TEACHER ATTUNEMENT: SUPPORTING STUDENTS' PEER EXPERIENCES IN
THE EARLY ELEMENTARY CLASSROOM

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ABSTRACT

ABIGAIL HOFFMAN: Teacher Attunement: Supporting Students' Peer Experiences in
the Early Elementary Classroom
(Under the direction of Dr. Jill V. Hamm)

This multi-method, longitudinal study examines the role of teacher attunement

(teacher accuracy in identifying the peer group memberships of individual students) in

children's peer experiences in early elementary classrooms (1st-3rd grades). Social

cognitive mapping (SCM) procedures assessed and compared students' and teachers'

reports of peer groups. Peer nominations assessed students' social reputations as popular

and as leaders and student-SCM reports assessed students' social network centrality. To

account for the nested structure of the data, Hierarchical Generalized Linear Modeling

procedures were used. Findings suggested that early elementary grade school teachers

tended to have a low attunement to students' peer group memberships. However, when

teachers were highly attuned to children's peer group memberships in the fall, results

indicated that students were more likely to be perceived as popular and as leaders in the

spring and students were more likely to be socially embedded in the classroom social

network in the spring. Findings regarding teacher attunement are discussed in reference

to teachers' invisible hand and the role of teacher attunement in creating classroom

contexts where positive and productive peer relationships are established.

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CHAPTER 1

INTRODUCTION

During the early elementary grades, developing positive peer relationships with classmates is important to young children's social adjustment. Early classroom relationships have the potential to support or exacerbate children's social adjustment (Ladd, 1990; Ladd & Burgess, 2001), thus, it is important that these experiences are positive and productive. Given the considerable amount of time children spend engaged in peer interactions, the peer groups that emerge are particularly important to children's adjustment (Cairns, Xie, & Lueng, 1998; Rodkin, 2004). For the purposes of this research, peer groups refer to informal groups of children who voluntarily and regularly interact within natural settings such as classrooms (Cairns & Cairns, 1994). The peer group connections that occur among children serve as important proximal settings for children's social interactions and development at school (Cairns et al., 1998; Rodkin, 2004) and are a pathway for children to meet a fundamental human need for relatedness and acceptance (Cairns & Cairns, 1994; Baumesister & Leary, 1995). Further, scholars agree that during elementary school, psychological processes associated with children's peer interactions become salient developmental pathways for children that have a long-term impact. That is, fitting in and being accepted, valued, and included by peers takes on special significance during middle childhood (Osterman, 2000).

Although children self-select into peer groups during the early elementary grades, they still depend on their teacher to navigate classroom social dynamics successfully, and

to benefit fully from positive social relationships. A central responsibility of elementary teachers is to organize the classroom environment in ways that best attend to children's developmental needs, including their need to form connections with their peers (Cairns & Cairns, 1994; Doll, Song, & Siemers, 2004; Hamre & Pianta, 2010; Skinner & Belmont, 1993). In fact, how teachers organize features of the classroom environment to meet students' social needs impacts their social interactions and relationships beyond the early elementary grades (Hamre & Pianta, 2010).

A substantial body of research demonstrates that children's adjustment is supported when teachers create classroom contexts that address students' basic psychological need to feel valued, important, and accepted in their relationships with significant others including their peers (e.g., Furrer & Skinner, 2003; Osterman, 2000;Wentzel, 2002; Wentzel, 2010). In order for teachers to create supportive classroom environments, they must be aware of children's peer group patterns (Cairns & Cairns, 1994). Teacher attunement, a dimension of teacher involvement, is the degree to which teachers accurately identify children's peer group memberships in the classroom. (Hamm, Farmer, Dadisman, Gravelle, & Murray, 2011). Teacher attunement is also referred to as teacher accuracy (Pearl, Leung, Van Acker, Farmer, & Rodkin, 2007; Farmer, Hall, Petrin, Hamm, & Dadisman, 2011) and teacher-student agreement (Gest, 2006; Neal, Cappell, Wagner, & Atkins, 2010). Teacher attunement may be one skill that enables teachers to more effectively use peer group memberships to foster children's social adjustment in the classroom social system (Hamm et al., 2011). Accordingly, a heightened attunement to children's peer group memberships in the classroom may help

teachers organize classrooms that facilitate and sustain accepting, supportive, and productive peer associations.

Consistent with this depiction of teacher attunement in relation to students' social adjustment, recent research demonstrates that middle school teachers with higher attunement more effectively manage classroom social dynamics. In addition, teacher attunement predicted improvement to adolescents' perceptions of the school social-affective context and bullying context during the middle school transition year (Hamm et al., 2011). However, teacher attunement is not a well-studied construct, especially within the early elementary school years. The proposed study begins to fill this gap in understanding the role of teacher attunement to peer group membership in supporting children's social adjustment during first through third grades.

Conceptual Framework

Two perspectives underscore the significance of teacher attunement to student adjustment: a *developmental science framework*, and a conceptualization of teacher influence that connects dimensions of teacher involvement to aspects of children's peer experiences through effective teaching practices such as *network-related teaching* and *teacher warmth* (Bierman, 2011; Chang, 2003; Chang, Liu, Wen, Fung, Wang, & Xu, 2004; Farmer, Lines, & Hamm, 2011; Gest & Rodkin, 2011; Skinner & Belmont, 1993; Wentzel, 2002). According to a developmental science perspective (Magnusson & Cairns, 1998), children develop as whole persons, for whom functioning in one context constrains functioning in other contexts. At school, the two primary relational contexts are those children experience with their peers and with their teacher. This suggests that how the peer context and teacher context work relative to one another may affect

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students' social adjustment (Cairns & Cairns, 1994). Furthermore, peer group memberships are an integral aspect of the classroom context to which teachers attend during teachable moments and when planning day-to-day activities (Cairns & Cairns, 1994; Farmer, Lines, & Hamm, 2011; Kindermann, 2011). It is likely that a reciprocal relationship exists between the peer and teacher contexts in the classroom. However, as the primary adult and leader of the class, early elementary teachers may exert a greater influence in children's social experiences in the classroom than peers (Cairns & Cairns, 1994; Farmer et al., 2011).

Cairns and Cairns (1994) introduced the metaphor of *teachers' invisible hand* to characterize the everyday and often intentional ways that teachers (as well as other adults) shape social processes that support or constrain children's adjustment in the classroom. The teacher's invisible hand metaphor includes teachers' understanding of their students' peer group memberships and classroom social dynamics (Cairns & Cairns, 1994). Farmer et al., (2011) describe this process further by suggesting that teachers' invisible hand refers to teacher interactions, behaviors, activities, or strategies which "promotes students' self directed, autonomous, and developmentally productive peer experiences" (p. 249). Consistent with this depiction, recent conceptual models linking teaching practices and children's peer relationships identifies teacher attunement to peer group memberships as a feature of the teaching ecology through which teachers may exert influence on children's peer experiences (Bierman, 2011). From this perspective, teacher attunement to peer group memberships as an aspect of teachers' invisible hand may help teachers to arrange the classroom environment in ways that support children's

positive and productive relations with their peers (Bierman, 2011; Cairns & Cairns, 1994; Farmer et al., 2011; Rodkin & Gest, 2010).

Skinner and Belmont's (1993) conceptualization of teacher involvement and its influence on student adjustment is drawn from Connell and Wellborn's (1991) model of student engagement. According to this model, student adjustment is optimized to the degree that teachers create classroom environments that satisfy children's basic needs for competence, autonomy, and relatedness (Connell & Wellborn, 1991; Skinner & Belmont, 1993). Within this framework, students' need to form meaningful social connections with others is particularly significant to their willingness to internalize socialization processes important to the teacher (Furrer & Skinner, 2003; Skinner & Belmont, 1993; Wentzel, 2010). Moreover, teacher involvement may be an important construct that provides teachers with tangible ways to create contexts that satisfy this basic psychological drive (Hamm et al., 2011; Skinner & Belmont, 1993; Wentzel, 2002).

Teacher involvement includes teacher affection and liking, attunement to and knowledge of students, and time and energy spent on students, and addresses students' basic need to feel related and connected in the classroom context (Skinner & Belmont, 1993). From this broader definition, teacher attunement to children's peer group memberships represents a dimension of a teacher's overall involvement with students and may be a particularly relevant skill that allows teachers to intentionally foster positive and productive social relationships that meet students' need for acceptance, inclusion, and relatedness (Hamm et al., 2011).

