were able to name a classroom peer as a friend but only one third experienced reciprocity as compared to sixty percent for peers without disabilities.

Assessing accuracy provides important insight into understanding some of the complexities of peer relations. For example, in this study, 7 of the 15 children with ASD were able to name the same children as members of peer groups at a rate that was comparable to peer consensus reports. This is indicative that some children with ASD do exhibit some accuracy in

social-cognitive processing. It may be possible that the children with ASD that were able to identify these groups were academically higher than other peers with ASD or that these students were members of classrooms in which peer networks were significantly salient and stable where naming groups became a lower demanding social-cognitive task. Previous research that has assessed social perceptions of children with disabilities have used methods that required higher levels of processing ability to interpret nonverbal and verbal social cues (Jackson et al., 1987; Saloner & Gettinger, 1985). Competency in deciphering these cues may be a factor that separates children with ASD who were able to identify similar peer groups and children with no disabilities from the children with ASD who were not able to accurately identify similar peer groupings.

The ability to perceive one's own relationship and the relationships of other students in the class requires the reporter to be competent in observing social interactions between other students and well as understanding interactions between themselves and fellow classmates (i.e., having a well-developed ToM). Therefore, it is possible that the overlap in the social-cognitive accuracy scores of the children with ASD and peer consensus reports existed because children with ASD possessed the ability to observe and comprehend peer interactions, thus deciding which children "hang around together a lot." More research needs to be conducted to see if this finding is generalized across studies as well as whether it is specific to just inclusive environments. The ability to perceive peer interactions and peer relations may be a better predictor when assessing social-cognitive accuracy as compared to nonecological approaches that require children to interpret verbal and nonverbal social cues in discrete tasks. Further, the findings from this current study suggest that some children with ASD may have a better understanding of friendships and relationships than previously credited with.

Because the sample of children with ASD who fully participated in the study was small, it is difficult to draw definitive hypotheses, however, there are some areas that warrant further investigation. For example, the current findings revealed that children with ASD, overall, only named nuclear members of a group. There were two exceptions: one student was able to accurately identify all of the nuclear members and the sole peripheral member of a group in which he was a member. Another student who was a peripheral member in a primary group, was not able to name the two nuclear students in his peer cluster but was able to name 3 peripheral members with accuracy. There did not seem to be a correlation between network centrality, social preference and accuracy. Again, caution should be noted due to the sample size.

It would appear to follow that if children with ASD were able to identify peer groups with a significant level of accuracy then they would also be accurate in identifying their own membership in a peer group as identified through SCM. However, the findings of this study did not support this. Only four students with ASD were able to recognize their membership in the same peer group as identified through peer consensus reports, though these students tended to name extra students or failed to identify students who were actual members of the same peer group. The failure of students with ASD to identify their own membership in a peer group as named through peer consensus reports has many implications. Although students with ASD can identify peer groups in which they are not a part of with some accuracy, but not able to identify their own peer relations, may be due to deficits in social-cognitive abilities. It is possible that students with ASD rely on visual input such as seeing peers sitting next to each other, talking with one another, etc. to identify “who hangs around with each other a lot.” Or they may be identifying students with whom they would *like* to have as friends. However, a number of students with ASD in this study were not able to infer their own interactions with classmates, a

higher order cognitive skill that they may not be using or have the ability to use when assessing peer-to-peer relations.

### **Limitations**

When interpreting the results of this study, several limitations should be considered. First, all of the student participants were from the same Midwestern city that has had a known history of consistently supporting inclusion of students with disabilities in the general education setting well before legal mandates were instituted. It may be possible that students with ASD exhibited higher rates of social participation due to a longer duration of being in an inclusive classroom. It is also noted that the sample size of students in the study was small ( $N = 20$ ) which may affect the feasibility to obtain similar results when larger populations are studied. Also, it appeared that children with ASD were disproportionately overrepresented in this sampling. According to the U.S. Department of Education, National Center for Education and Statistics (2011), students with disabilities comprise 13.2% of the public school population in the United States. Of this 0.7% are children with ASD, 0.9% EBD, 1.0% CDB, 1.3% OHI, 2.9% S/L, 5.0% SLD, and 1.4% other disabilities. Therefore, it would be expected that there would be almost 5 times as many children identified with SLD, almost 3 times the number of children with S/L, etc. It has not been validated as to why this discrepancy exists, but there are possible reasons such that the state in which the school district is situated has different guidelines in identifying disabilities, that assessment for the presence of a disability is delayed until later years of schooling due to the implementation of Response to Intervention strategies, or whether this is a rare phenomenon specific to this city.

Another limitation that exists in this study is the lack of IQ scores. Through IEP reports and teacher input, it was determined that students with ASD in this study exhibited comparable

academic skills as their regular education peers and required little help to participate and complete classroom assignment. Therefore, it was impossible to determine if children with ASD that were named to social networks had higher academic cognitive abilities than those children with ASD that were isolates. Support for this hypothesis comes from the work such as that of Heremelin and O'Connor (1985), Kasari, Chamberlain, and Kasari (2001), and Sigman and Ruskin (1999) who have investigated children with autism who had normal intelligence. They found that the rates of social engagement by students with ASD in higher levels of social relationships that encompassed more complex emotions were directly related to intelligence level.

An additional shortcoming of the current study is a lack of inclusion of a ToM measure, which may have allowed a more direct examination between theory of others' minds and self-perception. It is recommended that ToM measures be included in future studies of self-perception. The current study may also have been limited in that the construct of self-perception and social cognition has yet to be fully understood. Therefore, the current study considered the accuracy between self- and peer-reports as a representation of ToM. Further investigations may seek to develop more universal measurements that can be applied to thoroughly examine how individuals with ASD perceive the peer relations and behaviors of themselves and their peers.

Further, the present study's conceptual basis was rooted in an ecological model which, when applied to this study, assumes that improvement of social skills in high-functioning children with ASD is composed of the influence of different social agents in the child's environment (peer, parents, teachers, etc.). This might be a contributing factor in determining the social status of children with ASD, as it is plausible that parental interactions with their children were different; thus if a parent was more interactive with their child and provided social corrections in natural contexts, that this might help the student in being more successful in peer



relations. As well, there was no information regarding outside services that the child might be enrolled in. For example, using the elements of the ecological approach, if a child was a part of a play group, received private social work and or speech-language services, etc. this might very well account for social success.

Lastly, it is possible that there was a variation in philosophical methodologies among the 14 teachers of the 14 participating classrooms. For instance, if teachers actively incorporated the philosophy of social inclusion in their classroom, it would seem to reason that this would positively impact how children interacted with one another regardless of educational classification. For example, a teacher may utilize shared learning activities and strategically integrate students with disabilities among groups of children with out disabilities. Also, if such awareness existed, it might also follow that these teachers have assessed their physical environments and have designed spaces to limit sensory distractions, have incorporated movement in their curriculums, etc. so that the problem behaviors of students with ASD are minimized, and less bothersome to other students, a factor that has been shown to promote social inclusion among these students (e.g., Jones & Frederickson, 2010; All of these are possible factors that might influence the social acceptability of students with special needs (Boutot, 2007). This theory may offer an explanation as to why some classrooms in the present study had well-developed social structures where every student in the class, regardless of educational classification, was a member of a social group.

### **General Discussion**

The current study is among the first to examine the social networks of students with ASD in inclusive classrooms. A considerable amount of research has accumulated over the past several decades that have investigated the social deficits of children with ASD (e.g., Kanner,

1943; Wing, 1981; Ochs, Kremer-Sadlik, Solomon, & Gainer Sirota, 2001). Another line of research has focused on identifying the specificity of those social deficits in an attempt to provide social skill interventions (e.g., Lord & Magill-Evans, 1995; Rutter, 1996; Rogers, 2000). It was thought that by identifying specific social skill deficits (such as maintaining eye-gaze, limiting hand flapping, aggressive outbursts, etc.), that intensive instruction could be given to students with ASD so that they learned how to properly interpret the actions of others and thus be able to increase interactions with peers without disabilities.

Some success was identified in social skills interventions, however, it was also found that students were not able to maintain these newly learned skills for long and they also were not able to generalize these skills in various environments (Handleman, 1999). As a result, researchers then began to examine the environments that best supported the learning and generalization of learned social skills. It was generally found that children with severe difficulties benefited from interactions with peers without disabilities (Brinker & Thorpe, 1984). Thus, began a movement to integrate these students into general education classes. The findings of the present study are discussed in light of the previous research and attempts to provide a bridge of intersection so that children with ASD can experience greater peer involvement in the general education environment.

Several overall conclusions can be drawn from the results of this study. First, findings indicate that some students with ASD are experiencing some level of social success in inclusive classrooms (e.g., more embeddedness with peer groups). This suggests that there are some students with ASD that possess the social cognition, social skills, and social problem solving strategies needed to access and successfully enter into peer social networks. This further is indicative that some students with ASD are experiencing peer acceptance among their inclusive

peer-mates, however, a majority of these students are not able to avoid social isolation. Students that found membership in a peer group tended to be peripherally or secondarily connected to either another peer with whom had peripheral or secondary relations to core group members. This suggests that, while some students with ASD were affiliating in peer groups, that their social bonds with peers were weak and that they were not as socially accepted as other their peers without ASD.

Secondly, children with ASD that did affiliate within peer groups, were perceived by their classmates as problem students (e.g., problematic, causes trouble, etc.) whereas many children with ASD that were isolated tended to be described as shy and sad. These findings suggest that students with ASD that tended to be more assertive were able to find relations with peers although these relations were not always with peers that shared salient behaviors. Students with ASD that were “quiet” tended to be ignored by their peers, despite some children without disabilities in the same classes that exhibited the same behavioral features were able to find membership in peer groups.

Thirdly, based on the results of the present study, while some students with ASD identified having at least one peer that that they “hung around with,” the relationship was not reciprocated by the peers that they named. When examined further, a number of students with ASD were able to name peer groups in their classrooms with some significance, however, they were not able to identify their membership in groups in which peers named them as members of. It is possible that children with ASD are defining peer relations differently than peers without ASD or that deficits in social-cognitive abilities impede the accuracy of being able to perceive one’s own identity, both in behavioral attributes as well as in relations with peers. These findings suggest that students with ASD may exhibit more competence in identifying peer groups through

observation, which tends to be a less complex cognitive task (e.g., Dodge & Tomlin, 1987; Fontaine et al., 2002), than identifying one's own involvement in a social group requires an individual to make perceptions about his involvement in others, which requires a greater facility of social cognition. An example of this also was found in this study. Peers without disabilities perceived students with ASD with high rates of antisocial behaviors, while students with ASD tended to rate themselves more positively, suggesting that definite cognitive deficits exist in students with ASD.

Interestingly, there was a significant correspondence between peer and self-reports when identifying students with ASD as being "sad." This was a trait that students with ASD seemed to define in the same capacity as their peers without ASD. These findings are in line with research such as that of Bauminger and Kasari (2000), which concluded that students with ASD were not able to accurately identify more complex emotions, but were consistently able to identify "loneliness." It is possible that these students were well aware of their social isolation but only have a limited repertoire of emotional recognition to identify "shyness" as one trait that was the most similar to "loneliness." Overall, these findings suggest that there is evidence that some children with ASD are experiencing some social success in inclusive classrooms and by continuing to examine what these relations look like, how they are perceived, and how they are formed, it may then be possible to increase the quantity and quality of peer relations for all included children with ASD.

### **Implications**

The results of the present study have various implications for the implementation of interventions for children with ASD. First, the finding that children with ASD continue to have difficulty interacting with peers, despite increased involvement, suggests that interventions to

enhance social functioning should begin for children with ASD who appear to have few, or no friends, soon after they have been identified. Because this population of students is already at a heightened risk for social difficulties with peers and because a lack of, or troubled, peer relationships have been found to be associated with impaired psychosocial functioning and negative later life trajectories (e.g., Parker & Asher, 1987), beginning these interventions early is imperative.

Additionally, this study found that some children with ASD were able to gain entry into peer groups in their inclusive classrooms despite having high nominations on externally based antisocial behaviors, such as being problematic, gets in trouble, disruptive, etc. However, the children with ASD that more frequently identified as isolates were not the students with these behaviors but were those students that tended to be rated high by peers in the behavioral attributes of sad, shy, or simply were not noticed by their peers. This suggests that these children may be at the highest risk for social difficulties with peers and continued relationship issues in the later school years.

Since the effectiveness of social skills training has not been well supported by itself (e.g., Bauminger, 2002), altering social and behavioral tendencies may be better achieved by focusing on classroom social structures which has been found to work as well or better than social skill based interventions (Cichetti & Richters, 1993; McCord, 1993). Further, it has been found that prosocial behavior is more likely to be maintained in social systems that reflects and supports such behavior (e.g., Farmer et al., 1999). Therefore, for students that are shy and withdrawn, interventions may include changing their social context so that they are encouraged and supported to interact with other peers. In addition, incorporating more cognitive based learning such as increasing opportunities to engage in shared learning experiences with students without

disabilities (Putnam, 1993) or facilitating cross age peer tutoring, and structured group activities may also help these students achieve social success (Bay-Hinitz, Peterson, & Quilitch, 1994; Johnson & Johnson, 1989). Teachers can also reshape classroom instruction to include materials that are designed to teach important social skills, values and normative beliefs in various subjects such as literature, social sciences, and health studies.

Interventions that may also help students with ASD to become more socially integrated into classroom peer groups may include counseling at-risk students on techniques that help them become actively engaged with peers or to boost their self-confidence so that they are not hindered from group participation because of shyness. In addition, for children with ASD who have found their way into peer groups (those students with antisocial behaviors), strategies may include addressing the behavior of the entire group or helping the classroom reframe their views about aggressive and problem behaviors so these behaviors are discouraged rather than supported (Garrity, Jens, Porter, Sager, & Short-Camilli, 1997).

Social-cognitive ability was an additional factor that seemed to be an important variable in determining peer involvement. It was also found that children with ASD expressed difficulties in this area. For example, some students with ASD identified themselves as a member of a peer group, when in actuality named peers did not reciprocate those affiliations. Students with ASD were also more likely to have a skewed view of their own behavioral traits, as they tended to rate themselves significantly higher in positive traits than indicated by peer nominations. Often these students did not seem to have an awareness that their peers perceived them as being problematic and causing trouble nor were they aware of their own membership in peer groups in which they were named though they showed a significant level of competency in being able to identify peer groups in which they were not members.

Given the disparities in awareness and perceptions, there are two conclusions that can be deduced; (1) that students with ASD may demonstrate more social-cognitive competency through observations as seen in their ability in naming existing peer groups that were significantly similar to peer reports, and (2) that children with ASD express deficits in measures that require them to perceive their own involvement in or measures that require self reflection, such as identifying their own social behaviors. This could be a very significant area that would enhance the understanding of social information processing and its role in the success or detriment in the social integration of students with ASD in general education classrooms.

Findings from the current study further suggest that educational practices and policies should continue to be promoted that encourage the social integration of children with disabilities, specifically those with ASD. For example, social status has been predicted by teachers' classroom practices such as facilitative instruction. Fuchs, et al. (2002) and Utley et al. (2001), studied the effects of peer tutoring (a form of facilitative instruction) and found that students with disabilities in these classes were more socially accepted than their counterparts, enjoying the same social standings as their classmates without disabilities. A key implication of this finding is that teachers need to be conscious of their classroom's social structures so that all children are socially included and that they hold the power to facilitate and make a difference by fostering more learning opportunities and potentially better social experiences for students with ASD.

School policies should also reflect a host of practical initiatives that have been successful in promoting the social integration of children with ASD. These practices, which require wider dissemination, include how to build on strengths and self-esteem, classroom organization, structuring of teaching and leisure activities, friendship support networks, prevention of teasing

and bullying, students and staff preparation, phased positive implementation of new experiences, etc. (see Spence, 2003; Utley, et al. 2001; Vaughn, 2007). For example, in this study, many students with ASD were perceived by their peers as "gets into trouble" and "sad." It may be possible for classroom practices to reflect activities where these students are given opportunities that build on their strengths so that they are proactive participants in the classroom rather than being "troublesome." Such activities may also build self-esteem so these students are not seen by their peers as sad. While it is realized that current research practices and policies do address academic standards, there is still room to grow in terms of researching, designing, and implementing social/emotional learning standards, specifically standards that address the unique needs of students with disabilities, such as those students with ASD.

### **Directions for Future Research**

The current study is just one of a few that have begun examining the social networks of children with ASD in general education classrooms, therefore many unanswered questions surface that warrant further investigation on how to best optimize opportunities for students with this disability to be socially successful in making friends and associating with other peers without disabilities. The impact that social-cognitive accuracy and student perception have in social integration cannot be ignored. Additional research needs to explore the factors that contribute to the significant discrepancies in how students with ASD perceive their relationships with peers when compared to the reports of their peers. For example, if students with ASD are naming themselves to peer groups in which their peers are not naming them to and are not able to identify their own membership in groups in which they have been named to leads one to question how children with ASD define "friendship" or their perception of what peer relations "look like." It is very possible that students with ASD are not able to accurately identify their membership



because they are operating with a different working definition of what membership is or what it means to hang around a lot together means. It is also possible that children with ASD are naming groups in which they would *like* to be a member of which would support research that suggests these children have a desire for friendships (e.g., Buaminger, 2010).

Another area where further research is needed is in examining the psychological satisfaction of friendships of children with ASD. The call for this investigation comes from children with ASD not being able to accurately name peer groups in which they were named to. It is of interest to know if students with ASD are afforded the same benefits that friendships provide though they are not able to identify their own membership. For example, would students with ASD be able to identify cluster mates as being a source of protection, companionship and mutual support? It is also possible that peers that name these students as group members extend acceptance based on different dynamics that are typically researched in SCM. For example, if peers without ASD name these students as affiliating as peers, it may be that they are taking on a more care taking role or they see these peers as tagging along with the group. It is also possible that students with ASD provide a benefit for the group such as the student may provide protection for the group because he is willing to engage in aggressive acts.

The current study is based on quantitative measurements of peer and self-reports. It would be of value to conduct mix method research that combines observational reports with these other measurements. For example, for students with ASD that are identified as "sad" and "shy" by their peers and face isolation; are there other variables that can explain their isolation as other students without ASD with the same traits are able to gain peer group entry. Are students with ASD understanding behavioral dimensions accurately when compared to observed peer actions? In other words, with deficits in perception, it may be possible that students with ASD

are not accurately naming peer behavioral traits. This may further lead to an understanding of why students with ASD name themselves with more prosocial behaviors than their peers.

Additionally, a small body of research suggests that students with ASD are able to understand simple emotional constructs such as loneliness but do not comprehend more complex emotions such as being surprised (e.g., Bauminger & Kasari, 2000). A limitation such as these would impact how children with ASD understand peer relations.

While there is some research that has begun to examine the peer relations and social networks of students with ASD in the inclusive classroom, this is just a step on a steep staircase in understanding the dimensions of social integration of these students in the inclusive classroom. It is possible that children with ASD are content with their level of peer acceptance as they name more peers as friends than are reciprocated. It may be that friendships for children with ASD provide a more basic fulfillment than that which has been identified in peers without disabilities. It is possible that instead of analyzing the behaviors of children without disabilities and using those findings to teach children with ASD peer integration strategies, that a shift in focus needs to be undertaken in investigating the traits and skills of children with ASD that are gaining peer group entry and using those findings to shape intervention programs. Additionally, future studies may want to expand on this line of thought to investigate whether a student's perception of their level of membership in a positive peer network serves as a protective factor against social maladjustments in adulthood. In other words, is it really important for students with ASD to have friends or rather is the perception of having friends significant?

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doi:10.1177/002221949102400802



## APPENDIX A

### UNIVERSITY OF ILLINOIS AT CHICAGO

Office for the Protection of Research Subjects (OPRS)  
Office of the Vice Chancellor for Research (MC 672)  
203 Administrative Office Building  
1737 West Polk Street  
Chicago, Illinois 60612-7227

#### Notice of Determination of Human Subject Research

September 4, 2009



20090771-49237-1

Peggy Power, M.Ed  
Special Education  
710 Oakton  
Unit 407  
Evanston, IL 60202  
Phone: (847) 328-1265 / Fax: (847) 251-4067

RE: **Protocol # 2009-0771**  
**An Examination of the Social Networks of Children with Autism in Inclusive Settings**

Dear Ms. Power:

The UIC Office for the Protection of Research Subjects received your "Determination of Whether an Activity Represents Human Subjects Research" application, and has determined that this activity **DOES NOT meet the definition of human subject research** as defined by 45 CFR 46.102(f).

You may conduct your activity without further submission to the IRB.

If this activity is used in conjunction with any other research involving human subjects or if it is modified in any way, it must be re-reviewed by OPRS staff.

The UIC Office for the Protection of Research Subjects received your "Determination of Whether an Activity Represents Human Subjects Research" application, and has determined that this activity **DOES meet the definition of human subject research** as defined by 45 CFR 46.102(f).

You must submit either a Claim of Exemption or an Initial Review Application for IRB review. Your research cannot be conducted until written notice of an exemption determination or IRB approval has been granted.

For guidance on submitting your application, please refer to the guidance at:  
<http://tigger.uic.edu/depts/ovcr/research/protocolreview/irb/index.shtml>

**APPENDIX B**

Table B1

*Classroom Demographics for All Students Regardless of Participation Level*

	Students with Disabilities (DIS)							Students with No Disabilities (REG)			Total Class (DIS +REG)						
	Gender	Disability Type						Total	Gender	Total	*Free/ reduce Lunch	Ethnicity					
		ASD	CDB	EBD	OHI	S/L	SLD					W	AA	HL	AS	AI	Other
School A																	
Teacher 1	M	1	0	0	0	0	1	2	M	9	1	10	0	0	0	1	0
Grade 3	F	0	0	0	0	1	2	2	F	13	2	13	0	1	1	0	0
School A																	
Teacher 2	M	1	0	0	0	1	0	2	M	10	1	12	0	0	0	0	0
Grade 4	F	0	0	0	0	0	0	0	F	18	0	16	0	0	1	0	0
School A																	
Teacher 3	M	1	0	0	0	0	1	2	M	10	0	11	0	0	1	0	0
Grade 4	F	0	1	0	0	0	0	1	F	16	1	15	1	0	1	0	0
School A																	
Teacher 4	M	1	0	0	0	0	0	1	M	10	2	11	0	0	0	0	0
Grade 5	F	1	0	0	0	0	0	1	F	14	1	12	0	1	0	2	0
School B																	
Teacher 5	M	2	0	0	1	0	0	3	M	7	4	7	0	3	0	0	0
Grade 3	F	0	0	0	0	0	0	0	F	12	2	7	0	2	3	0	0
School B																	
Teacher 6	M	0	0	0	0	1	0	1	M	8	6	4	0	3	3	0	0
Grade 3	F	1	0	0	0	0	0	1	F	11	4	8	0	1	2	0	0
School B																	
Teacher 7	M	2	0	0	0	0	1	3	M	10	7	10	0	2	1	0	0
Grade 4	F	0	0	0	0	0	2	2	F	14	9	9	1	0	3	0	0

Table B1

(Continued)

	Students with Disabilities (DIS)							Students with No Disabilities (REG)			Total Class (DIS +REG)							
	Gender	Disability Type						Total	Gender	Total	*Free/ reduce Lunch	Ethnicity						
		ASD	CDB	EBD	OHI	S/L	SLD					W	AA	HL	AS	AI	Other	
School B																		
Teacher 8	M	0	0	0	0	0	0	0	M	9	5	7	0	1	1	0	0	
Grade 5	F	1	0	0	1	0	1	3	F	10	5	9	1	0	3	0	0	
School C																		
Teacher 9	M	1	3	0	0	0	0	4	M	7	5	11	1	0	0	1	0	
Grade 5	F	0	0	0	1	0	0	1	F	9	3	7	1	0	1	0	0	
School D																		
Teacher 10	M	3	1	0	2	0	0	6	M	9	6	14	0	0	2	0	0	
Grade 3	F	0	0	0	0	0	0	0	F	9	1	7	0	0	1	0	0	
School D																		
Teacher 11	M	1	0	2	0	0	0	3	M	21	4	17	2	1	1	0	0	
Grade 4	F	0	0	0	0	1	1	2	F	4	1	7	0	0	1	0	0	
School D																		
Teacher 12	M	2	0	0	0	0	1	3	M	11	1	12	1	1	0	0	0	
Grade 5	F	0	0	0	0	0	0	0	F	12	2	11	1	0	0	0	0	
School E																		
Teacher 13	M	0	1	0	1	0	2	4	M	7	3	7	3	1	0	0	0	
Grade 5	F	1	0	1	0	0	1	3	F	13	7	13	1	0	2	0	0	
School F																		
Teacher 14	M	1	0	0	0	1	0	2	M	11	4	9	1	3	0	0	0	
Grade 4	F	0	0	0	0	0	0	0	F	13	5	12	0	0	0	1	0	
Totals		20	6	3	5	8	10	52	Totals	307	92	287	13	21	33	5	0	

Note. W = White; AA = African American; HL = Hispanic/Latino; AS = Asian; AI = American Indian.

\*Students qualify for free/reduced lunch based on household size and family income. For example, to qualify for free lunch a family of 3 must earn a yearly income of no more than \$28,803 and a child would qualify for a reduced price lunch if the family of 3 grossed between \$28,804-\$33,874 yearly.

Table B2

*Classroom Demographics of Students who fully participated in the study*

	Students with Disabilities (DIS)							Students with No Disabilities (REG)			Total Class (DIS +REG)							
	Gender	Disability Type					Total	Gender	Total	*Free/ reduce Lunch	Ethnicity							
		ASD	CDB	EBD	OHI	S/L					SLD	W	AA	HL	AS	AI	Other	
School A																		
Teacher 1	M	0	0	0	0	0	0	M	7	1	7	0	0	0	0	0	0	0
Grade 3	F	0	0	0	0	1	0	F	10	1	10	0	1	0	0	0	0	0
School A																		
Teacher 2	M	0	0	0	0	1	0	M	8	1	9	0	0	0	0	0	0	0
Grade 4	F	0	0	0	0	0	0	F	18	0	16	0	1	1	0	0	0	0
School A																		
Teacher 3	M	0	0	0	0	0	0	M	6	0	6	0	0	0	0	0	0	0
Grade 4	F	0	0	0	0	0	0	F	16	1	15	0	0	1	0	0	0	0
School A																		
Teacher 4	M	1	0	0	0	0	0	M	6	2	7	0	0	0	0	0	0	0
Grade 5	F	0	0	0	0	0	0	F	11	0	9	0	0	0	0	2	0	0
School B																		
Teacher 5	M	2	0	0	0	1	0	M	4	2	6	0	1	0	0	0	0	0
Grade 3	F	0	0	0	0	0	0	F	11	2	7	0	2	2	0	0	0	0
School B																		
Teacher 6	M	0	0	0	0	1	0	M	2	1	2	0	0	1	0	0	0	0
Grade 3	F	1	0	0	0	0	0	F	8	3	7	0	1	1	0	0	0	0
School B																		
Teacher 7	M	1	0	0	0	0	2	M	6	4	7	0	1	1	0	0	0	0
Grade 4	F	0	0	0	0	0	0	F	9	3	6	0	0	3	0	0	0	0

Table B2 (Continued)

	Students with Disabilities (DIS)								Students with No Disabilities (REG)			Total Class (DIS +REG)						
	Gender	Disability Type						Total	Gender	Total	*Free/ reduce Lunch	Ethnicity						
		ASD	CDB	EBD	OHI	S/L	SLD					W	AA	HL	AS	AI	Other	
School B																		
Teacher 8	M	0	0	0	0	0	0	0	M	7	3	6	0	1	0	0	0	
Grade 5	F	1	0	0	0	0	1	2	F	9	5	7	1	0	3	0	0	
School C																		
Teacher 9	M	1	1	0	0	0	0	2	M	8	5	8	1	0	0	1	0	
Grade 5	F	0	0	0	1	0	0	1	F	7	3	7	0	0	1	0	0	
School D																		
Teacher 10	M	3	1	0	2	0	0	6	M	8	4	13	0	0	1	0	0	
Grade 3	F	0	0	0	0	0	0	0	F	7	3	6	0	0	1	0	0	
School D																		
Teacher 11	M	1	0	2	0	0	0	3	M	16	3	15	2	1	1	0	0	
Grade 4	F	0	0	0	0	1	1	2	F	6	1	7	0	0	1	0	0	
School D																		
Teacher 12	M	2	0	0	0	0	0	2	M	8	1	9	1	0	0	0	0	
Grade 5	F	0	0	0	0	0	0	0	F	9	1	8	1	0	0	0	0	
School E																		
Teacher 13	M	0	0	0	0	0	1	1	M	5	3	4	2	0	0	0	0	
Grade 5	F	1	0	0	0	0	1	2	F	10	4	10	1	0	1	0	0	
School F																		
Teacher 14	M	1	0	0	0	1	0	2	M	11	4	9	1	3	0	0	0	
Grade 4	F	0	0	0	0	0	0	0	F	13	5	12	0	0	0	1	0	
Totals		15	2	2	3	6	6	34	Totals	246	63	235	10	12	19	4	0	

Note. W = White; AA = African American; HL = Hispanic/Latino; AS = Asian; AI = American Indian.

\*Students qualify for free/reduced lunch based on household size and family income. For example, to qualify for free lunch a family of 3 must earn a yearly income of no more than \$28,803 and a child would qualify for a reduced price lunch if the family of 3 grossed between \$28,804-\$33,874 yearly.

**APPENDIX C**

SCM Student Survey

SCM Questionnaire

1. Are there some kids in your classroom who hang around together a lot? Yes / No  
If you circled yes, please write their names on the lines. Please remember to include last initials.  
Name all the groups you can think of.

**Group 1:**

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**Group 2:**

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**Group 3:**

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**Group 4:**

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**Group 5:**

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**Group 6:**

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---

**If you need more space, turn the paper over.  
Remember, you don't have to fill all the lines.**

Code: \_ \_ \_ / \_ / \_ / \_ \_ / \_ \_ / \_ / \_

# M/F G School Tch Disab Eth F/R

Peer Behavioral Assessment

For the following, name up to 3 kids in your class who best fit the description.

- 1. **Cooperative:** Here is someone who is really good to have as part of your group, because this person is agreeable and cooperates- pitches in, shares, and gives everyone a turn.

\_\_\_\_\_

- 2. **Disruptive:** This person has a way of upsetting everything when he or she gets into a group- doesn't share and tries to get everyone to do things their way.

\_\_\_\_\_

- 3. **Acts Shy:** This person acts very shy with other kids. It's hard to get to know this person.

\_\_\_\_\_

- 4. **Starts Fights:** This person starts fights. This person says mean things to other kids or pushes them or hits them.

\_\_\_\_\_

- 5. **Seeks help:** This person is always looking for help, asks for help even before trying very hard.

\_\_\_\_\_

- 6. **Leader:** This person gets chosen by others as the leader. Other people like to have this person in charge.

\_\_\_\_\_

- 7. **Athletic:** This person is very good at many outdoor games and sports.

\_\_\_\_\_

- 8. **Gets in trouble:** This person doesn't follow the rules, doesn't pay attention, and talks back to the teacher.

\_\_\_\_\_

**Do not name more than 3 people for each question.**

**Remember, you don't have to fill in all of the lines.**

Code: \_ \_ \_ / \_ / \_ / \_ \_ / \_ \_ / \_ \_ / \_ / \_

# M/F G School Tch Disab Eth F/R

9. **Good student:** This person makes good grades, usually knows the right answer, and works hard in class.

\_\_\_\_\_

10. **Cool:** This person is really cool. Just about everybody in the school knows this person.

\_\_\_\_\_

11. **Sad:** This person often seems sad.

\_\_\_\_\_

12. **Popular:** This person is well liked by lots of kids in the class.

\_\_\_\_\_

13. **Friendly:** This person is usually friendly to others.

\_\_\_\_\_

**Do not name more than 3 people for each question.**

**Remember, you don't have to fill in all of the lines.**

Code: \_ \_ \_ / \_ / \_ / \_ \_ / \_ \_ / \_ / \_

.... # M/F G School Tch Disab Eth F/R



**APPENDIX D**

Table D1

*Mean Scores of Peer Assessment by Education Classification*

	Cop.	Dis.	Shy	Ft.	Hlp.	Ldr.	Ath.	Trb.	GSt.	Col.	Sad	Pop.	Fri.
<b>ASD</b> (n=20)													
M	.70	2.35	2.30	1.30	2.05	.30	.45	3.45	1.40	.65	2.10	.10	.85
SD	1.03	3.62	3.88	2.47	2.19	.47	.60	5.61	1.14	.75	2.47	.31	.93
<b>DIS</b> (n=32)													
M	1.09	0.59	2.38	1.72	1.47	0.67	1.03	1.50	1.69	0.78	1.09	0.63	1.41
SD	1.49	0.98	3.83	3.22	1.48	1.00	1.73	2.75	1.82	1.50	1.65	0.87	1.52
<b>REG</b> (n=307)													
M	2.20	1.05	1.06	1.34	.94	1.53	2.11	1.13	2.81	1.58	.58	1.61	1.90
SD	2.01	2.23	2.17	2.53	1.78	1.92	3.22	3.07	2.66	2.44	1.84	2.40	1.88

*Note.* Cop. = cooperative; Dis. = disruptive; Shy = shy/withdrawn; Ft. = starts fights; Hlp. =

seeks help; Ldr. = leader; Ath. = athletic; Trb. = trouble; Gst. = good student; Col. = cool; Sad =

sad; Pop. = popular; and Fri. = friendly.

## APPENDIX E

Table E1

*Network Centrality and Social Characteristics Per Cluster-School A Class 1 Grade 3*

Centrality	<u>Student Characteristic</u>									<u>Peer-Assessed Characteristic</u>							
	ID	Gender	Ethnicity	Educational Classification	Cooperative	Disruptive	Shy	Fights	Seeks Help	Leader	Athletic	Trouble	Good Student	Cool	Sad	Popular	Friendly
<i>Cluster A</i>																	
Nuclear	2082	M	W	REG	0	1	0	0	0	1	3	2	1	3	0	3	1
	2084	M	W	REG	4	0	0	0	0	8	9	0	7	7	1	6	0
	2089	F	W	REG	7	0	0	1	0	2	4	0	4	4	0	5	4
	2092	M	W	REG	0	3	0	8	0	0	2	1	0	0	0	1	0
	2086	M	W	REG	7	0	0	0	0	4	7	0	7	4	0	3	1
MEAN					3.6	1.3	0.0	1.8	0.0	3.0	5.0	1.7	3.8	3.6	0.2	3.6	1.2
Secondary	2094	M	W	REG	1	3	0	7	2	0	1	3	2	0	0	1	1
	2100	M	W	REG	1	10	1	2	0	2	2	10	4	0	1	1	2
	2083	M	W	REG	1	1	0	2	0	1	0	0	2	0	1	0	0
	2087	M	W	REG	1	0	0	0	0	3	1	0	2	0	1	1	3
MEAN				1.0	3.5	0.3	2.8	0.5	1.5	1.0	3.3	2.5	0.0	0.8	0.8	1.5	
Peripheral	2101	M	W	REG	0	1	0	1	1	0	0	0	0	0	0	0	0
MEAN					0.0	1.0	0.0	1.0	1.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<i>Cluster B</i>																	
Nuclear	2080	F	W	REG	1	0	1	0	0	4	1	0	5	5	0	5	5
	2081	F	W	REG	1	0	0	0	0	2	3	0	3	3	0	3	0

Table E1

(Continued)

Centrality	<u>Student Characteristic</u>							<u>Peer-Assessed Characteristic</u>										
	ID	Gender	Ethnicity	ED/Class	Cooperative	Disruptive	Shy	Fights	Seeks Help	Leader	Athletic	Trouble	Good Student	Cool	Sad	Popular	Friendly	
	2085	F	W	REG	1	0	0	0	1	0	0	0	2	2	0	1	1	
	2095	F	W	REG	4	0	0	2	0	12	10	0	11	6	0	5	1	
	2096	F	W	REG	5	0	0	0	0	2	8	0	5	4	0	5	1	
	2099	F	W	REG	4	0	0	3	0	3	1	1	3	1	0	1	0	
	2104	F	W	REG	6	0	4	0	1	2	0	0	2	2	1	2	8	
	MEAN				2.9	0.0	0.7	0.7	0.3	3.6	3.3	0.1	4.4	3.3	0.1	3.1	2.3	
	<i>Cluster C</i>																	
Secondary	2088	F	W	REG	4	0	0	0	0	0	0	0	4	1	2	1	2	
	2097	F	W	REG	1	1	1	1	1	0	0	0	1	0	0	0	1	
	MEAN				2.5	0.5	0.5	0.5	0.5	0.0	0.0	0.0	2.5	0.5	1.0	0.5	1.5	
	<i>Cluster D</i>																	
Secondary	2091	F	W	REG	2	0	1	0	0	2	0	0	1	2	0	2	0	
	2102	F	AS	REG	0	0	4	0	0	0	0	0	1	1	0	0	0	
	MEAN				1.0	0.0	2.5	0.0	0.0	1.0	0.0	0.0	1.0	1.5	0.0	1.0	0.0	
<i>Isolates</i>	2090	M	W	REG	0	1	0	1	1	0	0	3	0	0	1	0	0	
	2093	F	HL	S/L	2	0	14	0	1	1	0	0	2	1	4	0	1	
	2103	M	W	S/L	0	1	0	0	2	0	0	0	0	0	1	1	1	
	2105	M	W	S/L	0	0	9	0	0	0	0	0	0	0	7	1	2	
	2098	M	AI	ASD	0	14	0	6	8	0	0	15	0	0	1	0	0	

Note. Gender: F = female; M = male. Educational Classification: ASD = autism; CDB = cognitive disorder borderline; EBD = emotional behavior disorder; OHI = other health impairment; S/L = speech and language; SLD = specific learning disability. Free/reduce lunch: 0 = not qualified; 1 = qualifies. Ethnicity: W = White; AA = African American; HL = Hispanic/Latino; AS = Asian; AI = American Indian; other = all other ethnicities.

Table E2

*Network Centrality and Social Characteristics Per Cluster-School A Class 2 Grade 4*

Centrality	<u>Student Characteristic</u>								<u>Peer-Assessed Characteristic</u>								
	ID	Gender	Ethnicity	Educational Classification	Cooperative	Disruptive	Shy	Fights	Seeks Help	Leader	Athletic	Trouble	Good Student	Cool	Sad	Popular	Friendly
<i>Cluster A</i>																	
Nuclear	2120	M	W	REG	2	2	0	7	1	3	14	5	1	3	0	1	0
	2121	F	W	REG	5	0	0	1	1	4	10	0	7	3	0	1	3
	2128	M	W	REG	4	1	0	0	1	4	11	1	2	3	0	2	3
	MEAN				3.7	1.0	0.0	2.7	1.0	3.7	11.7	2.0	3.3	3.0	0.0	1.3	2.0
Secondary	2135	M	W	S/L	0	1	3	7	2	0	1	8	1	1	2	0	1
	2107	M	W	REG	0	1	0	0	1	1	0	1	0	0	0	0	1
	MEAN				0.0	1.0	1.5	3.5	1.5	0.5	0.5	4.5	0.5	0.5	1.0	0.0	1.0
Peripheral	2124	M	W	REG	0	14	0	17	0	0	5	20	0	0	2	0	1
	MEAN				0.0	14.0	0.0	17.0	0.0	0.0	5.0	20.0	0.0	0.0	2.0	0.0	1.0
<i>Cluster B</i>																	
Nuclear	2113	F	W	REG	2	0	0	0	2	0	1	0	1	0	0	1	4
	2115	F	W	REG	6	0	0	0	0	1	11	0	1	0	0	1	4
	MEAN				4.0	0.0	0.0	0.0	1.0	0.5	6.0	0.0	1.0	0.0	0.0	1.0	4.0
Secondary	2123	F	W	REG	7	0	0	0	0	5	4	0	11	4	0	5	5
	2117	F	W	REG	1	1	2	0	1	0	0	0	2	1	2	1	3
	2106	F	W	REG	4	2	0	0	0	0	0	0	2	0	0	0	4
	2108	F	AS	REG	0	1	0	3	1	0	1	0	3	0	0	0	0
	MEAN				3.0	1.0	0.5	1.3	0.5	1.3	1.3	0.0	4.5	1.3	0.5	1.5	3.0

Table E2

(Continued)