Together these perspectives suggest that teachers create classroom environments that support students' social adjustment. In addition, children may be particularly

responsive to teachers' socialization practices in contexts in which children have the opportunity to form warm and accepting social relationships (Doll et al., 2004; Chang, 2003; Wentzel, 2002; 2003). Teacher attunement to peer group affiliations may serve as a resource for children, by supporting their positive social relationships in the classroom context. It may be essential for teachers to identify peer group memberships accurately, to more effectively support positive social processes in the classroom (Cairns & Cairns, 1994). Understanding peer group memberships is an integral dimension of teacher attunement (Hamm et al., 2011) and may be an important skill informing how teachers organize the classroom to be relationally responsive and supportive environments. This may be especially relevant for children in the early elementary grades. Thus, this study examines the role of teacher attunement to children's peer group membership in supporting students' social adjustment in first through third grades.

The Need for Teacher Attunement to Peer Group Memberships During Early Elementary School

Although it is well established that peer groups take on particular importance during late childhood and early adolescence (Cairns & Cairns, 1994), researchers have begun to identify their significance during the early elementary grades (Estell, 2007; Kwon & Lease, 2008; 2009). Children's peer groups tend to consist of 3 to 9 individuals who regularly interact with one another. Research confirms that elementary-aged children form distinct peer groups (Bagwell, Coie, Terry, & Lochman, 2000; Estell, 2007; Kwon & Lease, 2008; 2009) and engage in positive interactions more frequently with same-sex group members than with same-sex non-group members (Gest, Graham-Bergmann, & Hartup, 2003). In addition, peer groups tend to be organized around factors such as

propinquity (Cairns & Cairns, 1994), which suggests the importance of school and classroom factors in determining children's peer group affiliations within a school year and from year to year (Hamm & Zhang, 2010). That is, children's pool of potential affiliates is limited first, by classroom placement and then by teacher decisions in the classroom.

Peer group affiliations among students do not form outside of or independent from the adult world in the classroom. That is, peer group affiliations are embedded in the classroom social processes that the teacher arranges (Doll et al., 2004; Cairns & Cairns, 1994; Farmer, 2000; Farmer et al., 2011; Rodkin & Hodges, 2003). While children themselves are expert participant-observers into this complex social world that develops among the students (Cairns, Leung, Gest, & Cairns, 1995; Gest, 2006), teachers are privy to aspects of the social dynamics of the classroom, albeit as outside observers (Gest, 2006; Neal et al., 2010; Pittinsky & Carolan, 2007). Moreover, early elementary teachers may be in an advantageous position to attune to children's peer group memberships, as these teachers stay with the same group of students throughout the school year. Scholars have long advocated for teachers to develop an objective understanding of their students' social relationships in the classroom (Gronlund, 1959; in Rodkin, 2004). Yet, researchers have only recently begun to consider the significance of this kind of teacher cognition about children's social experiences for student adjustment and few studies have been conducted in elementary schools.

By attending to children's peer group memberships, teachers may more effectively organize and manage the classroom to foster children's peer experiences to engender cooperation and inhibit disruptive behaviors (Farmer, 2000; Farmer et al.,

2006). For example, a teacher may assign a student to a small group for a selected activity to promote a prosocial affiliation and a more productive reputation. When teachers are aware of children's peer group memberships, they may purposefully arrange opportunities that afford children the opportunity to be accepted or held in higher regard by their classmates. Understanding the extent to which teacher attunement to children's peer group membership is associated with students' peer experiences during the early elementary grades may contribute to effective classroom practices.

The Concurrent and Longitudinal Significance of Teacher Attunement

As the primary adult in elementary classrooms, teachers contribute to children's behaviors and the relationships children engage in with their peers contemporaneously and over the course of the school year (i.e., Hamre & Pianta, 2001; Hughes & Chen, 2011; Hughes, Cavell, & Willson, 2001). In addition, teachers organize the classroom environment to reinforce existing interaction patterns among classmates and create opportunities for new interaction patterns to emerge (Farmer et al., 2006). Making distinctions between the concurrent and short-term longitudinal role that teachers have in students' peer experiences is important especially for teacher practices that target children's peer relationships (Bierman, 2011; Gest & Rodkin, 2011). This is important in order to clarify what teachers can do to shape students' peer experiences.

This rationale may be extended to the potential contribution of teacher attunement to children's peer experiences. On one hand, teacher attunement, which is dynamic across the school year, may support students' on-going and daily peer interchanges in both the fall and in the spring. It is possible that this concurrent support from teachers may be associated with children's social experiences differently in the fall and in the

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spring (Farmer, et al., 2010; Neal, et al., 2009; Pearl et al., 2007). For example, at the beginning of a school year, teachers may help their young students to access a peer group before the classroom dynamics become entrenched. By the end of the school year, peer group memberships may be easier for teachers to decipher, but they may be harder for teachers to penetrate as the groups have had most of the school year to consolidate. Thus, the concurrent association between teacher attunement and children's peer experiences may be more apparent at the beginning of the year than at the end of the school year. On the other hand, when teachers have an accurate understanding of children's peer group memberships in the fall, children's peer experiences later in the school year may likely benefit. Teacher attunement early in the school year may provide students with a stronger foundation from which peer associations support socially competent behaviors and interaction patterns which, in turn, support positive and productive peer experiences later in the school year.

Although researchers interested in teacher influence focus on the extent to which teachers affect students' outcomes, much of the survey research employs concurrent methodology. Few studies on teacher attunement have taken a short-term longitudinal approach (see, for an exception Hamm et al., 2011). Distinguishing the concurrent associations from the short-term longitudinal associations between teacher attunement and children's peer experiences may have potentially important implications for research on teacher influence as well as for teacher practices. This study investigates both the concurrent associations between teacher attunement and children's peer experiences in the fall and in the spring and the short-term longitudinal associations between teacher

attunement in the fall and children's peer experiences in the spring after accounting for children's demographics and baseline scores on the dependent measures.

Children's Peer Experiences

Classroom-based peer experiences include children's social reputations as popular and as leader, children's peer acceptance, and children's social network centrality. These peer experiences represent key dimensions of children's interpersonal adjustment and are grounded in Moreno's (1939) articulation of sociometry (for reviews see Asher & McDonald, 2009; Cairns, et al., 1998; Parker & Asher, 1989; Parker, Rubin, Price, & De Rosier, 1995). Scholars agree that these dimensions of children's interpersonal experiences emerge and are sustained through direct and observed peer exchanges in classrooms (i.e., Hughes et al., 2001; Dodge, 1983; Coie & Kupersmidt, 1983).

Children's peer experiences may be especially important during early elementary grades. As children carve out their roles and reputations, whom they like, and their peer affiliations (Ladd, 2005), concerns related to fitting in begin to take on an added significance (Osterman, 2000). The developmental significance of children's peer experiences is captured in a relationship features perspective (i.e., Asher & Parker, 1993; Birch & Ladd, 1996). On one hand, children's peer experiences may act as a kind of resource and provide children with a sense of themselves as loveable and worthwhile and a sense that others value and accept them. In this way, peer experiences serve as a type of provision, which may encourage children to engage and participate in classroom activities. In turn, peer experiences that afford higher status may support students' willingness to learn and internalize adaptive classroom behaviors (Birch & Ladd, 1996). On the other hand, children's peer experiences may act as a kind of constraint in that they

can lead children to feel devalued and unimportant, which may inhibit children's social engagement. In turn, negative or undesirable peer experiences may interfere with children's adaptive behavior and learning. When children are afforded the opportunity to experience peer acceptance, peer regard, or peer group membership, they more likely engage and participate in classroom activities and internalize prosocial behaviors (Doll, Zucker, & Brehm, 2004; Birch & Ladd, 1996).

Social reputations as popular and as leader. For the present study, children's social reputations include children's reputation as popular and children's reputation as a leader. Research has documented that Popular-Leader reputations during middle childhood positively predict social competencies during emerging adulthood (Gest, Sesma, Masten, & Tellegen, 2006).

Popularity is defined as those individuals who are perceived by their classmates as being well known and as having many friends (Gorman, Kim, & Schimmelbusch, 2002). Peer nominations of popular represent group perceptions of students' popularity with classmates and are a marker of children's sociability (Gest et al., 2006). In early elementary school, popularity tends to be associated with prosocial interpersonal competencies (Estell, 2007; Xie et al., 2007). Research has shown that with whom children affiliate informs their reputations as popular or unpopular (Rodkin & Farmer, 1996; Xie, et al., 2006) which may enable students to feel respected and valued as student popularity reflects peer regard (Adler & Adler, 1995). For example, children's reputation as popular peaks and declines as they fall into and out of favor with other more popular children (Adler & Adler, 1995; Eder, 1985). A child's reputation as popular is based on the number of peer nominations for popular that child receives. Greater numbers of peer

nominations received for the popular role signifies a greater agreement among classmates that a child is well known and has many friends.

Peer nominations for leader represent group attitudes about children's role as an individual who is considered to have influence over classmates. Scholars have suggested that children's social characteristics and associations with classmates inform their reputations as a leader (Lease, Kennedy, Axelrod, 2002). A leadership reputation advantages children by positioning them to set social rules that other children follow which may support feelings of self-worth and importance (Lease, Kennedy, & Axelrod, 2002). A leadership reputation is based on the number of peer nominations for the leader that child receives. Greater numbers of peer nominations for leader reflect greater consensus among classmates that a given child is a leader.

Peer acceptance. Peer acceptance refers to group sentiments about student likeability. Scholars agree that peer acceptance makes significant and unique contributions to concurrent and long-term social and emotional adjustment (see Asher & Parker, 1989; Parker et al., 1995; Rubin, Bukowski, & Parker, 2006; Sandstrom & Zakriski, 2004). For example, research demonstrates the role of children's peer acceptance in supporting student engagement and in establishing and maintaining children's emerging social behaviors (i.e., Bierman, 2004; Ladd, 2005). Moreover, research has shown that children who are accepted tend to exhibit cooperative, helpful, and prosocial behaviors in the classroom setting (see Asher & McDonald, 2009). Peer acceptance may foster healthy and supportive friendships and positive feelings of self-worth. Peer nomination procedures involving *liked most* and *liked least* nominations are

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used to determine peer acceptance (Coie, Dodge, & Coppotelli, 1982). Higher sores reflect being liked by many and disliked by few.

Social network centrality. Social network centrality refers to the extent to which children are integrated into the peer group system of their classroom (Cairns et al., 1998). Scholars have suggested that consideration of children's peer experiences that do not take peer group dynamics into account is incomplete (Cairns et al., 1998). As a marker of affiliative success (Gest et al., 2001), a central position in the social network may afford children with a stronger social footing in the classroom (Xie & Cairns, 1999). Social network centrality is measured via Social Cognitive Mapping procedures and denotes children's participation in small informal social groups within the classroom social network (Cairns et al., 1998; Gest, et al., 2001). The more times children are named as a member of a peer group, the higher the social network centrality score they receive; higher scores reflect a greater integration in the social network.

Teacher Attunement and Children's Peer Experiences

The dimensions of children's peer experiences discussed above (e.g., social reputations, peer acceptance, and social network centrality) reflect discrete aspects of children's social experiences with their classmates. Studies suggest that the behavioral correlates associated with children's peer experiences undergo significant change over the course of elementary school and beyond (i.e., Cillessen & Mayeux, 2004; Xie et al., 2006) and teachers may have an important role in guiding early peer experiences to be positive and productive. In fact, teachers may support children's early opportunities to experience positive and influential social reputations, peer acceptance, and a central position within the peer group system. Such early peer experiences may afford children

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success in interpersonal relationships later in life (Gest et al., 2006). However, studies have not examined the teachers' role in children's early peer experiences. Gaining a clearer picture about teachers' influence in students' peer experiences during early elementary school may be important for research and classroom practices. Thus, this study includes an examination of the links between teacher attunement and discrete markers of children's peer experiences including children's social reputations as popular and as a leader, children's peer acceptance, and children's social network centrality during the early elementary school years.

Teacher attunement and children's social reputations. Conceptualizations of teacher practices and children's peer relationships propose that teachers influence both peer experiences at the individual level and at the group level (Bierman, 2011; Gest & Rodkin, 2011). At the individual level, Hughes and colleagues (2001) suggest that in the absence of direct experiences, children rely on their indirect experiences with classmates, such as students' reputations. This indicates that managing children's reputations is an important factor for teachers to consider when guiding the classroom context to be supportive and nurturing (Farmer et al., 2011; Gest & Rodkin, 2011). Teachers may support children' positive and productive reputations through their social management practices (Farmer, et al., 2006). For example, when teachers have knowledge of children's peer group memberships they may use this information to organize groups that simultaneously promotes prosocial behaviors and supports more productive reputations (Farmer et al., 2006; Rodkin & Hodges, 2003). As a general strategy, teachers may use a range of criteria other than academic skill to form groups. When teachers create groups around skills other than academic readiness, groups may be more fluid. When groups are

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more fluid and not only based on student academic skills, teachers may arrange groups to advantage particular students by providing them with the opportunity to be seen in a more favorable light by peers. In addition, using diverse criteria to group students may ensure that all students have more occasions to enact a variety of roles with many different classmates. This grouping strategy, for example, may enable teachers to support students' social reputations such as being popular or being a leader (Farmer, et al., 2006). Teacher attunement may be important for such social management practices to be successful (Gest & Rodkin, 2011).

In addition, attuned teachers may create an environment in which classmates engage in adaptive peer processes that afford children more opportunity to develop a reputation as popular or a reputation as leader (Kochenderfer-Ladd & Pelletier, 2008; Farmer, 2000; Rodkin & Hodges, 2003). As a first step, teachers may group students in ways that minimize bullying episodes. This can take the form of ensuring that vulnerable students are placed in groups where their liabilities are minimized and their strengths are maximized which requires teacher attunement to children's peer group memberships (Gest & Rodkin, 2011; Hamm et al., 2011). In such environments, bullying may be less acceptable and all students may have more opportunities to enact socially competent behaviors (Hamm et al., 2011). In particular, vulnerable students may have more opportunities to competently interact with peers and classmates may more likely observe vulnerable peers engaged in competent and productive social interactions. Both benefit student reputations (Bierman, 2002; Farmer, et al., 2006). It may be that in order for teachers to structure a classroom environment that supports children's opportunities to

experience being popular or being a leader an accurate assessment of children's peer group memberships is required (Bierman, 2011; Gest & Rodkin, 2011).

Teacher attunement and peer acceptance. Perspectives on teacher involvement (i.e., Connell & Wellborn, 1991; Furrer & Skinner, 2003; Skinner & Belmont, 1993; Wentzel, 2002; 2010) propose that classrooms in which teachers' relationships are accepting, supportive, and caring more likely motivate students to adopt and internalize prosocial behaviors and attitudes (Skinner & Belmont, 1993; Wentzel, 2002; 2003; 2010). From this perspective, a key aspect of teachers' influence is conceptualized in terms of the extent to which students experience acceptance in their classroom relationships (Chang, 2003; Furrer & Skinner, 2003; Wenzel, 2002; 2003; 2010).

Middle school teachers' socialization goals for students include being responsible, helpful, and cooperative (in Wentzel, 2010). There is little reason to believe that elementary school teachers value different social behaviors than their counterparts teaching in middle schools.

There are a number a ways in which teacher attunement may promote students' experiences with peer acceptance. First, teachers who are attuned to their students' peer group memberships may be more responsive to children's social needs. In turn, children whose teachers are attentive to their social situation by taking into account their peer group memberships may more readily adopt prosocial behaviors emphasized by the teacher including enacting social behaviors that undergird accepting relationships with classmates. Similarly, teachers who are attuned to children's peer group memberships may more likely establish caring environments; peer acceptance is more likely to emerge within responsive classroom contexts (Osterman, 2000). However, little is known about

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the role of teacher attunement to children's peer group memberships in children's peer acceptance especially during the early elementary grades. With this in mind, the current study investigates the extent to which teacher attunement to students' peer group memberships is related to children's peer acceptance.