Centrality	<u>Student Characteristic</u>								<u>Peer-Assessed Characteristic</u>								
	ID	Gender	Ethnicity	Educational Classification	Cooperative	Disruptive	Shy	Fights	Seeks Help	Leader	Athletic	Trouble	Good Student	Cool	Sad	Popular	Friendly
<i>Cluster C</i>																	
	2129	F	W	REG	1	0	0	1	0	4	1	0	5	10	0	8	4
Nuclear	2118	F	W	REG	2	0	1	0	0	0	1	0	4	2	0	2	3
	2133	F	W	REG	2	0	0	2	3	3	0	0	3	1	0	2	0
MEAN					1.7	0.0	0.3	1.0	1.0	2.3	0.7	0.0	4.0	4.3	0.0	4.0	2.3
Secondary	2131	F	W	REG	8	0	0	1	1	8	1	0	15	14	0	15	4
MEAN					8.0	0.0	0.0	1.0	1.0	8.0	1.0	0.0	15.0	14.0	0.0	15.0	4.0
<i>Cluster D</i>																	
Nuclear	2125	M	W	REG	5	0	0	0	0	1	2	0	7	1	1	0	3
	2134	M	W	REG	3	1	0	0	0	2	2	0	2	1	0	2	3
	2110	M	W	REG	5	1	0	2	0	1	4	1	2	1	0	1	2
MEAN					4.3	0.7	0.0	0.7	0.0	1.3	2.7	0.3	3.7	1.0	0.3	1.0	2.7
Secondary	2109	M	W	REG	0	0	0	0	0	1	3	1	1	0	1	1	0
	2126	M	W	REG	2	0	3	0	0	0	0	0	4	1	0	1	2
MEAN					1.0	0.0	1.5	0.0	0.0	0.5	1.5	0.5	2.5	0.5	0.5	1.0	1.0
<i>Cluster E</i>																	
Nuclear	2114	F	W	REG	1	0	2	1	0	0	2	0	1	0	0	0	1
	2130	F	W	REG	1	0	3	0	4	0	0	0	1	0	0	0	0
MEAN					1.0	0.0	2.5	0.5	2.0	0.0	1.0	0.0	1.0	0.0	0.0	0.0	0.5

Table E2

(Continued)

		<u>Student Characteristic</u>							<u>Peer-Assessed Characteristic</u>								
Centrality	ID	Gender	Ethnicity	Educational Classification	Cooperative	Disruptive	Shy	Fights	Seeks Help	Leader	Athletic	Trouble	Good Student	Cool	Sad	Popular	Friendly
Secondary	2116	F	W	REG	0	3	0	0	2	0	0	0	2	0	1	0	0
	2122	F	W	REG	7	0	0	0	0	5	4	0	11	4	0	5	5
	MEAN				3.5	1.5	0.0	0.0	1.0	2.5	2.0	0.0	6.5	2.0	0.5	2.5	2.5
<i>Cluster F</i>																	
Nuclear	2112	F	HL	REG	2	0	1	0	2	1	0	0	2	1	0	1	2
	2119	F	W	REG	2	0	2	0	4	0	0	1	1	0	1	0	1
	2132	F	W	REG	1	0	0	0	2	2	0	0	3	1	0	1	2
	MEAN				1.7	0.0	1.0	0.0	2.7	1.0	0.0	0.3	2.0	0.7	0.3	0.7	1.7
<i>Isolates</i>	2127	M	W	ASD	0	0	0	0	0	0	0	0	0	0	0	0	0
	2111	M	W	REG	0	7	9	5	6	0	1	7	0	1	8	1	0

*Note.* Gender: F = female; M = male. Educational Classification: ASD = autism; CDB = cognitive disorder borderline; EBD = emotional behavior disorder; OHI = other health impairment; S/L = speech and language; SLD = specific learning disability. Free/reduce lunch: 0 = not qualified; 1 = qualifies. Ethnicity: W = White; AA = African American; HL = Hispanic/Latino; AS = Asian; AI = American Indian; other = all other ethnicities.

Table E3

*Network Centrality and Social Characteristics Per Cluster-School A Class 3 Grade 4*

Centrality	<u>Student Characteristic</u>								<u>Peer-Assessed Characteristic</u>								
	ID	Gender	Ethnicity	Educational Classification	Cooperative	Disruptive	Shy	Fights	Seeks Help	Leader	Athletic	Trouble	Good Student	Cool	Sad	Popular	Friendly
<i>Cluster A</i>																	
Nuclear	2142	F	W	REG	5	0	0	0	0	1	3	0	5	0	0	0	5
	2164	F	W	REG	6	0	2	0	0	1	1	0	6	0	1	1	6
	2158	F	W	REG	6	0	0	0	0	6	4	0	6	1	0	6	3
	2139	F	W	REG	2	1	0	2	0	7	13	0	1	9	0	7	1
	2145	F	W	REG	4	3	0	6	0	4	0	0	15	2	3	4	3
	2159	F	W	REG	6	0	0	3	2	4	3	0	7	2	0	4	6
MEAN					4.8	0.7	0.3	1.8	0.3	3.8	4.0	0.0	6.7	2.3	0.7	3.7	4.0
Secondary	2140	F	W	REG	2	1	1	1	0	2	1	0	2	0	0	1	1
	2162	F	W	REG	1	2	0	2	7	0	0	0	0	1	0	0	1
	2154	F	W	REG	1	0	0	0	0	0	0	0	2	0	3	1	0
MEAN					1.3	1.0	0.3	1.0	2.3	0.7	0.3	0.0	1.3	0.3	1.0	0.7	0.7
Peripheral	2153	F	AA	CDB	0	0	0	0	1	0	0	0	0	0	0	0	0
MEAN					0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<i>Cluster B</i>																	
Nuclear	2138	M	W	REG	1	1	0	2	0	2	2	0	2	9	0	7	1
	2144	M	W	REG	2	0	2	0	0	1	5	0	3	0	2	0	0
	2155	M	W	REG	1	3	1	3	2	1	11	1	1	3	0	1	1
	2161	F	W	REG	0	0	0	1	0	0	3	0	5	0	0	0	2
MEAN					1.0	1.0	0.8	1.5	0.5	1.0	5.3	0.3	2.8	3.0	0.5	2.0	1.0

Table E3

(Continued)

Centrality	<u>Student Characteristic</u>									<u>Peer-Assessed Characteristic</u>							
	ID	Gender	Ethnicity	Educational Classification	Cooperative	Disruptive	Shy	Fights	Seeks Help	Leader	Athletic	Trouble	Good Student	Cool	Sad	Popular	Friendly
Secondary	2136	M	W	REG	0	0	0	0	0	0	3	0	1	0	0	0	0
	2163	M	AS	REG	0	0	10	0	0	0	0	1	0	0	2	0	0
MEAN					0.0	0.0	5.0	0.0	0.0	0.0	1.5	0.5	0.5	0.0	1.0	0.0	0.0
<i>Cluster C</i>																	
Secondary	2137	F	W	REG	2	0	5	0	0	1	0	0	3	0	0	1	2
	2147	F	W	REG	2	0	3	0	0	1	0	0	2	0	0	0	3
MEAN				2.0	0.0	4.0	0.0	0.0	1.0	0.0	0.0	2.5	0.0	0.0	0.5	2.5	
<i>Cluster D</i>																	
Nuclear	2143	M	W	REG	1	0	1	0	0	1	1	1	2	1	0	2	2
	2152	M	W	REG	2	14	1	11	18	0	0	16	2	0	7	0	1
	2146	M	W	REG	1	0	0	0	0	1	1	0	4	0	0	0	0
MEAN				1.3	4.7	0.7	3.7	6.0	0.7	0.7	5.7	2.7	0.3	2.3	0.7	1.0	
<i>Cluster E</i>																	
Nuclear	2141	F	W	REG	4	0	0	0	1	2	1	0	3	0	0	1	3
	2157	F	AS	REG	1	1	0	3	1	3	1	5	3	1	1	0	2
	2149	F	W	REG	1	1	1	3	0	1	3	2	2	2	2	1	2
MEAN				2.0	0.7	0.3	2.0	0.7	2.0	1.7	2.3	2.7	1.0	1.0	0.7	2.3	
Peripheral	2156	F	W	REG	3	0	0	0	1	0	0	0	1	0	0	1	2
MEAN				3.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	2.0	
<i>Isolates</i>																	
	2151	M	W	ASD	0	0	0	0	0	0	0	0	0	0	0	0	0
	2150	M	W	REG	0	1	0	0	2	0	0	0	0	0	1	0	0
	2148	M	W	SLD	0	0	9	0	0	0	1	1	0	0	0	0	0
	2160	F	W	REG	5	0	0	0	0	0	1	0	2	1	0	0	0



Table E4

*Network Centrality and Social Characteristics Per Cluster-School A Class 4 Grade 5*

Centrality	<u>Student Characteristic</u>								<u>Peer-Assessed Characteristic</u>								
	ID	Gender	Ethnicity	Educational Classification	Cooperative	Disruptive	Shy	Fights	Seeks Help	Leader	Athletic	Trouble	Good Student	Cool	Sad	Popular	Friendly
<i>Cluster A</i>																	
<i>Nuclear</i>	2182	F	W	REG	0	2	0	3	0	0	2	5	2	0	2	0	1
	2184	M	W	REG	3	0	0	0	1	0	7	1	1	1	1	0	0
	2188	M	W	REG	4	0	2	0	1	2	0	0	8	0	0	1	2
	2174	M	W	REG	1	0	0	0	0	0	1	0	0	0	0	0	0
	2172	M	W	REG	1	0	2	0	0	1	0	1	1	2	1	2	2
MEAN					1.8	0.4	0.8	0.6	0.4	0.6	2.0	1.4	2.4	0.6	0.8	0.6	1.0
<i>Peripheral</i>	2165	M	W	REG	0	0	0	0	0	0	0	0	0	0	0	1	1
	MEAN				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	1.0
<i>Cluster B</i>																	
<i>Nuclear</i>	2170	M	W	REG	3	1	1	0	1	2	4	1	2	3	0	2	2
	2168	M	W	REG	0	8	0	8	0	4	12	15	3	10	2	9	2
MEAN				1.5	4.5	0.5	4.0	0.5	3.0	8.0	8.0	2.5	6.5	1.0	5.5	2.0	
<i>Secondary</i>	2181	F	W	REG	0	2	0	3	0	0	2	5	2	0	2	0	1
	MEAN				0.0	2.0	0.0	3.0	0.0	0.0	2.0	5.0	2.0	0.0	2.0	0.0	1.0
<i>Peripheral</i>	2190	M	W	REG	2	1	1	0	1	0	1	0	1	0	0	0	0
	MEAN				2.0	1.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	0.0	0.0	0.0
<i>Cluster C</i>																	
<i>Nuclear</i>	2171	F	W	REG	0	0	0	2	1	2	1	0	0	2	0	1	1
	2187	F	W	REG	1	1	0	2	1	1	0	0	7	0	0	1	2
	2180	F	W	REG	7	0	0	1	0	3	2	0	7	1	0	2	6

Table E4

(Continued)

Centrality	<u>Student Characteristic</u>								<u>Peer-Assessed Characteristic</u>								
	ID	Gender	Ethnicity	Educational Classification	Cooperative	Disruptive	Shy	Fights	Seeks Help	Leader	Athletic	Trouble	Good Student	Cool	Sad	Popular	Friendly
	2186	F	W	REG	1	3	0	2	1	6	4	1	2	8	0	8	1
	2183	F	W	REG	0	2	0	6	3	2	1	2	0	2	0	4	0
	2175	F	AI	REG	5	0	0	0	1	5	5	0	2	3	0	2	3
MEAN					2.0	1.7	0.0	2.7	1.7	4.3	3.3	1.0	1.3	4.3	0.0	4.7	1.3
<i>Cluster D</i>																	
Secondary	2166	F	W	REG	8	0	4	0	0	3	0	0	8	2	0	1	5
	2178	F	AI	REG	6	0	3	0	0	2	0	0	9	0	0	0	6
MEAN					7.0	0.0	3.5	0.0	0.0	2.5	0.0	0.0	8.5	1.0	0.0	0.5	5.5
<i>Cluster E</i>																	
Secondary	2167	F	W	REG	0	0	0	0	0	1	0	0	2	0	0	0	1
	2177	F	HL	REG	0	1	0	0	0	0	0	0	0	0	0	0	0
	2179	F	W	REG	1	0	1	1	1	0	1	0	2	0	0	1	2
MEAN					0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.0	1.3	0.0	0.0	0.3	1.0
<i>Isolates</i>																	
	2189	M	W	REG	1	4	0	3	2	0	0	3	2	0	2	0	2
	2173	M	W	ASD	1	0	13	0	5	0	1	0	3	1	9	0	2
	2169	M	W	REG	0	4	0	6	4	0	0	2	0	0	7	0	0
	2185	F	W	ASD	0	1	5	0	3	0	0	0	0	0	1	0	0

Note. Gender: F = female; M = male. Educational Classification: ASD = autism; CDB = cognitive disorder borderline; EBD = emotional behavior disorder; OHI = other health impairment; S/L = speech and language; SLD = specific learning disability. Free/reduce lunch: 0 = not qualified; 1 = qualifies. Ethnicity: W = White; AA = African American; HL = Hispanic/Latino; AS = Asian; AI = American Indian; other = all other ethnicities.

Table E5

*Network Centrality and Social Characteristics Per Cluster-School B Class 5 Grade 3*

Centrality	<u>Student Characteristic</u>				<u>Peer-Assessed Characteristic</u>												
	ID	Gender	Ethnicity	Educational Classification	Cooperative	Disruptive	Shy	Fights	Seeks Help	Leader	Athletic	Trouble	Good Student	Cool	Sad	Popular	Friendly
<i>Cluster A</i>																	
Nuclear	2326	F	W	REG	5	1	0	0	2	4	4	0	5	6	0	7	5
	2319	F	W	REG	1	0	0	0	0	3	5	0	8	4	1	7	2
	2321	F	W	REG	2	1	0	2	0	3	1	2	2	4	0	3	3
	2317	F	W	REG	3	1	1	2	2	2	1	2	1	1	0	4	3
MEAN					2.8	0.8	0.3	1.0	1.0	3.0	2.8	1.0	4.0	3.8	0.3	5.3	3.3
Secondary	2323	F	HL	REG	0	0	1	1	5	0	0	0	2	0	1	1	1
	2336	F	AS	REG	4	0	1	0	2	1	1	0	5	0	0	0	4
MEAN					2.5	0.0	1.0	0.5	3.5	0.5	0.5	0.0	3.5	0.0	0.5	0.5	2.5
Peripheral	2320	M	W	ASD	3	2	0	1	1	0	0	1	2	2	0	0	2
MEAN					3.0	2.0	0.0	1.0	1.0	0.0	0.0	1.0	2.0	2.0	0.0	0.0	2.0
<i>Cluster B</i>																	
Nuclear	2331	M	W	REG	1	1	1	0	0	0	4	0	3	1	0	0	1
	2325	M	W	REG	1	0	1	0	0	2	6	1	5	4	0	3	1
	2337	M	W	REG	2	2	0	4	1	5	3	9	6	9	0	10	1
	2329	M	HL	REG	3	1	1	1	0	1	0	3	1	1	0	0	2
MEAN					1.8	1.0	0.8	1.3	0.3	2.0	3.3	3.3	3.8	3.8	0.0	3.3	1.3
Secondary	2334	M	HL	S/L	0	4	0	2	0	0	0	1	1	0	0	0	0
	2318	M	W	ASD	0	2	0	3	1	1	1	3	4	1	3	0	1
MEAN					0.0	3.0	0.0	2.5	0.5	0.5	0.5	2.0	2.5	0.5	1.5	0.0	0.5
Peripheral	2332	M	W	REG	2	0	3	0	1	1	2	0	2	0	3	0	2
MEAN					2.0	0.0	3.0	0.0	1.0	1.0	2.0	0.0	2.0	0.0	3.0	0.0	2.0

Table E5

(Continued)

Centrality	Student Characteristic									Peer-Assessed Characteristic							
	ID	Gender	Ethnicity	Educational Classification	Cooperative	Disruptive	Shy	Fights	Seeks Help	Leader	Athletic	Trouble	Good Student	Cool	Sad	Popular	Friendly
<i>Cluster C</i>																	
Secondary	2335	F	AS	REG	2	1	2	2	1	2	1	0	3	0	3	0	1
	2338	F	AS	REG	0	0	0	2	1	1	0	0	0	1	0	0	1
MEAN					1.0	0.5	1.0	2.0	1.0	1.5	0.5	0.0	1.5	0.5	1.5	0.0	1.0
<i>Cluster D</i>																	
Peripheral	2327	F	HL	REG	1	1	0	2	0	1	1	0	1	0	1	0	1
	2324	F	W	REG	5	0	0	0	2	1	3	0	5	0	0	1	5
	2330	F	W	REG	5	1	0	0	1	1	0	0	2	1	0	0	0
	2333	F	W	REG	1	0	1	0	2	1	0	1	1	1	1	0	1
MEAN					3.0	0.5	0.3	0.5	1.3	1.0	1.0	0.3	2.3	0.5	0.5	0.3	1.8
<i>Isolates</i>																	
	2328	M	HL	REG	0	0	4	0	0	0	0	0	0	0	0	0	0
	2322	M	HL	REG	0	0	0	0	0	0	0	0	0	0	0	0	0

*Note.* Gender: F = female; M = male. Educational Classification: ASD = autism; CDB = cognitive disorder borderline; EBD = emotional behavior disorder; OHI = other health impairment; S/L = speech and language; SLD = specific learning disability. Free/reduce lunch: 0 = not qualified; 1 = qualifies. Ethnicity: W = White; AA = African American; HL = Hispanic/Latino; AS = Asian; AI = American Indian; other = all other ethnicities.

Table E6

*Network Centrality and Social Characteristics Per Cluster-School B Class 6 Grade 3*

Centrality	<u>Student Characteristic</u>									<u>Peer-Assessed Characteristic</u>							
	ID	Gender	Ethnicity	Educational Classification	Cooperative	Disruptive	Shy	Fights	Seeks Help	Leader	Athletic	Trouble	Good Student	Cool	Sad	Popular	Friendly
<i>Cluster A</i>																	
Nuclear	2340	F	W	REG	4	0	0	1	0	8	0	1	7	1	0	2	3
	2348	F	W	REG	2	0	1	2	0	1	2	1	3	1	0	3	3
MEAN					3.0	0.0	0.5	1.5	0.0	4.5	1.0	1.0	5.0	1.0	0.0	2.5	3.0
Secondary	2353	F	HL	REG	1	0	0	1	0	0	2	1	0	2	0	2	0
	2356	F	W	REG	7	0	1	0	0	7	1	0	3	0	0	2	4
MEAN					4.0	0.0	0.5	0.5	0.0	3.5	1.5	0.5	1.5	1.0	0.0	2.0	2.0
Peripheral	2350	F	W	REG	1	0	1	0	0	0	0	0	0	0	1	0	1
	2344	M	W	REG	0	1	0	1	0	0	0	0	0	0	0	0	0
	2341	F	W	REG	4	0	1	0	0	6	0	0	5	1	1	2	3
	2345	F	W	REG	5	0	0	0	1	6	1	0	9	1	1	2	2
	2351	F	W	ASD	0	2	0	2	3	0	1	1	1	0	0	0	0
	MEAN					5.0	0.6	0.4	0.6	0.8	2.4	0.4	0.2	3.0	0.4	0.6	0.8
<i>Cluster B</i>																	
Secondary	2347	F	AS	REG	0	0	4	0	0	0	0	0	3	0	0	0	1
	2352	F	W	REG	1	1	2	0	0	1	1	2	2	0	2	0	1
	2359	F	AS	REG	0	1	0	2	0	0	0	1	0	0	0	0	0
MEAN					0.3	0.7	2.0	0.7	0.0	0.3	0.3	1.0	1.7	0.0	0.7	0.0	0.7
Peripheral	2339	F	HL	REG	2	1	5	0	0	0	0	1	1	0	3	1	1
MEAN					2.0	1.0	5.0	0.0	0.0	0.0	0.0	1.0	1.0	0.0	3.0	1.0	1.0

Table E6

(Continued)

Centrality	<u>Student Characteristic</u>									<u>Peer-Assessed Characteristic</u>							
	ID	Gender	Ethnicity	Educational Classification	Cooperative	Disruptive	Shy	Fights	Seeks Help	Leader	Athletic	Trouble	Good Student	Cool	Sad	Popular	Friendly
<i>Cluster C</i>																	
Secondary	2343	M	HL	REG	0	0	6	0	0	0	1	0	0	2	0	2	1
	2358	M	AS	REG	0	0	3	0	0	1	2	0	1	1	0	0	0
	2357	M	AS	REG	2	1	0	1	0	0	7	0	0	3	0	1	1
	2354	M	HL	REG	1	3	0	3	1	0	0	8	0	0	0	0	0
	2355	M	W	REG	0	0	1	0	2	1	2	1	2	0	0	0	1
	2349	M	HL	REG	0	0	0	0	0	0	3	0	0	0	0	0	1
	2346	M	AS	S/L	1	2	0	0	0	0	1	0	2	1	0	1	1
MEAN					0.6	0.9	1.4	0.6	0.4	0.3	2.3	1.3	0.7	1.0	0.0	0.6	0.7
<i>Isolates</i>	2342	M	W	REG	1	2	0	5	0	1	3	4	2	1	1	1	1

Note. Gender: F = female; M = male. Educational Classification: ASD = autism; CDB = cognitive disorder borderline; EBD = emotional behavior disorder; OHI = other health impairment; S/L = speech and language; SLD = specific learning disability. Free/reduce lunch: 0 = not qualified; 1 = qualifies. Ethnicity: W = White; AA = African American; HL = Hispanic/Latino; AS = Asian; AI = American Indian; other = all other ethnicities.