Teacher attunement and social network centrality. How teachers understand, organize, and respond to the classroom ecology is foundational to the opportunities children have to engage in direct and regular interactions with their peers (Farmer, 2000; Gest & Rodkin, 2011; Rodkin & Hodges, 2003). Supportive peer relationships are believed to emerge out of repeated and enjoyable social interactions (Doll, Song, et al., 2004). When teachers structure classroom groups that bring compatible classmates together, productive peer connections that may not have naturally emerged may be encouraged (Doll, Song, et al., 2004; Rodkin & Hodges, 2003). When teachers are attuned to peer group memberships they may be better able to accurately identify potentially healthy connections between and among students, (Farmer, 2000; Rodkin & Hodges, 2003) and intentionally organize classroom activities to be engaging, supportive and inclusive. Teacher knowledge of children's peer group memberships may be a basic step for teachers to successfully support children's group affiliations among classmates and, thus, their social network centrality (Bierman, 2011; Gest & Rodkin, 2011). Thus, this study will examine the association between teacher attunement and children's social network centrality.

Summary

In summary this study focuses on the concurrent and longitudinal associations among teacher attunement to peer group memberships and children's social experiences

with their peers, including their reputations as popular and as a leader, children's peer acceptance and social network centrality. The concurrent associations between teacher attunement and children's peer experiences may vary in relation to the time of year (i.e., at fall versus at spring). In addition, teacher attunement early in the school year may support children's positive and productive peer experiences later in the school year. In either case, teachers may reinforce existing interaction patterns or create opportunities for new interaction patterns. The current study examines the concurrent and short-term longitudinal associations between teacher attunement and children's social experiences. Distinguishing between the concurrent associations from the short-term longitudinal associations is important in terms of informing research and practice related to teacher influence on children's peer experiences.

Based on conceptual models suggesting teachers organize and manage opportunities in the classroom for students to engage in competent peer exchanges that support children's productive reputations (i.e., Bierman, 2011; Cairns & Cairns, 1994; Farmer, 2000; Farmer, et al., 2011; Farmer et al., 2006), the first aim of the present study is to examine the extent to which teacher attunement to children's peer group memberships was associated with children's social reputations as popular and as a leader concurrently and across the school year. Such findings will extend research and theory on teacher influence to include the role of teacher attunement in supporting children's productive social reputations.

Drawing on Skinner and Belmont's (1993) theory of teacher involvement, teacher attunement to peer group memberships, an aspect of teacher involvement, may support children's social experiences with peer acceptance. Teachers who are attuned to

students' peer group memberships may attend to students' basic psychological need to feel connected to others and establish supportive classroom environments. Children are more likely to enact prosocial behaviors that undergird peer acceptance in classroom environment that are supportive (Wentzel, 2010). The second aim of the present study is to examine the extent to which teacher attunement was associated with children's peer acceptance. Findings will build upon recent research by Hamm and colleagues (2011) and suggest a skill (teacher attunement) elementary teachers can employ to support peer acceptance in the classroom.

Theory suggests teachers support and constrain children's peer affiliations (i.e., Cairns & Cairns, 1994; Hamm & Zhang, 2010); teacher attunement to children's peer group memberships may be related to children's social integration into peer groups in the classroom. The third aim of the present study is to examine the extent to which teacher attunement was associated with children's social network centrality. Such findings will extend theory and research on children's peer groups to include the role of the teacher, and, in particular, the role of teacher attunement in fostering children's integration in peer groups.

Research Hypotheses

> *Hypothesis 1a*: Teacher attunement will be associated concurrently with students' reputations as popular in the fall and in the spring after accounting for children's gender, minority status, and grade.

Hypothesis 1b: Teacher attunement in the fall will be associated with students' reputations as popular in the spring after accounting for children's gender, minority status, grade, and fall nominations for popular.

Hypothesis 1c: Teacher attunement will be associated concurrently with students' reputations as leader in the fall and spring after accounting for children's gender, minority status, and grade.

Hypothesis 1d: Teacher attunement in the fall will be associated with students' reputations as leader in the spring after accounting for children's gender, minority status, grade, and fall nominations for leader.

Hypothesis 2a: Teacher attunement will be associated concurrently with students' peer acceptance scores in the fall and spring after accounting for children's gender, minority status, and grade.

Hypothesis 2b: Teacher attunement in the fall will be associated with students' peer acceptance scores in the spring after accounting for children's gender, minority status, grade, and peer acceptance in the fall.

Hypothesis 3a: Teacher attunement will be associated concurrently with children's social network centrality in the fall and spring after accounting for children's gender, minority status, and grade.

Hypothesis 3b: Teacher attunement in the fall will be associated with children's

social network centrality in the spring after accounting for children's gender,

minority status, grade, and fall social network centrality scores.

CHAPTER 2

LITERATURE REVIEW

Elementary school children look to their peers for acceptance and support as concerns related to fitting in become more central (Osterman, 2000) and they continue to rely on their teachers to successfully navigate the complexities involved in the classroom social system (Farmer et al., 2011). This may be particularly relevant to children during the early elementary grades as they transition into middle childhood. During these early grades in elementary school, teachers may have a unique opportunity to support and guide children's peer experiences to be positive and productive.

Peer group memberships are an aspect of the classroom context to which teachers attend when organizing and managing the classroom environment to support children's competencies that underlie productive peer experiences (Cairns & Cairns, 1994; Farmer et al., 2011; Hamm et al., 2011). Teacher attunement to children's peer group affiliations is a component of the teachers' invisible hand (Cairns & Cairns, 1994), a metaphor used to conceptualize an aspect of the teacher's influence in students' social experiences. The significance of teacher attunement to peer group memberships in children's social adjustment is represented in Skinner and Belmont's depiction of teacher involvement (Hamm et al., 2011). Children who experience less teacher involvement are at greater risk to become disengaged from healthy classroom social processes such as productive peer interactions (Skinner & Belmont, 1993; Wentzel, 2002).

In order for teachers to create contexts in the classroom that support productive peer experiences, teachers may need to be attuned to children's peer group memberships. Teacher attunement may facilitate teachers' ability to arrange the classroom social environment to foster positive and productive peer experiences. Teachers who are attuned to children's peer group memberships may be more effective at using aspects of the peer social dynamics to create and manage opportunities for children to engage in early peer experiences that promote student adjustment. Thus, this study investigates the role of teacher attunement in distinct dimensions of children's peer experiences including children's social reputations as popular and as a leader, children's peer acceptance, and children's social network centrality.

In the following sections, the historical origins of teacher attunement are discussed, the importance of teacher attunement during early elementary school years is reviewed, and the literature that substantiates the role of teachers in enhancing and inhibiting children's productive social experiences in the classroom is examined. To demonstrate the role of teachers in children's peer experiences, literature that supports the association between teacher attunement and children's social reputations as popular and leaders is discussed first. Next, literature that supports a relationship between teacher attunement and students' experiences with peer acceptance is presented. Finally, the literature that emphasizes the potential for a link between teacher attunement and children's social network centrality is reviewed.

Historical Roots of Teacher Attunement to Peer Group Memberships

Bonney (1943; 1947) was among the first researchers to investigate agreement between student choices and teacher judgments regarding children's preferences in the

classroom; Gronlund (1951; 1955; 1956a; 1956b) continued this line of research throughout the 1950's. These studies specifically tested the extent to which teachers' perceptual accuracy in judging children's social status significantly correlated with students' actual sociometric status. In these early studies, teacher judgments were assessed against students' aggregated responses on friendship choices (Bonney, 1947) and on sociometric tests (Gronlund, 1955). According to Gronlund (1955) students have an insider view of the peer social system, and the teacher's view into the peer social system is a skill a teacher acquires to varying degrees. These early studies were concerned with examining the generality of teacher accuracy in judging students' sociometric status (Gronlund, 1955) as well as with making scientifically grounded connections to teacher effectiveness and teacher training (Gronlund, 1955). Moreover, these early studies laid the conceptual groundwork for the importance of children's social status within the peer group and, more importantly, for teachers' knowledge of such social preference patterns among classmates. However, this research did not progress to the point of examining the connection between teacher accuracy and other dimensions of students' social exchanges within the classroom social environment. Furthermore, with its focus on friendship nomination and sociometric status, the research overlooked other features of a teacher's understanding of children's social experiences in the classroom, namely children's peer group memberships within the larger classroom social setting. Sociometric status methods provide information on preferences for affiliations and not on children's actual affiliation patterns (Cairns et al., 1998). Although such instruments assess participation in peer relationships, they do not measure participation in smaller social groups in which children regularly interact (Cairns et al., 1998). In contrast,

network measurement tools such as Social Cognitive Mapping provide information on structural aspects of group connections as well as group dynamics in affiliation patterns (Cairns, Gariepy, Kindermann, & Leung, 1996). In particular, Social Cognitive Mapping methods yield information on peer group affiliations including who hangs around together; the centrality, or embeddedness of an individual within a peer group; the number of these subgroups making up the larger social network; and the individuals who do not belong to any group (Cairns et al, 1996). Such methods provide information regarding the functions of and the dynamics involved in affiliation patterns and group influence.