Table E7

*Network Centrality and Social Characteristics Per Cluster-School B Class 7 Grade 4*

Centrality	<u>Student Characteristic</u>								<u>Peer-Assessed Characteristic</u>								
	ID	Gender	Ethnicity	Educational Classification	Cooperative	Disruptive	Shy	Fights	Seeks Help	Leader	Athletic	Trouble	Good Student	Cool	Sad	Popular	Friendly
<i>Cluster A</i>																	
Nuclear	2368	F	AS	REG	3	0	2	0	0	0	0	0	6	6	0	3	2
	2386	F	W	REG	3	0	0	0	1	1	6	0	1	2	0	2	2
	2383	F	AS	REG	1	0	0	0	0	0	0	0	2	0	0	1	1
	2388	F	W	REG	0	5	0	2	3	3	0	1	3	2	1	4	2
	2375	F	W	REG	3	0	2	0	0	1	0	0	6	5	0	4	6
	MEAN				2.0	1.0	0.8	0.4	0.8	1.0	1.2	0.2	3.6	3.0	0.2	2.8	2.6
Secondary	2372	F	AS	REG	1	0	3	0	0	0	0	0	0	0	1	0	2
	2387	F	AS	REG	0	0	4	0	2	0	0	0	1	0	2	0	0
	2382	F	AS	REG	4	0	11	0	0	2	0	0	4	0	3	0	1
	MEAN				1.7	0.0	6.0	0.0	0.7	0.7	0.0	0.0	1.7	0.0	2.0	0.0	1.0
<i>Cluster B</i>																	
Nuclear	2361	F	W	REG	9	0	0	0	1	2	5	0	6	3	0	2	4
	2366	M	W	REG	3	0	0	0	1	1	1	0	5	0	0	0	2
	2370	M	W	REG	2	6	0	10	4	2	0	13	1	1	3	1	0
	2378	M	W	REG	2	0	0	0	1	1	0	0	3	0	0	0	2
	MEAN				4.0	1.5	0.0	2.5	1.8	1.5	1.5	3.3	3.8	1.0	0.8	0.8	2.0
<i>Cluster C</i>																	
Nuclear	2360	M	HL	REG	0	1	2	2	0	0	1	1	0	0	0	0	0
	2379	M	W	REG	0	7	0	12	13	3	5	14	1	1	1	2	0
	MEAN				0.0	4.0	1.0	7.0	6.5	1.5	3.0	7.5	0.5	0.5	0.5	1.0	0.0

Table E7

(Continued)

Centrality	<u>Student Characteristic</u>									<u>Peer-Assessed Characteristic</u>							
	ID	Gender	Ethnicity	Educational Classification	Cooperative	Disruptive	Shy	Fights	Seeks Help	Leader	Athletic	Trouble	Good Student	Cool	Sad	Popular	Friendly
<i>Cluster D</i>																	
Nuclear	2363	M	W	SLD	3	0	0	0	1	3	5	0	4	2	0	1	3
	2374	M	W	REG	2	8	1	13	3	6	8	12	5	2	1	1	1
MEAN					2.5	4.0	0.5	6.5	2.0	4.5	6.5	6.0	4.5	2.0	0.5	1.0	2.0
Secondary	2369	M	W	REG	3	0	0	0	0	3	1	0	5	2	0	1	2
	2371	F	W	REG	2	0	0	0	0	0	1	0	3	1	0	0	1
MEAN					2.5	0.0	0.0	0.0	0.0	1.5	1.0	0.0	4.0	1.5	0.0	0.5	1.5
<i>Cluster E</i>																	
Nuclear	2373	M	AS	SLD	3	0	3	0	1	2	1	0	2	0	1	1	2
	2383	F	AS	REG	1	0	0	0	0	0	0	0	2	0	0	1	1
MEAN					2.0	0.0	1.5	0.0	0.5	1.0	0.5	0.0	2.0	0.0	0.5	1.0	1.5
Secondary	2364	F	AS	SLD	0	0	1	0	0	0	0	0	0	0	0	0	3
	2380	F	W	REG	1	1	0	0	0	0	5	14	0	1	1	2	0
MEAN					0.5	0.5	0.5	0.0	0.0	0.0	2.5	7.0	0.0	0.5	0.5	1.0	1.5
<i>Isolates</i>																	
	2376	F	W	REG	0	0	0	0	1	0	1	0	0	1	0	0	0
	2381	M	W	ASD	0	0	2	0	1	0	0	0	2	0	0	0	0
	2362	M	W	REG	0	0	0	0	0	0	1	0	0	0	0	0	0
	2365	M	AS	REG	0	1	0	0	2	0	0	0	0	0	0	0	0
	2367	M	HL	REG	0	0	2	0	0	0	1	0	3	0	0	0	0
	2385	F	W	REG	1	0	1	0	1	1	1	0	2	1	0	0	1
	2377	M	W	ASD	0	0	1	0	0	0	0	0	0	0	1	0	0

Note. Gender: F = female; M = male. Educational Classification: ASD = autism; CDB = cognitive disorder borderline; EBD = emotional behavior disorder; OHI = other health impairment; S/L = speech and language; SLD = specific learning disability. Free/reduce lunch: 0 = not qualified; 1 = qualifies. Ethnicity: W = White; AA = African American; HL = Hispanic/Latino; AS = Asian; AI = American Indian; other = all other ethnicities.



Table E8

*Network Centrality and Social Characteristics Per Cluster-School B Class 8 Grade 5*

Centrality	<u>Student Characteristic</u>							<u>Peer-Assessed Characteristic</u>									
	ID	Gender	Ethnicity	Educational Classification	Cooperative	Disruptive	Shy	Fights	Seeks Help	Leader	Athletic	Trouble	Good Student	Cool	Sad	Popular	Friendly
<i>Cluster A</i>																	
Nuclear	2392	M	W	REG	2	1	0	1	1	3	4	2	3	6	0	3	1
	2391	M	W	REG	2	0	0	0	1	1	7	0	3	1	0	2	2
	2400	M	W	REG	2	1	0	0	4	1	3	2	3	1	1	1	2
	2405	M	HL	REG	2	0	0	3	1	1	0	2	3	1	0	1	0
	2406	M	W	REG	3	0	0	0	0	1	4	0	1	2	0	2	2
	2401	M	W	REG	3	2	0	0	3	0	0	4	2	0	0	1	1
MEAN					2.3	0.7	0.0	0.7	1.7	1.2	3.0	1.7	2.5	1.8	0.2	1.7	1.3
Secondary	2390	M	W	REG	1	6	0	7	0	1	4	6	2	3	0	3	1
	2398	M	AS	REG	0	1	0	1	0	3	3	1	1	1	0	1	0
	2399	M	W	REG	0	0	0	0	1	0	0	2	1	1	0	0	2
MEAN				0.3	2.3	0.0	2.7	0.3	1.3	2.3	3.0	1.3	1.7	0.0	1.3	1.0	
<i>Cluster B</i>																	
Nuclear	2389	F	W	REG	4	0	1	2	1	1	3	1	2	1	2	1	1
	2402	F	AA	REG	3	0	1	0	1	4	1	2	2	2	1	1	0
	2393	F	W	REG	3	0	1	1	3	1	1	0	3	2	3	3	3
	2408	F	W	REG	2	1	0	0	2	0	1	0	3	0	0	0	0
MEAN				3.0	0.3	0.8	0.8	1.8	1.5	1.5	0.8	2.5	1.3	1.5	1.3	1.0	
Peripheral	2394	F	W	OHI	1	1	1	0	2	0	0	0	0	0	1	0	0
MEAN					1.0	1.0	1.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0

Table E8

(Continued)

Centrality	<u>Student Characteristic</u>								<u>Peer-Assessed Characteristic</u>								
	ID	Gender	Ethnicity	Educational Classification	Cooperative	Disruptive	Shy	Fights	Seeks Help	Leader	Athletic	Trouble	Good Student	Cool	Sad	Popular	Friendly
<i>Cluster C</i>																	
Secondary	2410	F	W	SLD	2	0	1	1	2	3	4	0	1	4	0	3	5
	2402	F	AA	REG	3	0	1	0	1	4	1	2	2	2	1	1	0
	2395	F	W	REG	3	1	5	1	1	1	4	0	1	2	2	1	5
	2403	F	W	REG	8	0	0	0	1	6	0	0	12	1	0	2	8
MEAN					4.0	0.3	1.8	0.5	1.3	3.5	2.3	0.5	4.0	2.3	0.8	1.8	4.5
<i>Cluster D</i>																	
Secondary	2409	F	AS	REG	2	0	3	0	0	0	0	0	4	0	0	0	2
	2397	F	AS	REG	3	0	10	0	0	1	1	0	9	0	2	1	5
	2407	F	AS	REG	1	0	6	0	0	0	0	0	6	0	1	0	2
MEAN					2.0	0.0	6.3	0.0	0.0	0.3	0.3	0.0	6.3	0.0	1.0	0.3	3.0
<i>Isolates</i>	2396	F	W	ASD	0	0	0	0	0	0	0	0	1	0	4	0	2

Note. Gender: F = female; M = male. Educational Classification: ASD = autism; CDB = cognitive disorder borderline; EBD = emotional behavior disorder; OHI = other health impairment; S/L = speech and language; SLD = specific learning disability. Free/reduce lunch: 0 = not qualified; 1 = qualifies. Ethnicity: W = White; AA = African American; HL = Hispanic/Latino; AS = Asian; AI = American Indian; other = all other ethnicities.

Table E9

*Network Centrality and Social Characteristics Per Cluster-School C Class 9 Grade 5*

Centrality	<u>Student Characteristic</u>								<u>Peer-Assessed Characteristic</u>								
	ID	Gender	Ethnicity	Educational Classification	Cooperative	Disruptive	Shy	Fights	Seeks Help	Leader	Athletic	Trouble	Good Student	Cool	Sad	Popular	Friendly
<i>Cluster A</i>																	
Nuclear	2296	F	W	REG	9	0	0	0	1	4	1	0	12	0	0	8	9
	2309	F	W	OHI	6	0	1	0	0	0	0	0	7	0	0	0	2
	2312	F	W	REG	4	0	8	0	0	0	0	0	3	0	0	0	3
	2306	F	W	REG	1	2	0	1	1	0	1	0	4	1	0	0	1
MEAN					5.0	0.5	2.3	0.3	0.5	1.0	0.5	0.0	6.5	0.3	0.0	2.0	3.8
<i>Cluster B</i>																	
Nuclear	2311	M	AI	REG	0	1	0	0	5	0	0	0	1	0	0	0	0
	2315	F	AS	REG	3	0	0	0	3	1	0	0	2	2	0	4	2
MEAN				1.5	0.5	0.0	0.0	4.0	0.5	0.0	0.0	1.5	1.0	0.0	2.0	1.0	
Secondary	2313	F	W	REG	3	0	1	0	0	1	0	0	3	0	1	2	1
MEAN					3.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	3.0	0.0	1.0	2.0	1.0
Peripheral	2295	M	W	CDB	1	0	1	0	1	1	1	0	4	3	0	1	3
MEAN					1.0	0.0	1.0	0.0	1.0	1.0	1.0	0.0	4.0	3.0	0.0	1.0	3.0
<i>Cluster C</i>																	
Nuclear	2301	M	W	REG	3	0	0	0	0	7	16	0	6	12	0	10	5
	2316	M	W	REG	1	3	0	1	0	1	11	2	2	3	0	2	5
	2300	M	W	REG	3	3	1	2	0	3	13	0	5	7	0	5	3
MEAN					2.3	2.0	0.3	1.0	0.0	3.7	13.3	0.7	4.3	7.3	0.0	5.7	4.3
Peripheral	2302	M	W	REG	0	1	0	0	1	1	0	0	1	0	0	0	0
MEAN					0.0	1.0	0.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0

Table E9

(Continued)

Centrality	<u>Student Characteristic</u>									<u>Peer-Assessed Characteristic</u>							
	ID	Gender	Ethnicity	Educational Classification	Cooperative	Disruptive	Shy	Fights	Seeks Help	Leader	Athletic	Trouble	Good Student	Cool	Sad	Popular	Friendly
<i>Cluster D</i>																	
Secondary	2308	F	W	REG	1	0	1	1	1	0	0	0	2	0	0	0	1
	2314	F	W	REG	3	4	0	1	0	1	0	0	3	0	0	3	7
	2299	M	W	REG	1	0	1	0	1	1	0	0	3	1	0	2	2
	MEAN				1.7	1.3	0.7	0.7	0.7	0.7	0.0	0.0	2.7	0.3	0.0	1.7	3.3
<i>Cluster E</i>																	
Secondary	2305	M	A	REG	3	1	0	1	0	2	2	1	2	1	0	3	1
	2303	M	W	REG	2	0	0	0	0	2	0	0	3	0	0	0	4
	MEAN				2.5	0.5	0.0	0.5	0.0	2.0	1.0	0.5	2.5	0.5	0.0	1.5	2.5
<i>Isolates</i>																	
	2297	M	W	REG	0	0	0	0	0	0	0	0	0	0	0	0	0
	2310	F	AA	REG	0	0	0	0	0	0	0	0	0	0	0	0	0
	2307	M	W	CDB	0	0	1	0	0	0	0	0	0	0	0	0	0
	2298	M	W	ASD	1	0	0	0	0	0	0	0	2	1	0	0	0
	2304	M	W	CDB	0	0	2	0	0	0	0	0	0	0	0	0	0

Note. Gender: F = female; M = male. Educational Classification: ASD = autism; CDB = cognitive disorder borderline; EBD = emotional behavior disorder; OHI = other health impairment; S/L = speech and language; SLD = specific learning disability. Free/reduce lunch: 0 = not qualified; 1 = qualifies. Ethnicity: W = White; AA = African American; HL = Hispanic/Latino; AS = Asian; AI = American Indian; other = all other ethnicities.

Table E10

*Network Centrality and Social Characteristics Per Cluster-School D Class 10 Grade 3*

Centrality	<u>Student Characteristic</u>									<u>Peer-Assessed Characteristic</u>							
	ID	Gender	Ethnicity	Educational Classification	Cooperative	Disruptive	Shy	Fights	Seeks Help	Leader	Athletic	Trouble	Good Student	Cool	Sad	Popular	Friendly
<i>Cluster A</i>																	
Nuclear	2195	F	W	REG	4	0	0	0	0	3	1	0	7	0	0	1	9
	2202	F	W	REG	2	1	0	2	1	2	1	0	5	1	0	2	3
	2208	F	W	REG	5	0	0	0	1	3	4	0	9	3	0	1	8
	2203	F	W	REG	6	0	0	1	0	8	3	0	11	5	0	7	7
	2211	F	W	REG	3	0	1	1	0	1	1	0	3	1	0	1	2
MEAN					4.0	0.2	0.2	0.8	0.4	3.4	2.0	0.0	7.0	2.0	0.0	2.4	5.8
Secondary	2214	F	W	REG	2	0	0	0	0	0	1	0	2	0	1	0	3
	2206	F	W	REG	0	0	0	3	0	1	0	0	1	1	0	0	0
MEAN					1.0	0.0	0.0	1.5	0.0	0.5	0.5	0.0	1.5	0.5	0.5	0.0	1.5
<i>Cluster B</i>																	
Nuclear	2191	M	W	REG	5	1	1	0	0	0	6	2	1	5	0	3	0
	2199	M	W	REG	4	1	0	0	1	2	5	0	7	4	0	2	3
	2212	M	W	OHI	3	0	14	1	2	3	6	1	4	7	0	3	4
	2196	M	W	REG	3	0	0	0	1	0	7	0	6	2	0	2	3
MEAN					3.8	0.5	3.8	0.3	1.0	1.3	6.0	0.8	4.5	4.5	0.0	2.5	2.5
Secondary	2197	M	W	REG	5	0	14	0	4	2	10	0	4	6	7	4	5
	2194	M	W	REG	1	0	2	1	0	1	0	0	2	1	0	0	1
	2209	M	W	REG	1	1	0	5	0	3	2	0	2	5	0	2	0
MEAN					2.3	0.3	5.3	2.0	1.3	2.0	6.0	0.0	2.7	4.0	2.3	2.0	2.0
Peripheral	2207	M	W	REG	0	1	0	2	2	1	2	1	1	1	0	1	0
MEAN					0.0	1.0	0.0	2.0	2.0	1.0	2.0	1.0	1.0	1.0	0.0	1.0	0.0

Table E10

(Continued)

Centrality	<u>Student Characteristic</u>									<u>Peer-Assessed Characteristic</u>							
	ID	Gender	Ethnicity	Educational Classification	Cooperative	Disruptive	Shy	Fights	Seeks Help	Leader	Athletic	Trouble	Good Student	Cool	Sad	Popular	Friendly
<i>Cluster C</i>																	
Secondary	2192	M	W	ASD	2	1	0	2	0	0	1	1	3	0	1	0	2
	2213	M	AS	OHI	2	1	2	2	3	0	2	2	3	2	0	2	1
	2200	M	W	ASD	3	5	2	2	4	1	1	8	2	1	1	1	2
	2198	M	W	REG	1	0	1	0	2	1	1	0	1	0	1	0	2
	2193	M	W	CDB	0	1	1	6	2	1	1	7	2	1	1	1	0
	2205	M	W	REG	1	7	0	5	2	0	0	9	0	0	3	0	0
	2201	M	W	ASD	2	13	0	2	4	1	1	15	1	1	3	0	0
MEAN					1.6	4.0	0.9	2.7	2.4	0.6	1.0	6.0	1.7	0.7	1.4	0.6	1.0
<i>Isolates</i>	2204	F	W	REG	0	0	0	0	0	1	0	0	0	0	0	0	0
	2210	M	AS	REG	0	0	1	0	1	0	0	0	0	0	0	0	0

*Note.* Gender: F = female; M = male. Educational Classification: ASD = autism; CDB = cognitive disorder borderline; EBD = emotional behavior disorder; OHI = other health impairment; S/L = speech and language; SLD = specific learning disability. Free/reduce lunch: 0 = not qualified; 1 = qualifies. Ethnicity: W = White; AA = African American; HL = Hispanic/Latino; AS = Asian; AI = American Indian; other = all other ethnicities.

Table E11

*Network Centrality and Social Characteristics Per Cluster-School D Class 11 Grade 4*

Centrality	<u>Student Characteristic</u>									<u>Peer-Assessed Characteristic</u>							
	ID	Gender	Ethnicity	Educational Classification	Cooperative	Disruptive	Shy	Fights	Seeks Help	Leader	Athletic	Trouble	Good Student	Cool	Sad	Popular	Friendly
<i>Cluster A</i>																	
Nuclear	2238	M	W	REG	3	6	0	11	1	1	2	15	2	5	0	6	1
	2227	M	W	REG	5	0	0	0	1	3	15	0	4	6	0	8	4
	2219	M	W	REG	3	0	0	2	0	7	16	0	6	11	0	13	4
MEAN					3.7	2.0	0.0	4.3	0.7	3.7	11.0	5.0	4.0	7.3	0.0	9.0	3.0
Secondary	2226	M	W	REG	2	0	0	0	0	1	8	0	1	3	0	2	2
	2236	M	AA	REG	0	10	0	21	1	2	0	20	1	2	1	2	1
	2237	M	W	REG	4	0	0	0	0	4	2	0	9	0	0	2	1
MEAN					2.0	3.3	0.0	7.0	0.3	2.3	3.3	6.7	3.7	1.7	0.3	2.0	1.3
Peripheral	2217	F	W	SLD	1	0	0	0	2	1	1	0	3	1	2	1	2
	2218	M	W	REG	0	0	0	0	0	0	1	0	1	0	0	0	0
	2234	M	W	EBD	0	2	0	12	4	0	0	6	1	0	1	0	0
MEAN					0.3	0.7	0.0	4.0	2.0	0.3	0.7	2.0	1.7	0.3	1.0	0.3	0.7
<i>Cluster B</i>																	
Nuclear	2241	M	HL	REG	6	0	1	0	1	5	2	0	7	1	0	2	3
	2221	M	AS	REG	2	1	2	0	0	1	0	0	1	0	3	0	2
	2228	M	W	REG	2	0	1	0	0	1	0	0	1	0	0	0	2
	2229	M	AA	REG	2	1	0	0	0	2	3	0	2	5	0	1	3
	2242	F	W	REG	5	0	0	0	1	4	2	0	6	0	0	0	2
	2239	F	AS	REG	5	0	6	0	0	0	0	0	6	0	0	0	4
	2243	F	W	REG	1	0	2	1	1	0	0	0	2	1	3	0	1
MEAN					3.3	0.3	1.7	0.1	0.4	1.9	1.0	0.0	3.6	1.0	0.9	0.4	2.4

Table E11

(Continued)

Centrality	<u>Student Characteristic</u>				<u>Peer-Assessed Characteristic</u>												
	ID	Gender	Ethnicity	Educational Classification	Cooperative	Disruptive	Shy	Fights	Seeks Help	Leader	Athletic	Trouble	Good Student	Cool	Sad	Popular	Friendly
Secondary	2240	M	W	REG	6	0	1	0	0	2	3	0	5	3	0	3	5
MEAN					6.0	0.0	1.0	0.0	0.0	2.0	3.0	0.0	5.0	3.0	0.0	3.0	5.0
<i>Cluster C</i>																	
Nuclear	2232	F	W	REG	3	0	2	0	2	2	0	0	4	0	0	1	6
	2220	F	W	S/L	2	0	1	0	0	1	0	0	6	0	0	2	3
	2233	F	W	REG	4	0	1	0	0	4	1	0	6	3	0	4	3
MEAN					3.0	0.0	1.3	0.0	0.7	2.3	0.3	0.0	5.3	1.0	0.0	2.3	4.0
Secondary	2230	F	W	REG	2	0	1	0	1	1	1	0	4	1	0	0	4
MEAN					2.0	0.0	1.0	0.0	1.0	1.0	1.0	0.0	4.0	1.0	0.0	0.0	4.0
<i>Cluster D</i>																	
Secondary	2235	M	W	EBD	0	2	0	12	4	0	0	6	1	0	1	0	0
	2223	M	W	REG	0	1	0	0	1	0	2	1	2	2	0	0	1
MEAN					0.0	1.5	0.0	6.0	2.5	0.0	1.0	3.5	1.5	1.0	0.5	0.0	0.5
<i>Isolates</i>																	
	2231	M	W	REG	0	0	0	0	4	0	0	0	1	0	1	0	1
	2225	M	W	REG	1	2	5	0	3	0	0	1	0	0	2	0	2
	2222	M	W	ASD	0	9	5	0	8	0	0	7	1	1	7	0	2
	2215	M	W	EBD	0	0	6	1	1	0	0	0	0	0	5	0	0
	2216	M	W	REG	0	0	0	0	2	0	1	0	0	0	2	0	0
	2224	M	W	REG	0	1	1	1	5	0	0	2	1	0	4	0	1

Note. Gender: F = female; M = male. Educational Classification: ASD = autism; CDB = cognitive disorder borderline; EBD = emotional behavior disorder; OHI = other health impairment; S/L = speech and language; SLD = specific learning disability. Free/reduce lunch: 0 = not qualified; 1 = qualifies. Ethnicity: W = White; AA = African American; HL = Hispanic/Latino; AS = Asian; AI = American Indian; other = all other ethnicities.



Table E12

*Network Centrality and Social Characteristics Per Cluster-School D Class 12 Grade 5*

Centrality	<u>Student Characteristic</u>				<u>Peer-Assessed Characteristic</u>												
	ID	Gender	Ethnicity	Educational Classification	Cooperative	Disruptive	Shy	Fights	Seeks Help	Leader	Athletic	Trouble	Good Student	Cool	Sad	Popular	Friendly
<i>Cluster A</i>																	
Nuclear	2263	M	W	REG	3	0	0	0	1	1	11	0	3	1	0	2	1
	2255	M	W	REG	4	0	0	0	0	3	9	0	5	3	0	1	3
	2251	M	W	REG	2	0	0	0	0	2	11	0	4	5	0	4	3
MEAN					3.0	0.0	0.0	0.0	0.3	2.0	10.3	0.0	4.0	3.0	0.0	2.3	2.3
Secondary	2246	F	W	REG	1	0	0	0	0	3	1	0	3	2	0	3	3
	2267	M	W	REG	0	0	0	0	0	0	0	0	0	2	1	4	0
MEAN					0.5	0.0	0.0	0.0	0.2	1.5	0.5	0.0	1.5	2.0	0.5	3.5	1.5
<i>Cluster B</i>																	
Nuclear	2249	M	W	REG	2	0	2	0	0	0	0	0	2	0	0	0	1
	2245	M	W	REG	2	0	0	1	0	0	1	0	2	0	0	1	2
	2247	M	W	REG	5	2	0	1	0	2	3	2	4	0	0	1	2
	2248	M	AA	REG	3	0	3	0	0	1	2	0	1	2	0	2	4
MEAN					3.0	0.5	1.3	0.5	0.0	0.8	1.5	0.5	2.3	0.5	0.0	1.0	2.3
Secondary	2264	M	W	REG	1	1	0	0	0	0	0	0	0	0	0	0	0
MEAN					1.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<i>Cluster C</i>																	
Nuclear	2259	F	W	REG	4	1	1	1	2	0	2	0	4	1	1	2	3
	2244	F	W	REG	4	1	1	2	0	2	2	0	6	2	0	4	5
	2258	F	W	REG	2	0	1	0	1	0	0	0	0	0	0	0	1
	2254	F	W	REG	6	0	1	1	0	2	3	0	6	2	0	3	6
MEAN					4.0	0.5	1.0	1.0	0.8	1.0	1.8	0.0	4.0	1.3	0.3	2.3	3.8

Table E12  
(Continued)

Centrality	<u>Student Characteristic</u>									<u>Peer-Assessed Characteristic</u>							
	ID	Gender	Ethnicity	Educational Classification	Cooperative	Disruptive	Shy	Fights	Seeks Help	Leader	Athletic	Trouble	Good Student	Cool	Sad	Popular	Friendly
<i>Cluster D</i>																	
Nuclear	2257	F	W	REG	4	1	0	1	1	3	0	0	5	0	0	1	2
	2266	F	W	REG	2	0	0	1	1	2	0	0	2	3	0	2	1
MEAN					3.0	0.5	0.0	1.0	1.0	2.5	0.0	0.0	3.5	1.5	0.0	1.5	1.5
Secondary	2256	M	W	REG	0	0	0	2	0	0	0	2	4	2	0	0	0
	MEAN				0.0	0.0	0.0	2.0	0.0	0.0	0.0	2.0	4.0	2.0	0.0	0.0	0.0
Peripheral	2265	F	W	REG	0	1	0	1	0	1	0	1	4	0	1	0	0
	MEAN				0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0	4.0	0.0	1.0	0.0	0.0
<i>Cluster E</i>																	
Secondary	2261	F	W	REG	0	2	0	0	1	0	0	2	1	0	2	0	0
	2252	M	W	REG	0	4	0	0	0	0	0	1	1	0	0	0	1
MEAN				0.0	3.0	0.0	0.0	0.5	0.0	0.0	1.5	1.0	0.0	1.0	0.0	0.5	
<i>Cluster F</i>																	
Peripheral	2253	F	W	ASD	1	0	2	1	1	0	0	0	2	1	3	0	1
	2269	M	W	ASD	0	0	10	1	2	1	0	0	1	0	3	0	0
MEAN				0.5	0.0	6.0	1.0	1.5	0.5	0.0	0.0	1.5	0.5	3.0	0.0	0.5	
<i>Cluster G</i>																	
Secondary	2268	F	AA	REG	1	0	0	0	0	0	0	0	0	0	0	0	0
	2262	F	AA	REG	1	12	1	9	10	0	1	12	2	1	2	1	0
	2250	M	HL	SLD	0	2	0	4	1	0	0	8	0	0	0	0	0
MEAN				0.7	4.7	0.3	4.3	3.7	0.0	0.3	6.7	0.7	0.3	0.7	0.3	0.3	0.0
<i>Isolates</i>	2260	F	W	REG	0	3	0	1	3	1	0	2	0	0	0	0	0

Table E13

*Network Centrality and Social Characteristics Per Cluster-School E Class 13 Grade 5*

Centrality	<u>Student Characteristic</u>									<u>Peer-Assessed Characteristic</u>							
	ID	Gender	Ethnicity	Educational Classification	Cooperative	Disruptive	Shy	Fights	Seeks Help	Leader	Athletic	Trouble	Good Student	Cool	Sad	Popular	Friendly
<i>Cluster A</i>																	
Nuclear	2273	F	W	REG	0	0	0	0	1	5	3	0	2	7	0	8	1
	2274	F	W	REG	4	0	0	0	2	6	3	0	3	8	0	7	4
	2282	F	W	REG	3	0	0	0	1	5	5	1	3	6	0	3	4
	2290	F	W	REG	3	0	0	1	1	1	2	0	2	1	0	2	2
	2437	F	W	REG	2	0	6	0	0	0	0	0	2	0	2	3	4
	2286	F	AS	REG	2	0	3	0	3	2	2	0	4	1	2	2	3
	2279	F	W	SLD	2	0	1	2	3	2	1	0	3	1	2	1	4
	MEAN				2.3	0.0	1.4	0.4	1.6	3.0	2.3	0.1	2.7	3.4	0.9	3.7	3.1
Secondary	2278	F	W	REG	0	1	2	0	1	1	0	0	3	0	3	0	2
	MEAN				0.0	1.0	2.0	0.0	1.0	1.0	0.0	0.0	3.0	0.0	3.0	0.0	2.0
Peripheral	2277	F	AS	REG	1	0	2	0	0	0	0	0	1	1	1	0	1
	MEAN				1.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	1.0	1.0	1.0	0.0	1.0
<i>Cluster B</i>																	
Nuclear	2275	M	W	REG	2	4	0	3	1	0	5	12	2	4	1	0	1
	2291	M	W	REG	3	1	0	2	0	2	10	3	4	5	0	7	1
	2292	M	AA	REG	2	4	0	3	2	2	6	13	2	8	1	3	1
	2289	M	AA	SLD	0	2	0	3	1	0	6	7	1	0	1	0	0
	MEAN				1.8	2.8	0.0	2.8	1.0	1.0	6.8	8.8	2.3	4.3	0.8	2.5	0.8
Secondary	2287	M	HL	REG	1	0	2	0	2	0	0	0	0	0	1	0	1
	MEAN				1.0	0.0	2.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	1.0

Table E13

(Continued)

Centrality	<u>Student Characteristic</u>								<u>Peer-Assessed Characteristic</u>								
	ID	Gender	Ethnicity	Educational Classification	Cooperative	Disruptive	Shy	Fights	Seeks Help	Leader	Athletic	Trouble	Good Student	Cool	Sad	Popular	Friendly
<i>Cluster C</i>																	
Nuclear	2285	F	W	REG	1	2	0	0	0	0	0	1	0	0	0	0	0
	2284	M	W	REG	0	0	0	1	0	0	0	0	0	0	0	0	0
	2270	F	W	REG	5	0	3	1	2	1	0	0	5	1	1	1	2
MEAN					2.0	0.7	1.0	0.7	0.7	0.3	0.0	0.3	1.7	0.3	0.3	0.3	0.7
Secondary	2272	F	W	EBD	0	0	1	0	0	1	0	0	2	0	0	1	1
	2438	F	AA	REG	1	0	2	0	0	0	0	0	1	1	0	1	0
	2280	M	W	REG	3	0	4	0	0	1	0	0	3	0	1	1	3
	2283	F	W	REG	4	0	0	0	0	1	1	0	2	2	0	0	1
	2271	M	AA	CDB	4	0	3	1	5	0	0	0	2	1	2	0	2
MEAN				2.4	0.0	2.0	0.4	1.0	0.6	0.2	0.0	2.0	0.8	0.6	0.6	0.6	1.4
Peripheral	2276	M	W	REG	4	0	0	1	0	4	1	0	12	0	1	0	2
MEAN					4.0	0.0	0.0	1.0	0.0	4.0	1.0	0.0	12.0	0.0	1.0	0.0	2.0
<i>Isolates</i>																	
	2294	F	W	REG	4	0	0	0	0	0	1	0	3	0	0	0	3
	2281	M	W	SLD	0	0	0	0	1	0	1	1	0	0	1	0	0
	2288	M	HL	REG	0	6	0	0	0	0	0	2	0	0	0	0	0
	2293	F	W	ASD	0	2	0	1	4	0	1	2	2	1	3	0	0

Note. Gender: F = female; M = male. Educational Classification: ASD = autism; CDB = cognitive disorder borderline; EBD = emotional behavior disorder; OHI = other health impairment; S/L = speech and language; SLD = specific learning disability. Free/reduce lunch: 0 = not qualified; 1 = qualifies. Ethnicity: W = White; AA = African American; HL = Hispanic/Latino; AS = Asian; AI = American Indian; other = all other ethnicities.

Table E14

*Network Centrality and Social Characteristics Per Cluster-School E Class 14 Grade 4*

Centrality	<u>Student Characteristic</u>									<u>Peer-Assessed Characteristic</u>							
	ID	Gender	Ethnicity	Educational Classification	Cooperative	Disruptive	Shy	Fights	Seeks Help	Leader	Athletic	Trouble	Good Student	Cool	Sad	Popular	Friendly
<i>Cluster A</i>																	
Nuclear	2420	F	W	REG	4	0	1	0	1	2	1	0	6	1	0	1	4
	2429	1	W	REG	3	0	0	1	1	5	0	0	2	4	0	2	1
	2425	F	W	REG	3	1	1	2	4	0	0	2	2	0	4	0	3
MEAN					3.3	0.3	0.7	1.0	2.0	2.3	0.3	0.7	3.3	1.7	1.3	1.0	2.7
<i>Cluster B</i>																	
Nuclear	2423	F	W	REG	7	0	1	1	1	4	1	0	5	7	0	10	11
	2431	F	W	REG	2	0	1	0	1	1	4	1	4	1	0	0	2
	2434	F	W	REG	5	2	0	1	1	4	5	0	9	4	0	5	4
	2432	F	W	REG	3	0	0	0	0	1	1	0	2	1	0	0	1
	2427	F	W	REG	2	0	4	2	2	1	2	0	2	1	1	1	2
MEAN					3.8	0.4	1.2	0.8	1.0	2.2	2.6	0.2	4.4	2.8	0.2	3.2	4.0
Secondary	2424	F	W	REG	1	0	0	0	0	0	0	0	1	0	0	0	0
MEAN					1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0
Peripheral	2421	M	W	REG	2	0	2	0	2	1	0	0	2	0	1	0	0
MEAN					2.0	0.0	2.0	0.0	2.0	1.0	0.0	0.0	2.0	0.0	1.0	0.0	0.0
<i>Cluster C</i>																	
Secondary	2422	M	W	REG	7	0	0	0	0	8	14	0	5	16	0	14	5
	2428	M	W	REG	2	0	0	0	0	5	9	1	7	3	0	4	3
	2417	M	W	REG	1	7	1	6	2	3	9	5	2	3	0	3	1
	2416	M	W	S/L	2	0	1	1	5	2	1	0	2	0	3	0	4

Table E14

(Continued)

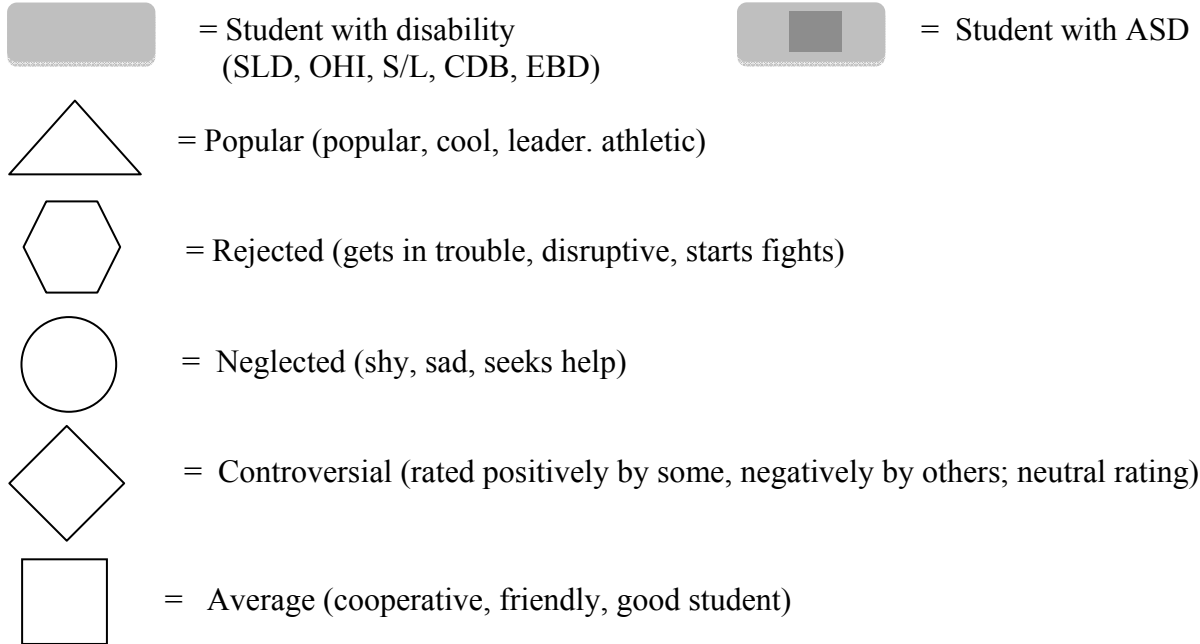
Centrality	<u>Student Characteristic</u>								<u>Peer-Assessed Characteristic</u>									
	ID	Gender	Ethnicity	Educational Classification	Cooperative	Disruptive	Shy	Fights	Seeks Help	Leader	Athletic	Trouble	Good Student	Cool	Sad	Popular	Friendly	
	2413	M	HL	REG	0	3	0	7	2	0	0	9	1	1	0	1	1	
	2436	M	W	ASD	1	8	0	11	3	1	2	16	2	2	1	1	1	
	2419	M	W	REG	2	0	0	0	0	0	3	0	3	0	1	1	2	
	MEAN				2.1	2.6	0.3	3.6	1.7	2.7	5.4	4.4	3.1	3.6	0.7	3.4	2.4	
	<i>Cluster D</i>																	
	Secondary	2411	M	W	REG	5	0	2	0	0	1	3	0	2	2	0	1	3
		2415	M	HL	REG	3	0	1	0	0	1	2	0	4	0	1	1	3
		2414	M	HL	REG	5	0	0	0	0	0	2	0	5	0	0	2	3
	MEAN				4.3	0.0	1.0	0.0	0.0	0.7	2.3	0.0	3.7	0.7	0.3	1.3	3.0	
	<i>Cluster E</i>																	
	Secondary	2412	F	A	REG	2	2	3	1	0	2	2	0	2	1	0	0	2
		2426	F	A	REG	2	0	2	1	1	3	2	0	2	1	0	0	1
	MEAN				2.0	1.0	2.5	1.0	0.5	2.5	2.0	0.0	2.0	1.0	0.0	0.0	1.5	
	<i>Isolates</i>																	
		2430	F	AI	REG	3	0	0	1	1	5	0	1	0	4	0	0	4
		2418	F	W	REG	1	1	2	0	4	0	0	1	1	0	4	0	2
		2433	F	W	REG	1	1	2	0	0	0	0	2	0	2	0	0	1

*Note.* Gender: F = female; M = male. Educational Classification: ASD = autism; CDB = cognitive disorder borderline; EBD = emotional behavior disorder; OHI = other health impairment; S/L = speech and language; SLD = specific learning disability. Free/reduce lunch: 0 = not qualified; 1 = qualifies. Ethnicity: W = White; AA = African American; HL = Hispanic/Latino; AS = Asian; AI = American Indian; other = all other ethnicities.

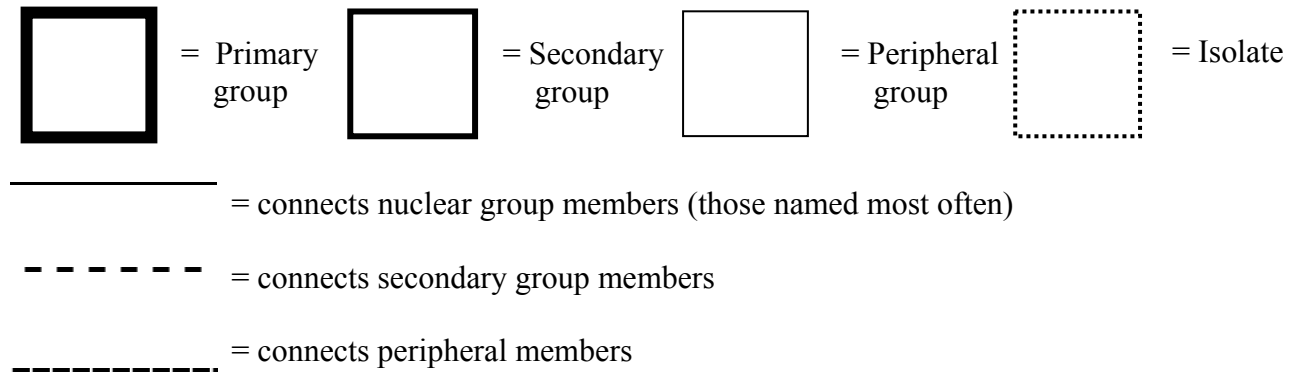
**APPENDIX F**

Class Social Maps

Key to class social maps.