A handful of recent studies suggest that teachers' actions function as an invisible hand to guide students' opportunities for competent and successful peer interaction (i.e., Chang et al, 2007; Gest & Rodkin, 2011; Hamm et al., 2011; Hughes & Chen, 2010; Luckner & Pianta, 2011) through such skills as their attunement to students' peer group memberships and the classroom social dynamics. This renewed attention to teacher influence takes a new direction, by focusing on teachers' knowledge of children's participation in friendship and peer group networks (i.e., Gest, 2006; Neal et al., 2010; Pearl et al., 2007; Pittinsky & Carolan, 2008). Underlying this focus on teacher attunement are empirical findings that demonstrate the significant role of peer group social dynamics to children's social and emotional adjustment in the classroom and school (i.e., Cairns et al., 1988; Estell et al., 2002; Estell et al., 2003; Farmer, 2000; Farmer et al., 2007; Hamm & Faircloth, 2005).

Interest in teacher attunement to peer group memberships signifies a shift in developmental and educational research, by returning attention to the role of the teacher

in supporting children's classroom-based social experiences. However, this more recent research on teacher attunement has not taken into account the extent to which teacher attunement is a skill that helps early elementary teachers create contexts that support students' social experiences. The present study fills this gap by examining the extent to which teacher attunement relates to aspects of children's peer experiences, including children's social reputation as popular and as a leader, children's peer acceptance, and children's social network centrality.

Teacher Attunement during the Early Elementary Grades

Teachers of the early elementary grades may be in an ideal position to develop an accurate understanding of children's peer group memberships and classroom social dynamics given that classrooms are largely self-contained settings in which students interact with the same classmates and stay with the same teacher across a school year. Moreover, early elementary grade teachers may be particularly advantaged given the focus on social adjustment during the early elementary grades (Howes & Ritchie, 2002). However, elementary school teachers tend to possess only a moderate accuracy in identifying their students' peer group memberships, which suggests that teachers in 2nd-5th grade may miss important connections among classmates (Gest, 2006; Neal et al., 2010; Pearl et al., 2007). This deficit in teacher attunement to peer group memberships is particularly evident at the beginning of the school year but continues to persist during the latter part of the school year as well (Pearl et al., 2007).

Furthermore, the beginning of the school year is the time during which aspects of peer group memberships begin to take shape and have lasting influence on students' behaviors (Kindermann, 1993; 2007). To the extent that teachers facilitate new peer

contacts and support established peer connections at the beginning of the school year, students' social adjustment is enhanced (Ladd, 1990). Highly attuned teachers may be in a better position to take advantage of evolving peer groups so as to foster children's opportunities in productive peer contacts and, thus, promote positive social experiences in the classroom. For example, when seating charts take into account peer dynamics, peer acceptance as well as new affiliations among classmates can be positively affected (van den Berg, Segers, Cillessen, 2011; Gronlund, 1959). It stands to reason that a lack of knowledge about important aspects of the classroom dynamics such as children's peer group memberships may make it more difficult for early elementary teachers to successfully structure and manage such social arrangements. However, little is known about the concurrent relationships between teacher attunement and children's peer experiences in the fall and spring. Even less is known about the extent to which teacher attunement at the beginning of the school year is associated with children's social experiences in the classroom at the end of the school year, including children's social reputations as popular and as leaders, their peer acceptance, and their social network centrality.

Teacher Attunement and Students' Social Reputations

Peer reputations are a source of information from which children draw when direct and regular interactions are not frequent (i.e., Hymel, Wagner, Butler, 1990; White & Jones, 2000). That is, social reputations can provide children information about classmates in the absence of direct and regular peer exchanges. Although children's social behaviors underlie their reputations (Dodge, 1982), reputations bias children's attention and reactions to a classmate's behaviors (Bierman, 2004; Hymel et al., 1990;

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White & Jones, 2000). For example, a popular and a leader reputation can positively bias children's evaluations of classmates (Adler & Adler, 1998; Estell et al., 2002; Gest et al., 2006; Lease, Musgrove, Axelrod, 2002). Social reputations such as being considered popular or a leader are productive in that they are a signal that children are mastering the developmental task of fitting in with their peer group (Gest et al., 2006; Lease, Musgrove, & Axelrod, 2002).

Teachers' reactions to the classroom social dynamics contribute to how children perceive one another, which, in turn, contributes to children's social adjustment outcomes (Gest & Rodkin, 2011; Farmer, 2000; Rodkin & Hodges, 2003). For example, Chang et al. (2007) found that teachers' dislike for aggressive students resulted in their lower peer acceptance. Similarly, White and Jones (2000) found that negative teacher feedback exacerbated peer perceptions of disruptive students with negative reputations. Although White and Jones (2000) did not find evidence that positive teacher feedback was strong enough to counter negative reputational effects on classmates' perceptions, the results suggest that consistent positive acknowledgement from the teacher over time could have a positive effect on children's reputations. Together, these studies illustrate that teachers can reinforce existing reputations or provide opportunities for new reputations to emerge (Chang, et al., 2007; Mercer & DeRosier, 2008; White & Jones, 2000). This may be particularly relevant in the early elementary grades as younger children are more likely to adopt their teachers' reactions which can contribute to promoting, sustaining, or possibly altering children's reputational status with their peers (Chang et al., 2007; Farmer et al., 2006).

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Similarly, young students may depend on their teachers to organize and manage social opportunities in which children's chances of having a popular reputation or children's chances of being a leader are increased. Teacher attunement may enable teachers to create an environment in which children are more likely to experience being nominated as popular or being nominated as a leader. To this point, Hamm et al. (2011) found that teachers who participated in professional training that included attention to social dynamics processes and adolescent development were rated as having more successful classroom management of social dynamics and evidenced greater attunement to students' peer group affiliations. In turn, students reported they would enact competent and socially responsible behaviors related to protecting their peers from bullying when teachers had a high attunement to students' peer group memberships. These results indicate that teacher attunement may enable teachers to manage an environment that encourages children to endorse socially competent and responsible behaviors related to bullying. Extending this rationale to include children's social reputations suggests that teacher attunement to children's peer group memberships may enable teachers to arrange an environment in which children have more opportunities to experience a reputation as popular and as a leader (Farmer, 2000; Farmer et al., 2006; Gest & Rodkin, 2011). However, there are no studies that examine the impact of teacher attunement on children's social reputations as popular or as a leader. With this literature analysis in mind, it is expected that teacher attunement will be associated with students' reputation as popular and as a leader concurrently in the fall and spring and longitudinally from fall to spring.

Teacher Attunement and Children's Peer Acceptance

A long line of developmental research underscores the significance of children's behavior and peer acceptance in the classroom (i.e., Asher & Parker, 1989; Parker et al., 1995). Students who experience acceptance tend to exhibit cooperative, helpful, and kind social behaviors in classrooms (i.e., Asher & McDonald, 2009). Researchers suggest that students in classrooms that promote accepting and warm relationships may be more open to adopting and internalizing prosocial stances endorsed by the teacher (Chang et al., 2007; Wentzel, 2002b). In turn, positive feelings about classroom relationships can foster students' liking and enjoyment of school (Gest, Welsh, & Domitrovich, 2005).

Studies suggest that aspects of teacher-student relationships are associated with children's peer acceptance (Howe et al., 1994; Hughes et al., 2001). For example, Hughes et al (2001) found that students who had negative relationships with their teachers were less likely to be accepted by their peers after taking into account the impact from children's aggressive behavior. In addition, when teachers express a high level of warmth and support for students, the negative experiences aggressive students have with peer acceptance are attenuated (Chang, 2003). The suggestion is that teacher-student relationships that teachers model to students may promote peer acceptance in the classroom.

Extending these findings to teacher attunement suggests that teacher attunement may provide teachers with an alternative means through which to promote productive behaviors and positive social processes that underlie peer acceptance among classmates. That is, teachers who are attuned to children's peer group memberships may create classroom contexts that support prosocial behaviors that underlie peer acceptance. For

example, Hamm et al. (2011) found that when teachers were highly attuned to children's peer group memberships, middle school students reported a higher sense of school belonging across the sixth grade transition year. Peer acceptance is related to students' sense of belonging at school (Osterman, 2000) and to competent social behaviors and productive classroom processes more generally. Along these lines, van den Berg, Segers, & Cillessen (2011) conducted a field experiment in which children who did not like each other were seated closer together for several weeks. This field study demonstrated that changing children's seating assignments based on liked most and liked least nominations improved the likeability of the most negatively perceived students in experimental classrooms. Neither peer group memberships nor teacher attunement to children's peer group memberships were assessed in this field experiment. However, it stands to reason that teacher attunement to children's peer group memberships would enable teachers to manage aspects of the physical environment of the class to maximize peer acceptance and minimize peer rejection (see also, Kindermann, 2011). Together these findings suggest that teachers can promote classroom contexts that support children's experiences with peer acceptance. In fact, an accurate understanding of children's affiliations patterns such as their peer group memberships may be necessary for teachers to effectively arrange affective and physical aspects of the environment to promote acceptance. Drawing on these findings, it is proposed that teacher attunement will be associated with children's peer acceptance concurrently in the fall and spring and across the school year from the fall to spring.

Teacher Attunement and Students' Social Network Centrality

How teachers' organize the classroom may narrow or broaden the pool from which children's peer affiliations develop and are sustained (Cairns & Cairns, 1994; Hamm & Zhang, 2010). When teachers have an understanding of children's peer group memberships, they may more effectively identify potentially productive peer affiliations. The effectiveness of grouping strategies that promote new friendships, sustain established peer affiliations, or even separate unhealthy connections depend on teacher awareness of children's peer group memberships (Rodkin & Gest, 2010; 2011). By taking children's peer group memberships into account, teachers may more likely coordinate social opportunities among classmates that promote children's social integration into healthy and sanctioned peer affiliations (Farmer, 2000; Rodkin & Hodges, 2003). This may be particularly important for younger students who rely more on and are more open to adult intervention, including identifying potential affiliates and creating opportunities to engage in interactions that support group connections (Ladd, 1990). Teacher attunement is one class of cognition that teachers develop, which may impact aspects of children's peer affiliations (Hamm et al., 2011; Neal et al., 2010; Pearl et al., 2007; Pittinsky & Carolan, 2008). However, research has not focused on teacher cognitions in relation to children's social network centrality, which is a key dimension of students' peer experiences as it represents children's integration within peer groups.

Teacher attunement may operate by influencing teacher practices related to promoting or inhibiting affiliations which may support children's participation in peer groups and, more specifically, children's social network centrality. To this point, Gest and Rodkin (2011) found that when teachers reported that they incorporated student peer

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dynamics into their grouping decisions, that is, by separating students with behavior problems, the overall rate of peer acceptance increased in the classroom. Teaching practices such as separating students with behavior problems or encouraging friendships requires teachers to attune to students' peer group memberships (Gest & Rodkin, 2011). When teachers incorporate information about children's peer group memberships into their teaching decisions including their grouping practices, children may have more success in their peer interactions which may support children's social integration and participation in a peer group.

Other studies suggest that children who are in classrooms that offer greater opportunity for interaction among a wide array of classmates are more sociable (van den Oord & Rossem, 2002). Similarly, van den Berg et al. (2011) found that there were significant changes in with whom children wanted to affiliate from pre-test to post-test when seating arrangements were adjusted to reflect less distance between students with mutual liked least nominations in contrast to the non-significant changes in children's desired affiliations in control classrooms where seating arrangement were not altered. It stands to reason that teacher attunement to children's peer group memberships would enable teachers to organize opportunities for children to successfully interact (Rodkin & Hodges, 2003). Together, these research studies point to the possibility that teacher practices that require attunement to students' peer group memberships may inhibit detrimental or promote beneficial peer affiliations. Teachers' understanding of classroom social dynamics including children's peer group memberships may position teachers to foster and support students' integration into peer groups that are sanctioned by the teacher (Doll, Song, et al., 2004; Rodkin & Hodges, 2003). Drawing on this literature, it

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is proposed that teacher attunement will be associated with students' social network centrality concurrently in the fall and spring and longitudinally from fall to spring.

The Current Study

The potential for teachers to support productive peer interactions has a long history in the literature and continues to be an important topic in recent research (see, for instance, *Journal of Applied Developmental Psychology,* special issue, 2011). Cairns and Cairns (1994) conceptualized the teacher's role in shaping children's peer adjustment with the metaphor of a teacher's "invisible hand." One element of the teacher's "invisible hand" may be teachers' accurate understanding of children's peer group memberships, referred to as teacher attunement to children's peer group memberships. Teacher attunement is a skill that enables teachers to take advantage of children's peer group memberships to promote children's positive peer experiences in the classroom (Hamm et al., 2011). When teachers are attuned to their students' peer group memberships, they may be in a better position to create responsive and supportive classroom contexts in which children's peer experiences are adaptive and positive. Early elementary school is a time when children look to their peers to feel liked and part of a group and, at the same time, turn to their teachers for guidance in navigating the social demands presented in the classroom. However, research is under-developed regarding the role of teacher attunement in the social transactions that involve children's peer affiliations in early elementary classrooms.

Thus, this study addresses the following research questions and hypotheses:

Question 1: Is teacher attunement to peer group memberships associated with students' reputations as popular and as a leader?

Social reputations are a source of information that children use to make judgments about their classmates (Hymel et al., 1990; White & Jones, 2000). A social reputation as popular and as a leader affords social prestige and may be an indication that students are successfully affiliating with their peers (Lease, Kennedy, et al., 2002; Gest et al., 2006). Research demonstrates that teacher's affective and behavioral responses to young children's behaviors impact students' social reputations (i.e., Chang et al., 2007; White & Jones, 2000). Likewise, young children may look to their teacher to organize and facilitate opportunities for students to be perceived as popular or as a leader. Teacher attunement to children's peer group memberships may represent a pathway that teachers can utilize, intentionally or unintentionally, to influence children's social reputations as popular and as leader. To date, no studies have examined the role of teacher attunement in facilitating children's reputations as popular or as a leader.

Hypothesis 1a: Teacher attunement will be associated concurrently with students' reputations as popular in the fall and in the spring after accounting for children's gender, minority status, and grade.

Hypothesis 1b: Teacher attunement in the fall will be associated with students' reputations as popular in the spring after accounting for children's gender, minority status, grade, and fall nominations for popular.

Hypothesis 1c: Teacher attunement will be associated concurrently with students' reputations as leader in the fall and spring after accounting for children's gender, minority status, and grade.

Hypothesis 1d: Teacher attunement in the fall will be associated with students' reputations as leader in the spring after accounting for children's gender, minority status, grade, and fall nominations for leader.

Question 2: Is *teacher attunement to children's peer group memberships associated with children's peer acceptance?*

Prosocial behaviors underlie children's peer acceptance (i.e., Asher & McDonald, 2009). However, elements of the classroom environment shape children's experiences with peer acceptance (i.e., Osterman, 2000). As the primary adult in early elementary classrooms, teachers may have a unique opportunity to create a classroom environment that promotes peer acceptance (i.e., Farmer et al., 2011). Teachers who are responsive to and involved in students' experiences create contexts in which supportive and caring relationships emerge (Furrer & Skinner, 2003; Gest et al., 2005; Murray & Greenberg, 2000; Skinner & Belmont, 1993; Wentzel et al., 2010). Teacher-student relationships may represent one pathway through which teachers influence children's peer acceptance (i.e., Chang et al., 2007), but teacher attunement may embody an alternative means through which teachers affect peer acceptance. When teachers accurately attune to students' peer group memberships, teachers may make use of children's affiliation patterns to organize the classroom environment to encourage acceptance among classmates. However, little is known about the extent to which teacher attunement during the early elementary grades enables students to experience greater peer acceptance.

Hypothesis 2a: Teacher attunement will be associated concurrently with students' peer acceptance scores in the fall and spring after accounting for children's gender, minority status, and grade.