Primary or nuclear groups are those named most often; those groups that are most commonly recognizable by the most students; secondary groups are those named less often; peripheral groups are named less frequently but still often enough to be recognized.



Educational Classifications:

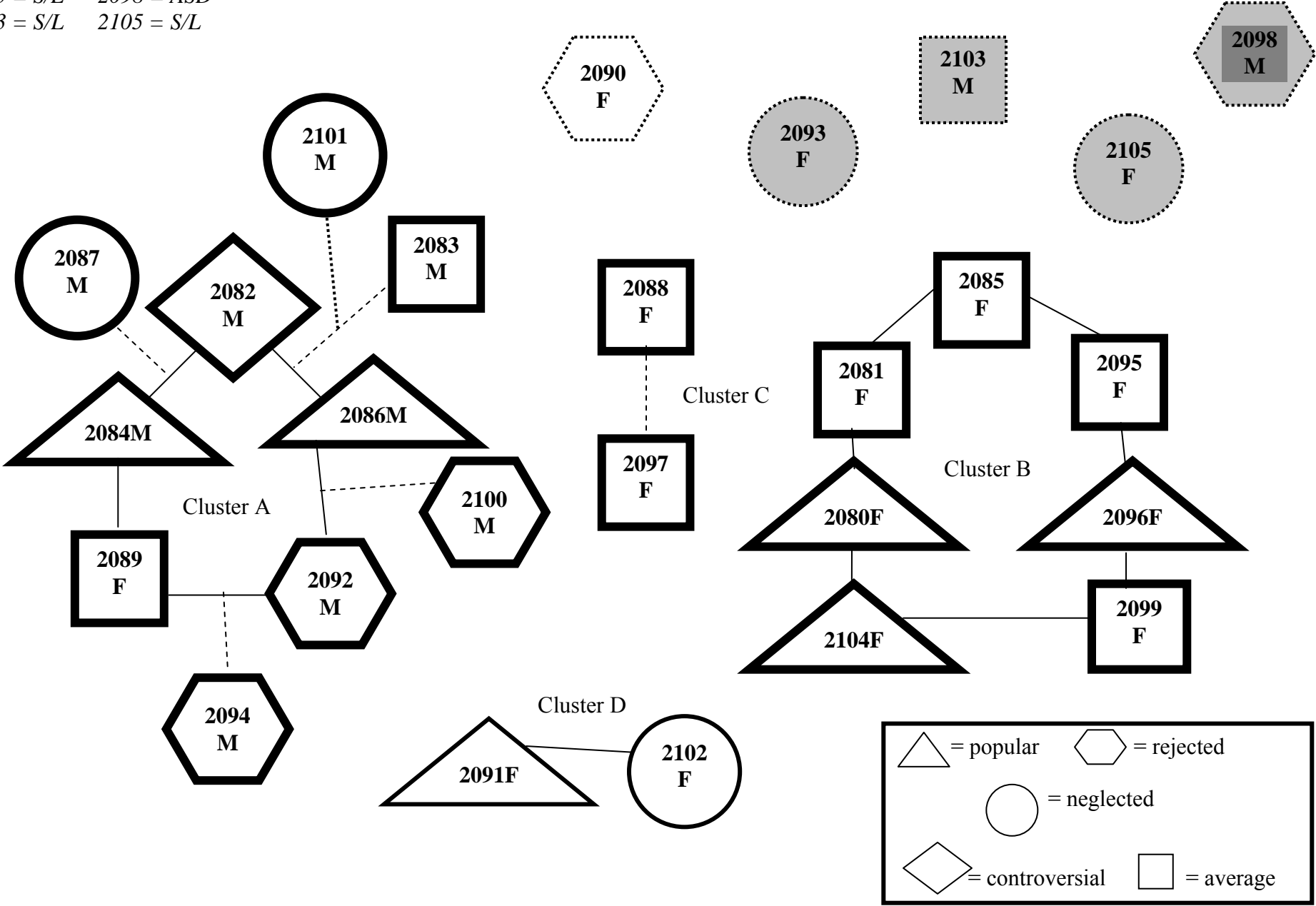
- ASD = Autism Spectrum Disorder
- CDB = Cognitive Disability Borderline
- EBD = Emotional Behavioral Disorder
- OHI = Other Health Impairment
- S/L = Speech/Language
- SLD = Specific Learning Disability

*Note.* Each classroom map includes every student enrolled in the classroom at the time of data collection.

**School A, Grade 3, Teacher 1**

2093 = S/L    2098 = ASD

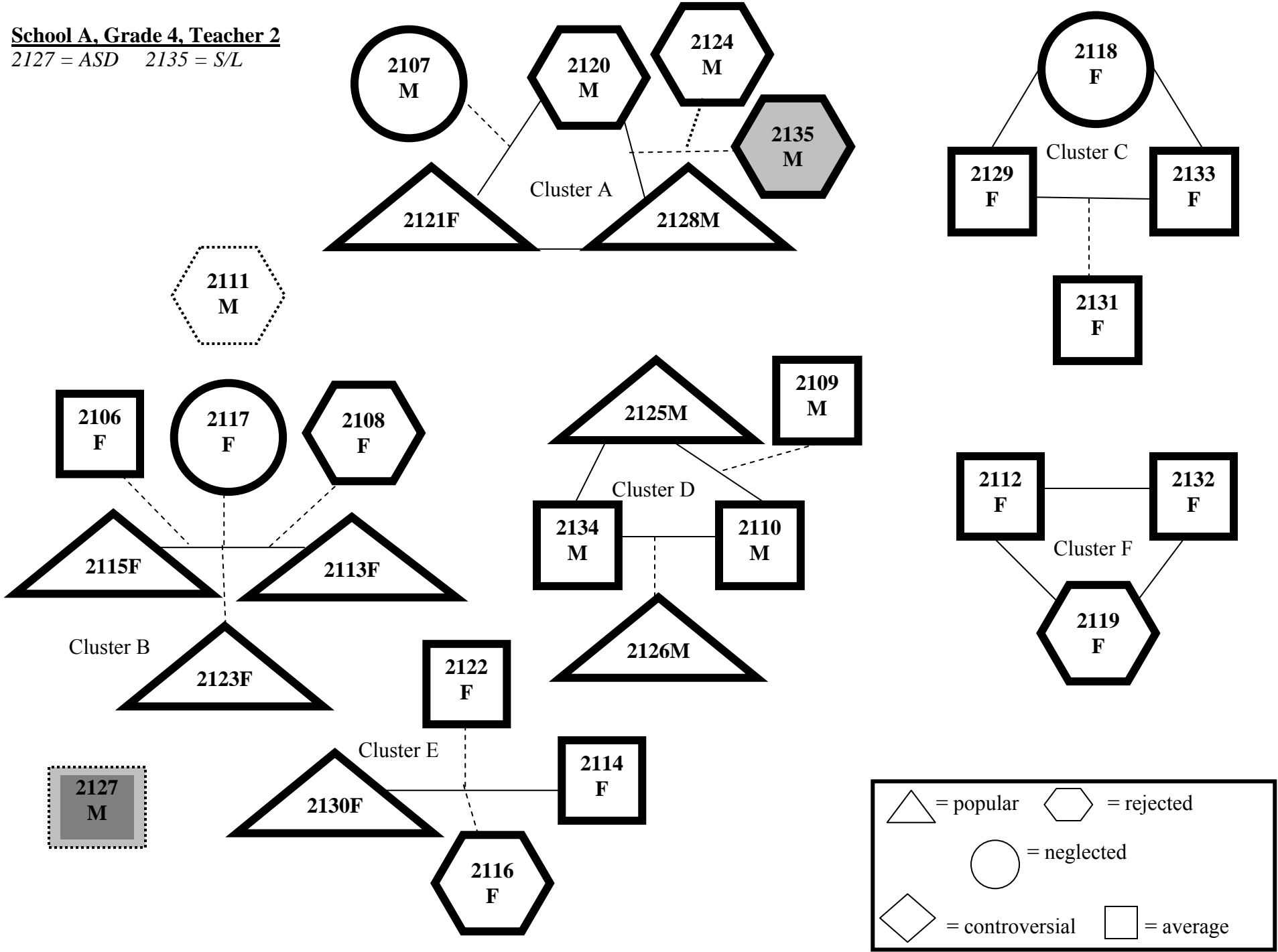
2103 = S/L    2105 = S/L





**School A, Grade 4, Teacher 2**

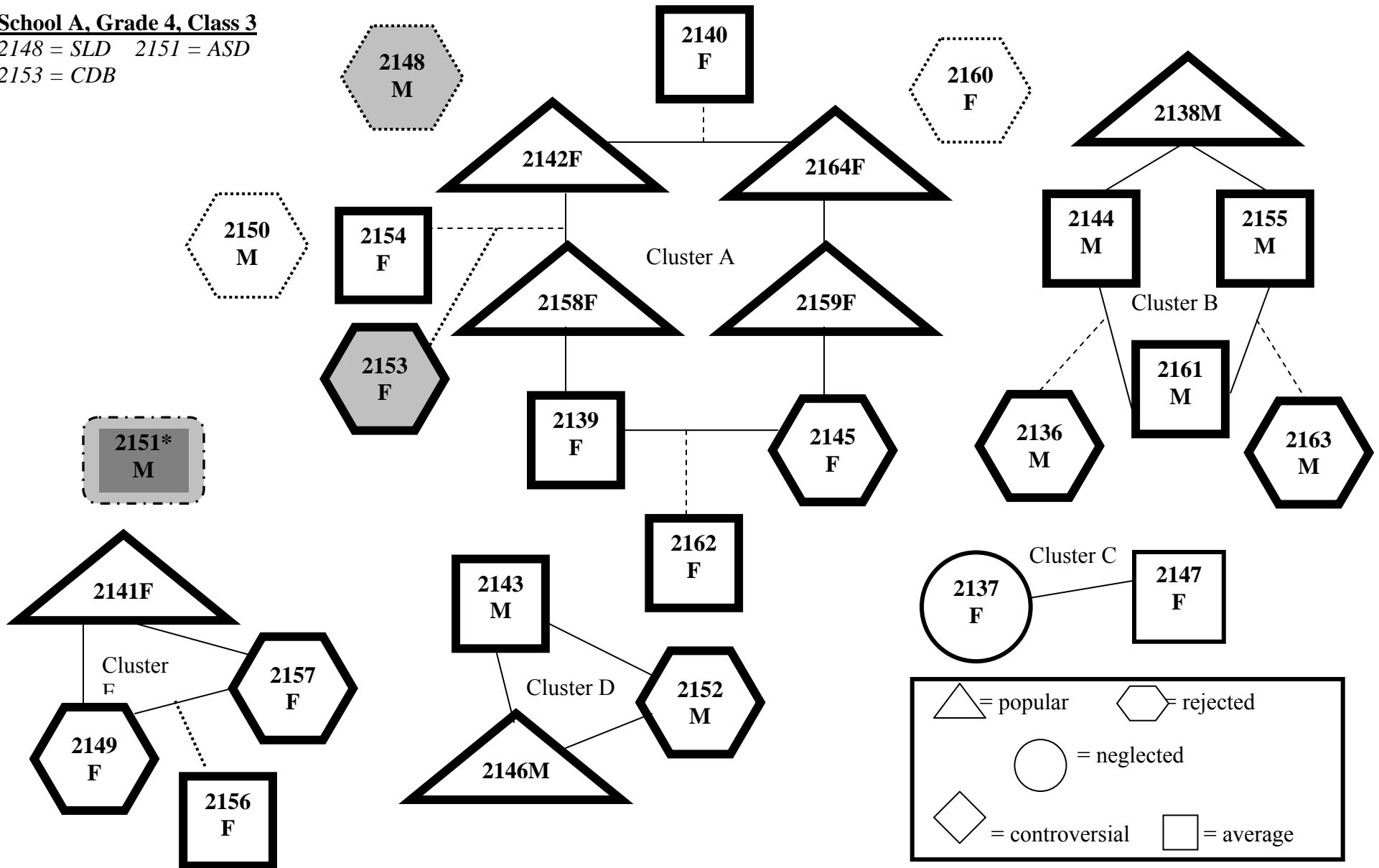
2127 = ASD 2135 = S/L



**School A, Grade 4, Class 3**

2148 = SLD 2151 = ASD

2153 = CDB

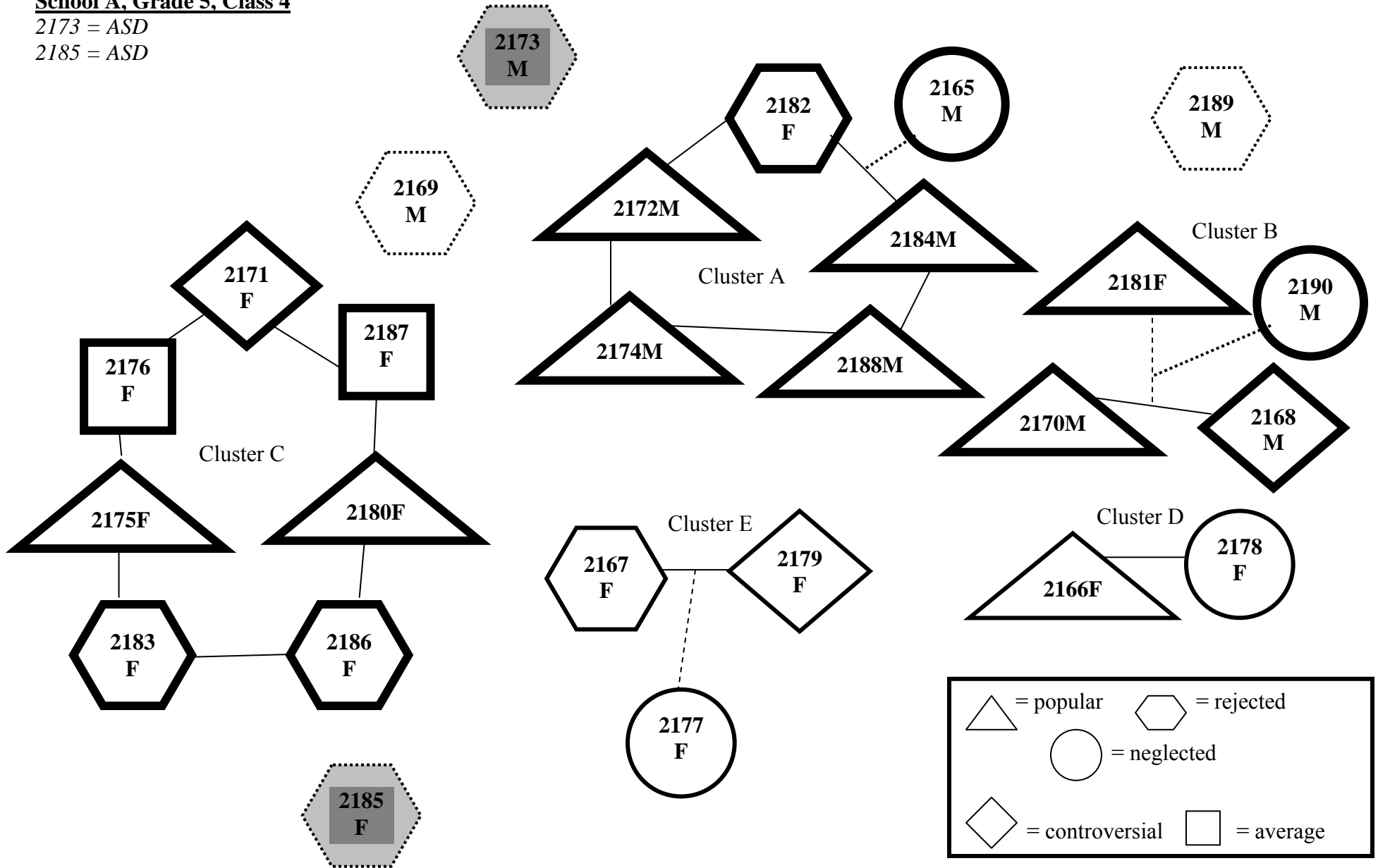


<sup>8</sup>2151 was not named in any groups and was not listed for any attributes

**School A, Grade 5, Class 4**

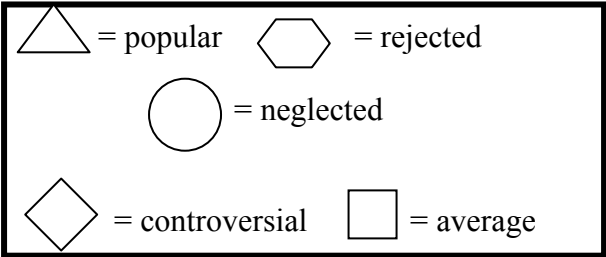
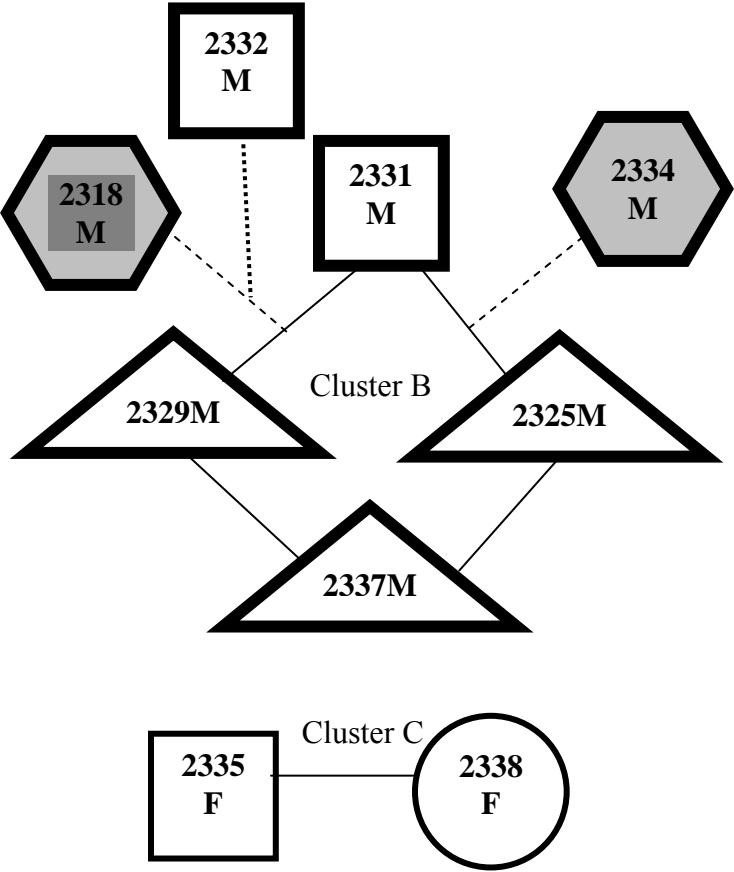
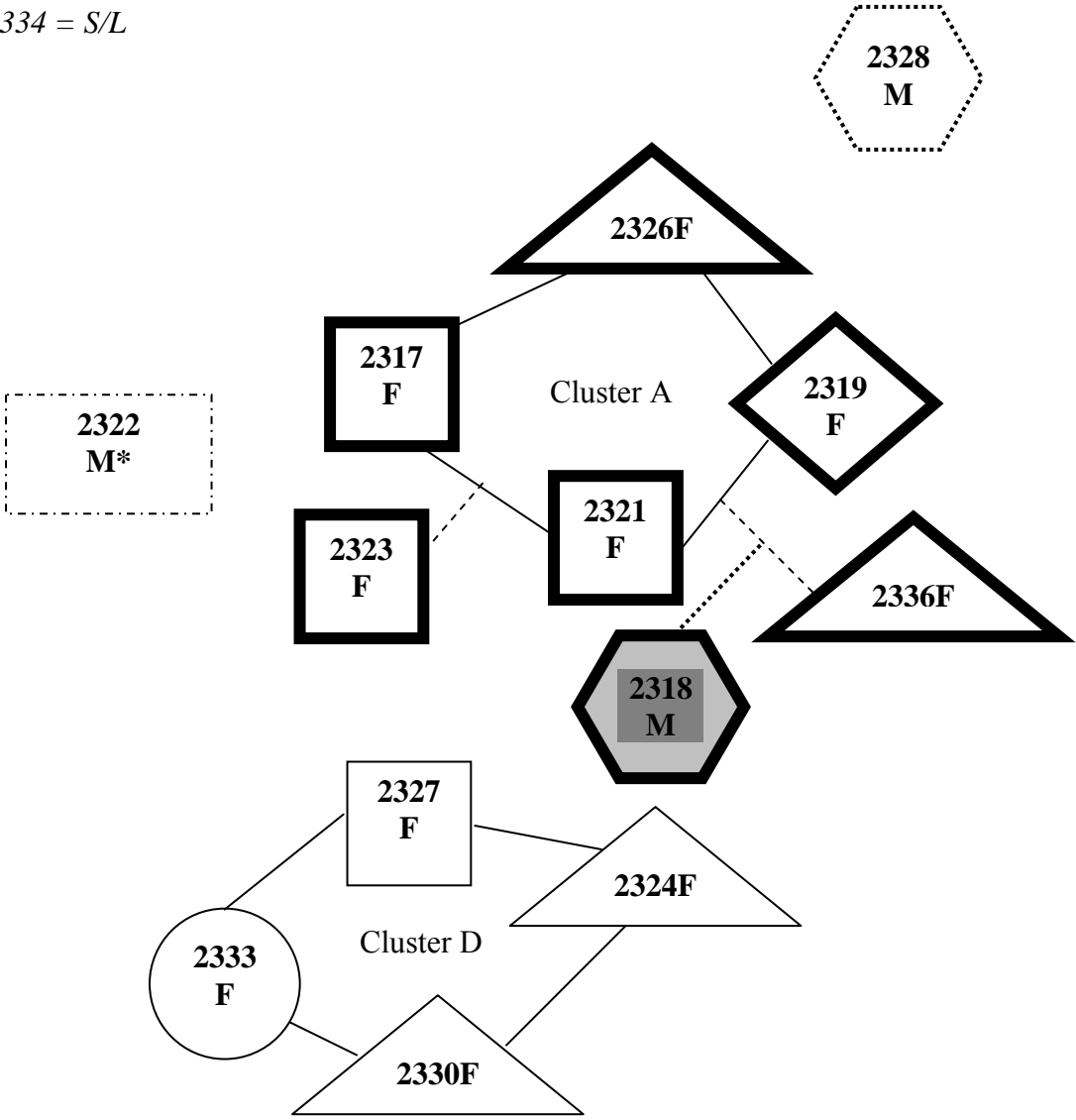
2173 = ASD

2185 = ASD



**School B, Grade 3, Teacher 5**

2318 = ASD  
2320 = ASD  
2334 = S/L

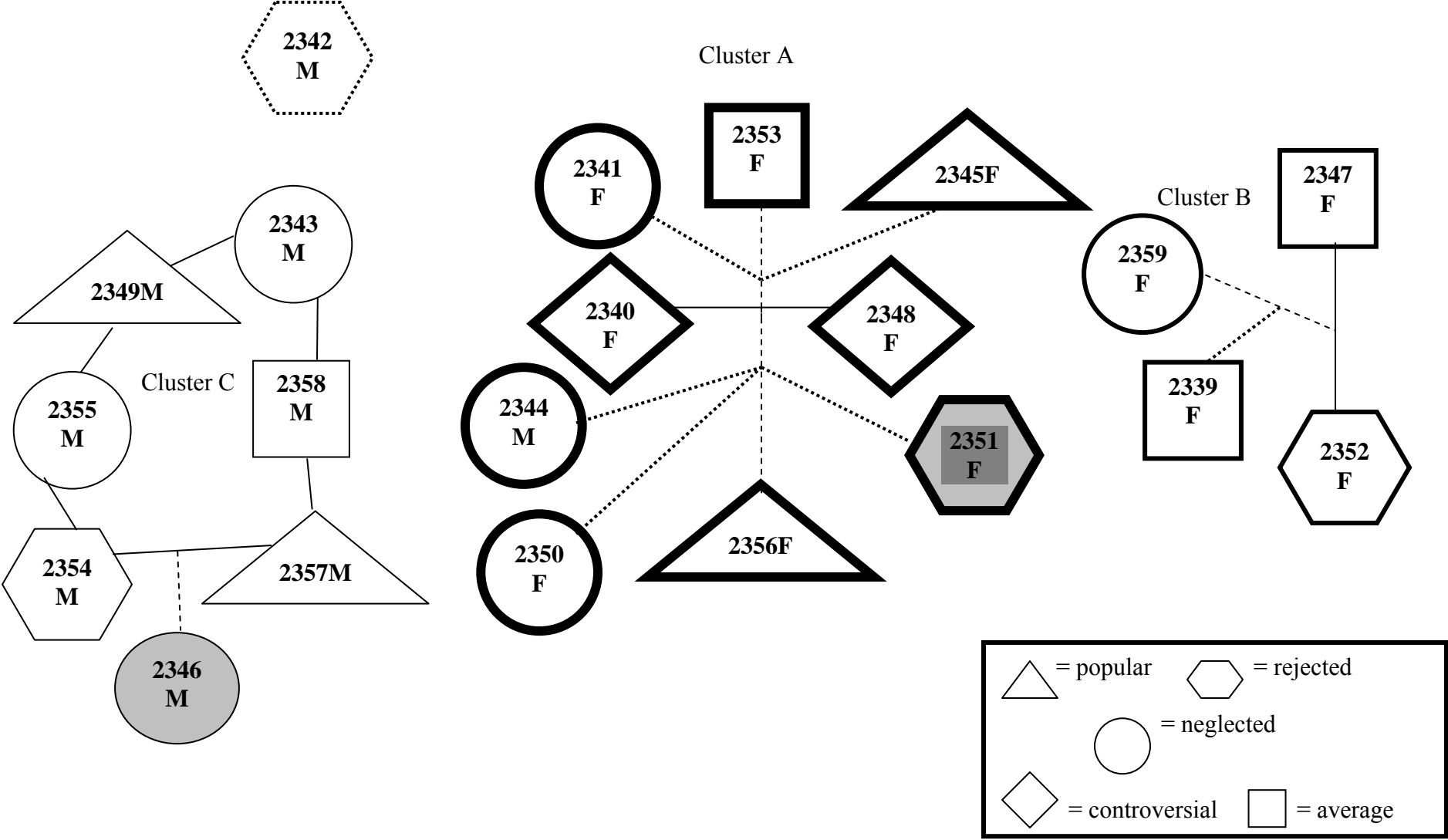


\*2322 was not named to any groups or nominated with any attributes.

**School B, Grade 3, Class 6**

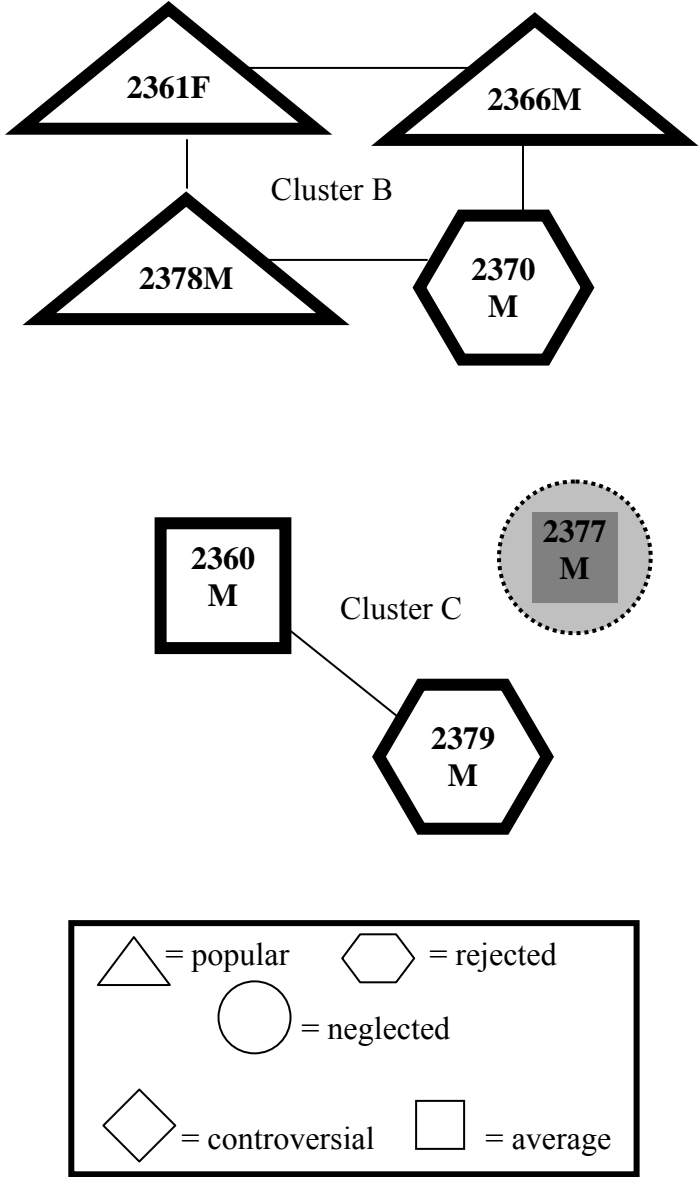
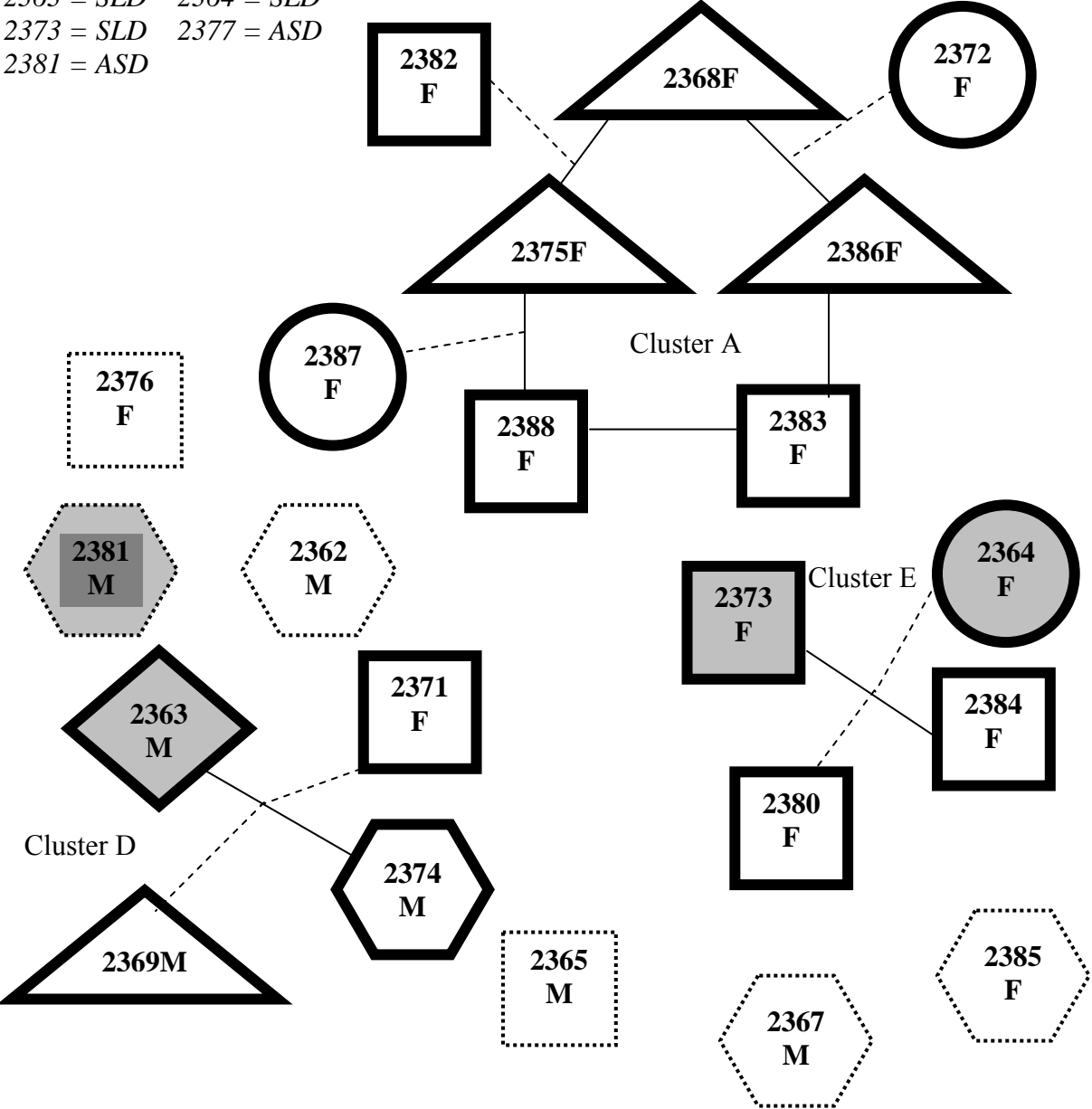
2346 = S/L

2351 = ASD



**School B, Grade 4, Class 7**

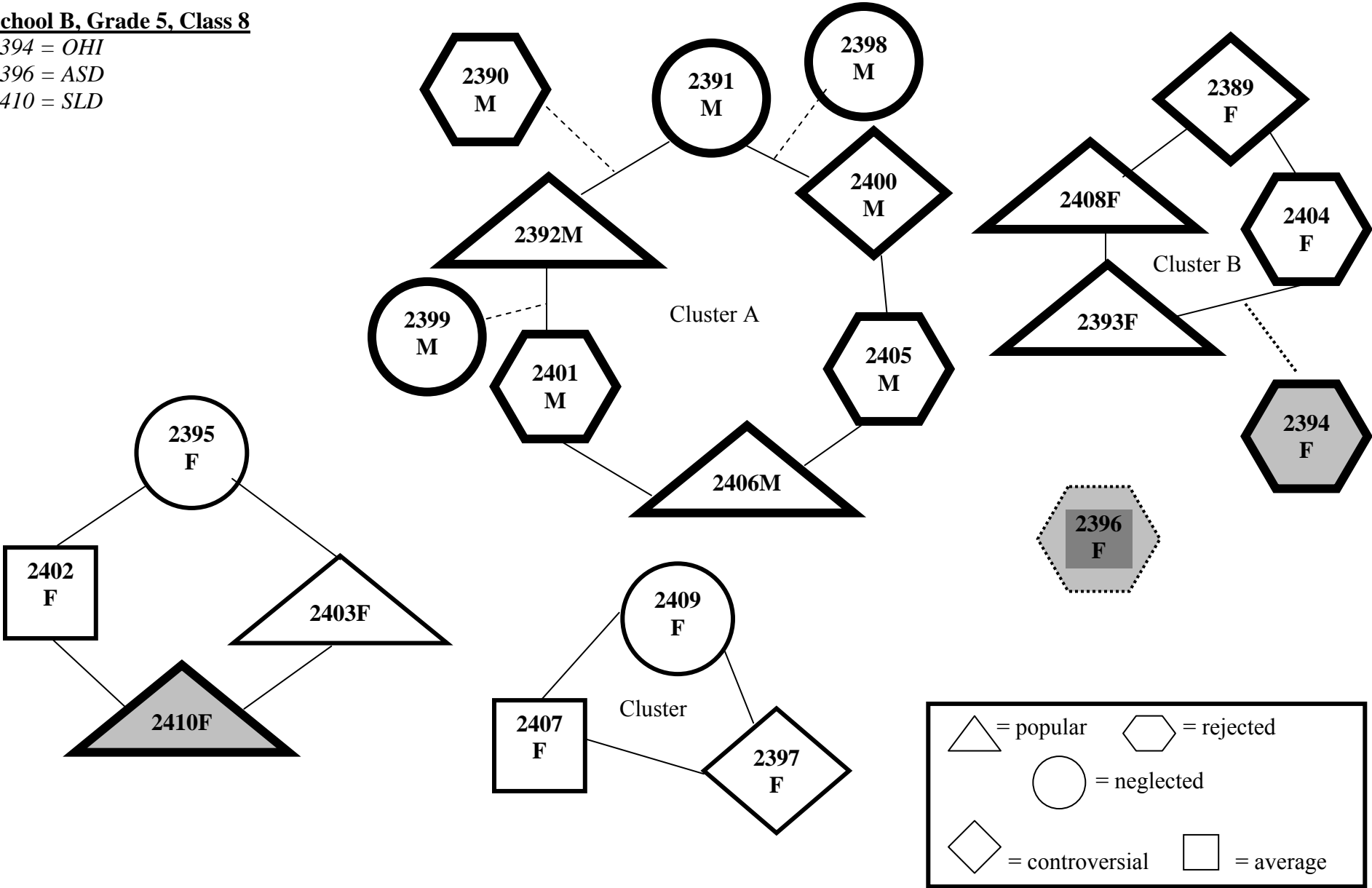
2363 = SLD 2364 = SLD  
2373 = SLD 2377 = ASD  
2381 = ASD