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Hypothesis 2b: Teacher attunement in the fall will be associated with students' peer acceptance scores in the spring after accounting for children's gender, minority status, grade, and peer acceptance in the fall.

Question 3: Is teacher attunement to peer group memberships associated with students' social network centrality?

Social network centrality, which is based on children's affiliations within the broader peer group system, is a marker of the extent to which students are embedded into the classroom social network (Gest, 2006). Although children develop group affiliations via direct social interactions (i.e., Dodge, 1983; Snyder, et al., 1996), teachers' decisions in the classroom place further constraints on with whom children affiliate (Cairns & Cairns, 1994; Hamm & Zhang, 2010). Moreover, studies demonstrate that classroom practices such as children's seating charts or placement in groups impact their peer experiences (Gest & Rodkin, 2011; van den Berg, et al., 2011). Scholars suggest that the extent to which teachers are attuned to children's peer group memberships may be critical for the success of such teaching practices (Gest & Rodkin, 2011). Teacher attunement to children's peer group memberships may enable teachers to arrange direct social experiences among compatible classmates who may otherwise not frequently interact with one another. From successful and productive classroom social exchanges, children may become emdedded into healthy affiliations that teachers sanction (Doll, Song, et al., 2004; van den Oord & Rossem, 2002). However, teacher attunement has not been examined in relation to children's social network centrality.

Hypothesis 3a: Teacher attunement will be associated concurrently with children's social network centrality in the fall and spring after accounting for children's gender, minority status, and grade.

Hypothesis 3b: Teacher attunement in the fall will be associated with children's social network centrality in the spring after accounting for children's gender, minority status, grade, and fall social network centrality scores.

CHAPTER 3

METHODS

The proposed study is part of a larger research intervention project, Whole

Schools (funded by the U.S. Department of Education, Institute for Education Sciences),

aimed at raising teacher awareness about the developmental implications of classroom

social dynamics for children's social adjustment for which data have already been

collected. The project followed a randomized controlled trial design. Matched pairs of

schools were randomly assigned to intervention or control condition. Teachers in

intervention condition schools received a brief professional development session at the

beginning of each year which was then followed up as needed with individual and small

group consultations with project intervention staff. Teachers in control schools were

offered the program materials after the completion of the project. Preliminary multilevel

analyses were conducted to test for intervention differences in the proposed hypotheses.

This included testing for intervention main effects and intervention by teacher attunement

interactions. There was one main effect for intervention found and a few intervention by

teacher attunement differences found in the analyses. To account for significant

differences between intervention and control classrooms, intervention condition as a

class-level variable was included in all of the analytic models and when significant are

reported in the results chapter.

Data sources for the current study drew on multiple methodologies from multiple

informants. Peer nominations were used to obtain participating children's peer

experiences; information on children's peer group memberships was obtained from student and teacher reports.

The current study examined the associations of teacher attunement with selected dimensions of children's peer experiences, including children's social reputations as popular and as a leader, children's peer acceptance, and children's social network centrality. Multi-level modeling techniques including Hierarchical Generalized Linear Modeling (HGLM) and Hierarchical Linear Modeling (HLM) procedures were used to examine concurrent and longitudinal associations between teacher attunement and children's peer group memberships and children's peer experiences in first through third grades.

Sample

Data collection began in the spring of 2006 and extended through the spring of 2009. For the current study, data associated with a single academic year, from the fall 2006 (Time 1) and spring 2007 (Time 2), were analyzed.

Students

Data were drawn from the sample of a larger research study, which included students in 1st through 3rd grade from 4 elementary schools located in a mid-size city in the southeastern United States. Parental consent was obtained for 63.9% of eligible children at Time 2. Sample characteristics of the children in the study largely mirrored those of the general population of schools; 41.8% of all students were eligible for free and reduced lunches through the National School Lunch Act. A total of 276 consented students participated in the data collection at both time points. Data from school records indicate that there were 141 Females (51%) and 135 males (48.9%). There were 73 first

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graders, 120 second graders, and 83 third graders. Two hundred nine were White (75%), 33 were African American (12%), 21 were Hispanic (7.6%), and 13 were other (4.7%). Minority students (24.3% of the sample) were collapsed into one group. Survey completion rates were 98% for students.

Teachers

Twenty- eight teachers in first through third grade participated in the research study during the 2006-2007 school year. The survey completion rate was 93% for teachers. Teacher-generated peer group data was missing for 8 teachers at Time 1 and 5 teachers at Time 2. Peer group data was available from 20 teachers for both time 1 and time 2. There were 6 first grade teachers, 8 second grade teachers, and 6 third grade teachers. Nine teachers participated in the intervention. The majority of the teachers were female and White.

The statistical analyses reported in this study were based on usable peer group data from 20 teachers and 276 consented students.

Procedures

Following a well-established research protocol, data were collected in the fall of 2006 near the beginning of the school year and in the spring of 2007 near the end of the school year. Informed consent was obtained from students' parents or legal guardians via letters sent home in both English and Spanish, where appropriate. All consented participants were told that their answers would be kept confidential, were asked to work alone, and were informed that they could stop at any time without penalty. Consented participants in the first grade were individually interviewed; consented second and third grades were administered the surveys in a group format. Trained project staff

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accompanied first grade participants from their classrooms to the library, and administered the interview at a private table. Second and third grade consented students reported to the cafeteria as a group, and were assigned alternating seats at predetermined lunch tables. A trained administrator read the instructions for completing the survey aloud, while trained graduate assistants circulated and assisted students individually, as needed.

Teachers completed brief student assessments for each consented student in their classroom. Teachers were financially compensated, and students received a pencil with the logo of the university for participating in this study.

Intervention Condition

The data for the present dissertation is drawn from a longitudinal study that included a teacher professional development component. The program focused on supporting teachers' assessment and use of classroom social dynamics. Specifically, the intervention included in-service trainings, face-to-face consultation, and electronic consultation on assessment and use of social dynamic processes to promote supportive and inclusive classroom contexts for all students. The in-service training consisted of developmentally informed training in social dynamics processes including assessing classroom social dynamics, supporting positive peer interactions, and integrating students with disabilities and children at-risk into the classroom peer system. The face-to-face consultation process included monthly grade-level meetings where individual cases were discussed and social dynamics interventions were designed and intervention progress was monitored. The electronic consultation component was provided on an as-needed basis to individual teachers and as a means to follow-up on issues raised in the face-to-face

meetings. Dummy codes were applied to the intervention condition; a score of "1" was assigned to teachers in intervention schools and a score of "0" was assigned to teachers in control schools. For the current study, the intervention condition was included as a predictor variable in the modeling techniques described below to account for possible intervention effects on the outcome variables of interest.

Study Measures

     Social cognitive mapping. Social Cognitive Mapping (SCM) procedures were used to measure two constructs in this study: teacher attunement and students' social network centrality scores. Student- and teacher-generated data on student's peer group affiliations were used to determine teacher attunement; student-reported data on students' peer group affiliations were used to determine social network centrality (see below for further explanation). SCM procedures were used with students to identify student peer group memberships in each classroom (student SCM). The student-generated SCM data were used as the basis for determining how accurately teachers identified students' peer groups (teacher SCM).

     The SCM procedure involved a series of steps in data collection and processing. First, in student surveys, students were asked, "Are there any kids in your class who hang around together a lot?" If they answered "yes," they were then given a further prompt to name all the groups that they can think of. Finally they were asked "Are there some kids who don't seem to have a particular group, who tend to stay by themselves a lot?" At this stage, teachers were asked, "Please write the names of any kids in your class who hang around a lot together." Participants were asked to write first and last names of group members from free recall, and were told that they could include a student in more than

one group. For the current study, only primary group memberships were used. Study participants and study non-participants could be reported as members of peer groups. Non-participants were included in the initial SCM calculations, but were excluded from the data analyzed for the present study. In addition, if students were nominated into a peer group but did not appear on the class rosters, school staff were contacted about any discrepancies. If students were nominated who did not match up-to-date roster information, who were from another class, grade, or were only identified by first name, they were excluded from the SCM procedures. This rarely happened.