	= popular		= rejected
	= neglected		
	= controversial		= average

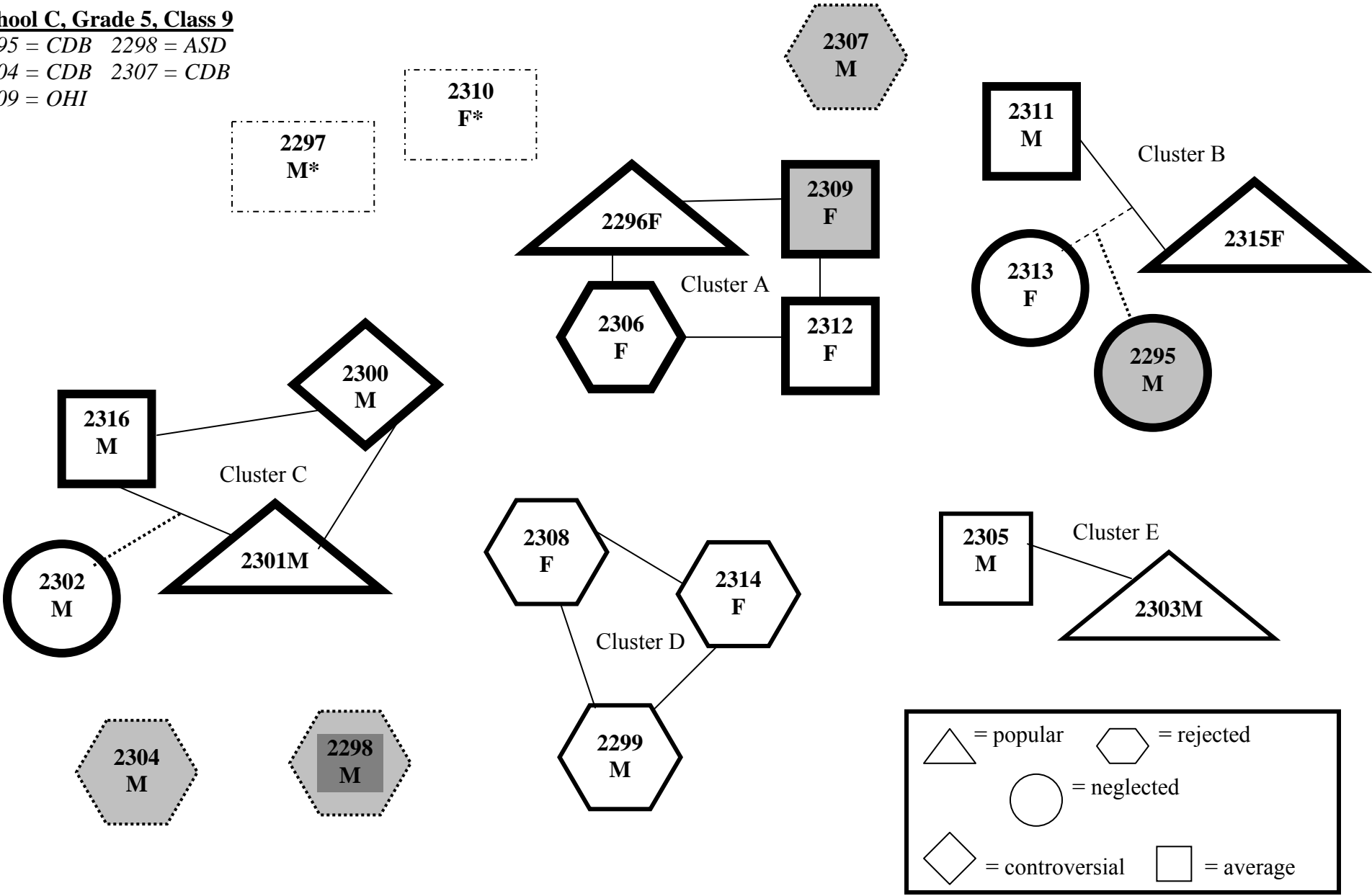
**School B, Grade 5, Class 8**

2394 = OHI  
2396 = ASD  
2410 = SLD



**School C, Grade 5, Class 9**

2295 = CDB 2298 = ASD  
2304 = CDB 2307 = CDB  
2309 = OHI

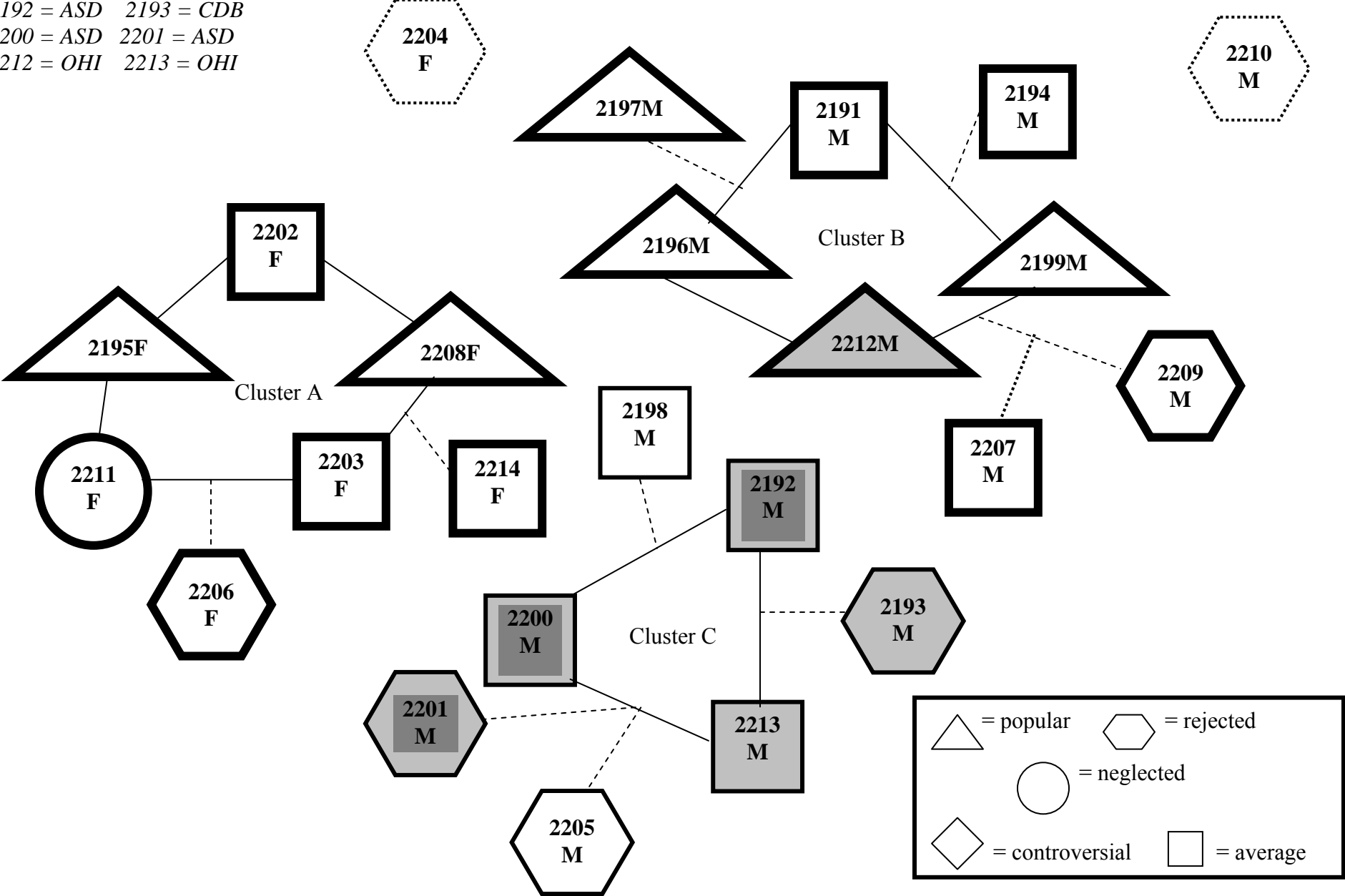


\* 2297 & 2310 were not named in any groups and were not nominated with any attributes.



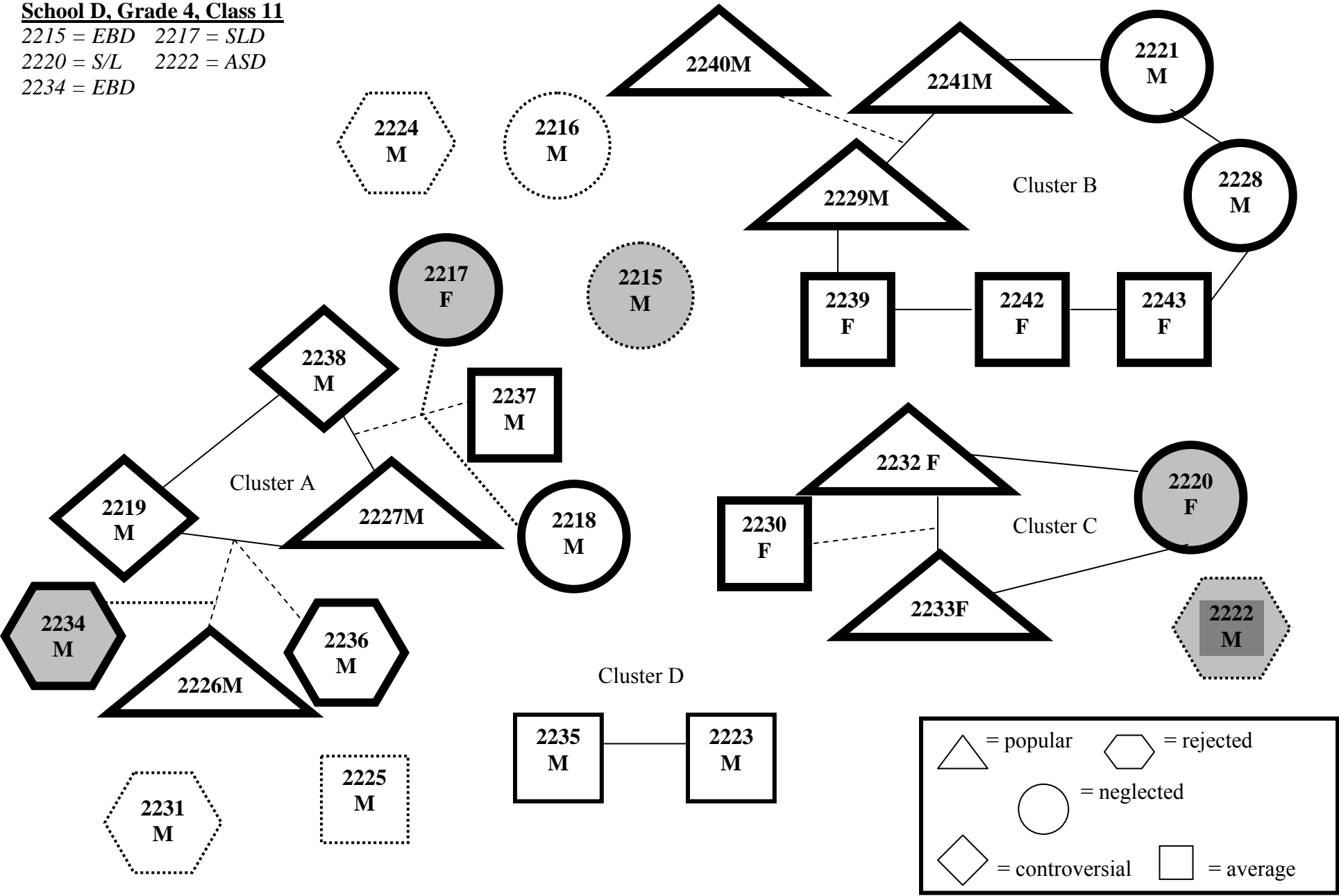
**School D, Grade 3, Teacher 10**

2192 = ASD 2193 = CDB  
2200 = ASD 2201 = ASD  
2212 = OHI 2213 = OHI



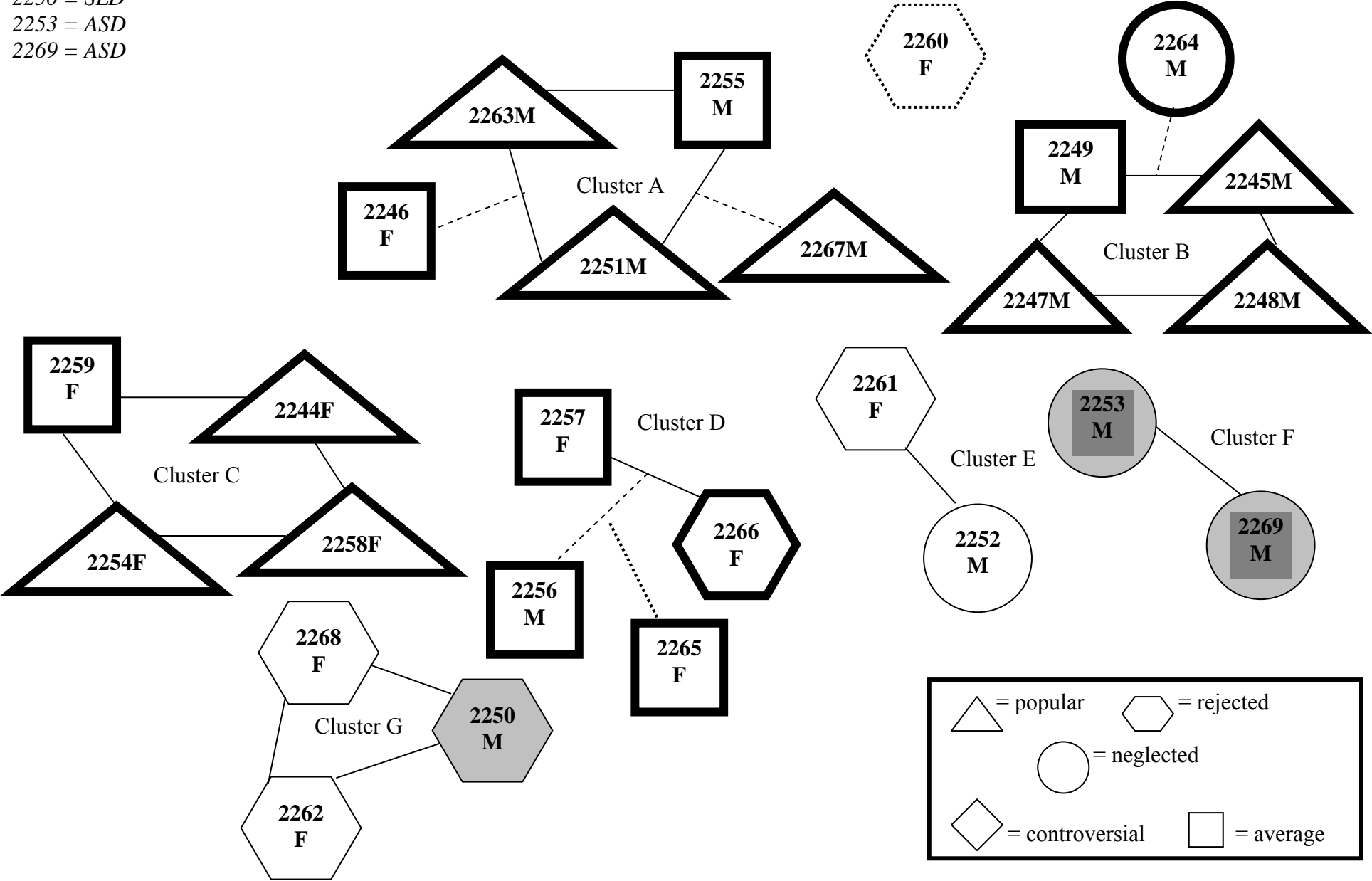
**School D, Grade 4, Class 11**

2215 = EBD 2217 = SLD  
2220 = S/L 2222 = ASD  
2234 = EBD



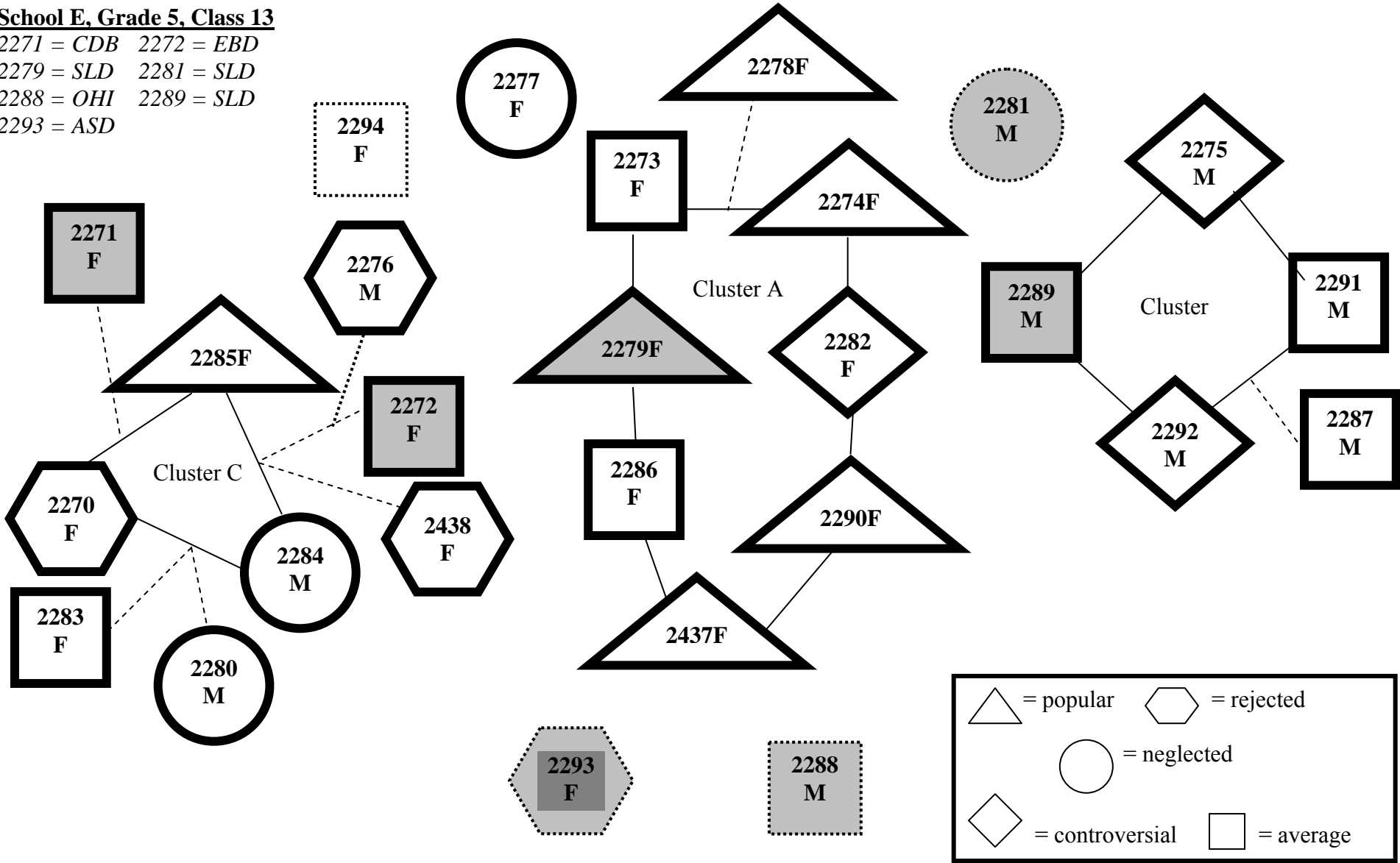
**School D, Grade 5, Class 12**

2250 = SLD  
2253 = ASD  
2269 = ASD



**School E, Grade 5, Class 13**

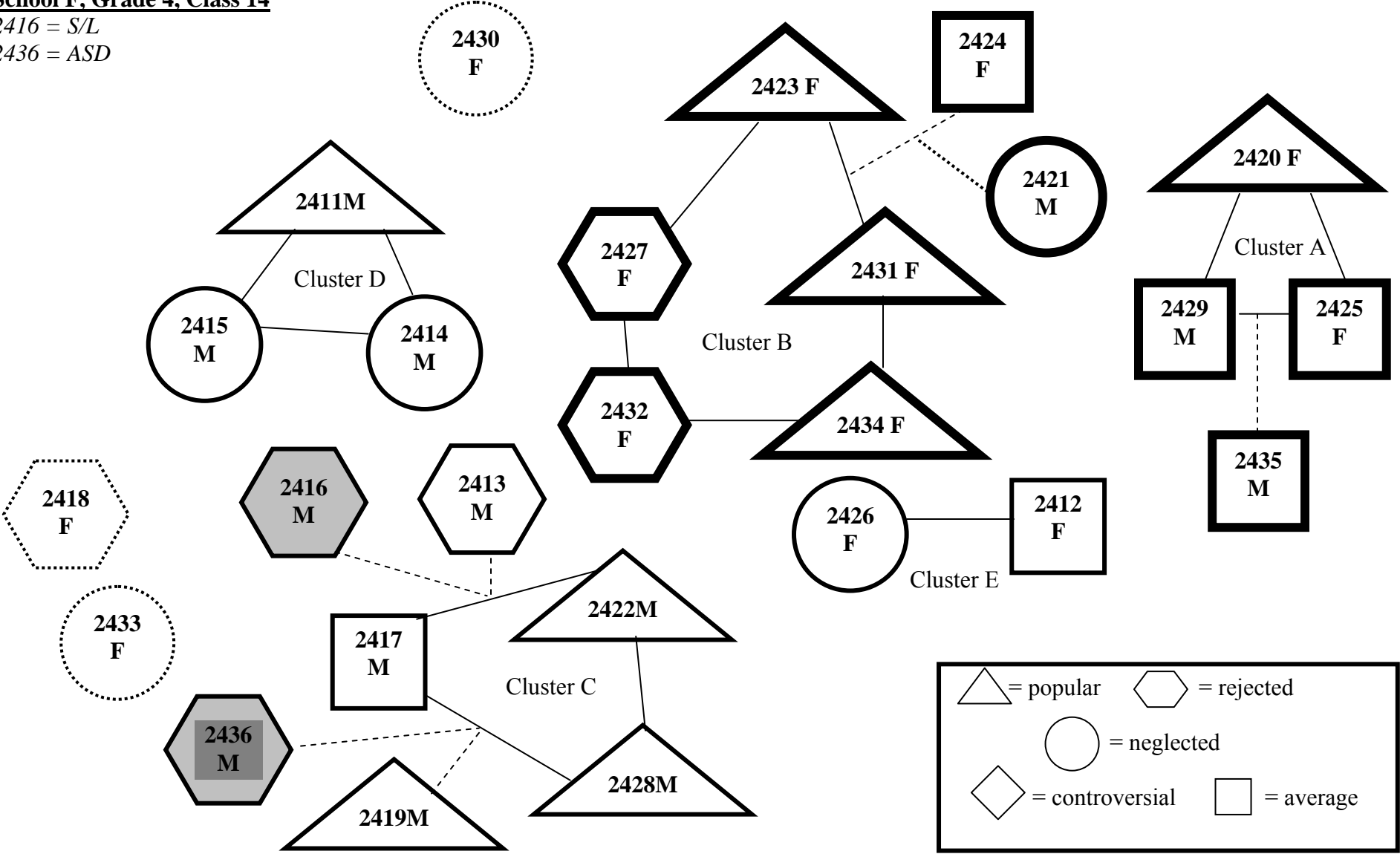
- 2271 = CDB    2272 = EBD
- 2279 = SLD    2281 = SLD
- 2288 = OHI    2289 = SLD
- 2293 = ASD



	= popular		= rejected
	= neglected		
	= controversial		= average

**School F, Grade 4, Class 14**

2416 = S/L  
2436 = ASD



VITA

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National Board Certified Teacher (NBPTS), 2010

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Council for Children with Behavioral Disorders, since 2006

Council for Exceptional Children, since 2005

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American Federal of Teachers Association, since 1995  
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- PUBLICATIONS: Power, P. (2003). Rocking to the beat. In G. Worthen (Ed.), *Celebrate! Poets Speak Out!* Logan, UT: Creative Communication Press.
- Power, P. (1994). Praying in the silence of my soul. In C. Sullivan and C. Stevens (Eds.), *Outstanding Poets of 1994*. The National Library of Poetry, Watermark Press.
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