The student procedures included asking students to report on peer group affiliations within their classrooms, not just for their own peer group. The underlying assumption is that an individuals' grasp of the social structure reaches beyond their own direct experiences. In fact, asking individuals to report on the social structure outside of their own personal circles generates highly similar results across participants (Cairns & Cairns, 1994). Participating students were asked to limit their nominations of individuals and groups to students in their classroom, because children in elementary schools are members of self-contained classrooms and rarely change teachers or interact with different classes or grade levels (Farmer & Cairns, 1991). Following the same procedures as used for students, teachers were also asked to only report on the peer group memberships of students in their classrooms.

Second, for each classroom, a list of student-generated peer groups and a separate list of teacher-generated peer groups from consented participants were created and entered into SCM computer software program (SCM version 4.0; Leung, 1998). For the student SCM analysis, this software is used to aggregate the student nominations entered

to create an overall picture of the student generated peer groups. Research has found that when student reports are aggregated, reliable and valid representations of group affiliation patterns is generated (Cairns et al. 1996). Parallel procedures were used for student- and teacher-generated data, but the teacher-generated data were not aggregated across teachers and student SCM nominations and teacher SCM nominations were never combined to determine one report of peer group affiliations in one classroom.

Third, the SCM 4.0 program was used to process the student-generated data. The program yields three matrices (the *recall* matrix, the *co-occurrence* matrix, and the *correlation* matrix), a list of peer groups, and the total number of nominations for each peer group member received. In the *recall* matrix the clustering of individuals is reported. This report provides information on who nominated specific students into each peer group. In the *co-occurrence* matrix, the number of times a person is nominated with every other student in the classroom is presented. SCM-determined peer groups are also presented in the co-occurrence matrix. In the *correlation* matrix, the likelihood of a student being nominated with every other possible student in the class is reported. Researches indicate that correlations $r \geq .40$ are significant and were used in the present study to help determine peer group memberships (Cairns, Perrin, & Cairns, 1985). What results is a report of the student-SCM determined peer groups. As recommended as part of the SCM procedures (Cairns et al., 1998), SCM reported peer groups were evaluated by the author to confirm SCM-determined peer groups. For the teacher-generated data, the SCM program yields a list of the teacher-identified peer groups.

Observational research on classroom interaction patterns and survey data has validated the peer group data yielded by the SCM procedures (Cairns & Cairns, 1994;

Cairns, Leung, Buchanan, & Cairns, 1995; Gest, Farmer, Cairns, & Xie, 2003; Rodkin et al., 2000*). High short-term test-retest stability of peer groups (90% of members remain in peer groups over this time period) has been found (Cairns et al., 1995). Research comparing data derived via SCM procedures with other well-established methods for determining social organization, affiliation, and centrality has demonstrated the validity of SCM procedures. In addition, peer groups have been shown to remain similar from one year to the next (Cairns et al., 1995).

Teacher attunement. The first phase in assessing teacher attunement followed the procedures outlined in Hamm et al. (2011). Student-generated SCM data were used as the gold standard from which to compare the teacher generated SCM groups. These comparisons were used to determine two agreement scores: a *teacher attunement to peer group* index and a *teacher attunement to individual student's peer group membership* score.

The teacher attunement to peer group index. The *teacher attunement to peer group* index is the proportion of students in each student-generated peer group a teacher accurately identifies. A *teacher attunement to peer group* score was defined as the total number of students the teacher correctly nominated into a peer group, divided by the total number of students in the student-identified group. A *teacher attunement to peer group* score was calculated for each student generated peer group within each classroom. To account for possible differences in the size of groups nominated by students versus the teacher, and the possibility that teacher attunement would be associated with group size, procedures outlined by Pearl et al (2007) and followed by Hamm et al (2011) were employed in the present study. Following these procedures, each member of a student identified peer group was assigned a *teacher attunement to peer group* score. For this

index, children in the same peer group received identical *teacher attunement to peer group* scores. This attunement score corresponded to how accurately the teacher identified the members of each student-identified peer group. This score ranges from 0 to 1.00. This index was used to calculate the *teacher attunement to individual student's peer group* measure used in the present study.

    Teacher attunement to individual student's peer group score. The *teacher attunement to peer group* score was used to calculate a *teacher attunement to individual student's peer group membership* score. Procedures outlined by Leung (personal communication, December 15, 2010) were followed to calculate a *teacher attunement to individual student's peer group membership* score. A *teacher attunement to individual student's peer group membership* score was defined as the total number of membership connections the teacher accurately identified for each pair of students in each student-generated SCM peer group divided by the total number of students in that student-generated peer group minus 1. A *teacher attunement to individual student's peer group membership* score was calculated for each member of a student-generated peer group. Children in the same peer group could receive different *teacher attunement to individual student's peer group membership* scores. This score ranges from 0.0 to 1.0. For example, if a student-generated peer group consisted of 4 members, each member would have the potential of being identified with three peers (the total-1). If the teacher accurately identified a connection between two of those students and missed the peer associations of the other two members, the students who were accurately identified would receive a *teacher attunement to an individual student's peer group membership* score of 1/3 or .33 and the other two students would receive a score of 0/3 or 0. This attunement score

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reflected how accurately a teacher identified each student's membership in that student's peer group. The teacher attunement to an individual student's peer group membership score was used as the teacher attunement variable.

Dependent Measures

Social network centrality. Social cognitive mapping procedures were used to derive social network centrality scores. After the student-generated peer groups were identified, students' individual social network centrality scores were derived. *Individual centrality* was used as the index for a student's classroom social network centrality. Individuals are categorized as having nuclear, secondary, or peripheral network centrality status. An *individual's social network centrality* score was calculated for each participant from the total number of times a child was named to any peer group and was standardized within classrooms and by sex. The more times an individual was named to any group, the higher the individuals' social network centrality. Since children categorized as secondary or peripheral are not central, it is conceptually reasonable to collapse these two groups into one group that reflects not being central while the nuclear group reflects centrality. Thus, for analyses, scores for this indicator were dichotomously coded. A score of "1" was assigned to students who had nuclear social network centrality to reflect centrality and a score of "0" was assigned to students with secondary or peripheral social network centrality to reflect not central.

Peer acceptance. Peer acceptance was measured following well-established nomination procedures outlined by Coie, Dodge, and Coppotelli (1982). Participating students were asked to nominate "three classmates you like most" and "three classmates you like least." Liked Most (LM) nominations were summed and standardized within

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classrooms. Like Least (LL) nominations were summed and standardized within classrooms. A peer acceptance score was calculated for each participant by subtracting the standardized Liked Least nomination scores from the standardized Liked Most score. This yields a continuous measure of peer acceptance where high scores reflect being liked by many and disliked by few and low scores reflect being liked by few and disliked by many.

Test-retest stability has been shown to be acceptable and comparable to other rating methods (Terry & Coie, 1991). Research has shown that the short-term reliabilities range between .60 and .90 (Bukowski & Newcomb, 1984). Moderate to high long-term stability and good test-retest reliability has been verified in a meta-analysis of studies that used sociometric status methods (Jiang & Cillesen, 2004).

Social reputations as popular and as leader. Students' perceptions of classmates' social reputation as popular and as leader were measured using a peer nomination procedure outlined by Farmer, Rodkin, Pearl, and Van Acker (1999). Students were provided with descriptor items that were designed to enhance comprehension and minimize negative concepts of peers. The descriptors use to assess children's social reputations as popular and leader included "Popular. Some kids are very popular with their peers. That is, many classmates like to play with them or do things with them." "Leader. This person gets chosen by others as the leader. Other people like to have this person in charge." Students were instructed to name up to three of their peers for each behavioral descriptor, and were told that they may name the same person for more than one descriptor and that they may nominate themselves. Self-nominations were not included in the nomination variables. For each social reputation assessed, two scores

were calculated: the count and the proportion scores. The count measure was defined as the total number of nominations participants received for each behavioral descriptor assessed. The proportion measure was defined as the total number of nominations participants received for each item on the peer behavioral assessment divided by the total number of possible nominators (all participants in class). Because children receive few nominations, this calculation yields a small number. A linear transformation is performed and scores are multiplied by 1000. This linear transformation does not change the meaning of the score; it makes the numbers easier to interpret (Estell, Farmer, & Cairns, 2007; Estell et al., 2008). Moderate to high three-week test-retest reliability (e.g., .72-.93) have been found with individual nomination items (Farmer et al., 1999).

Data Reduction

Given the negatively skewed nature of the teacher attunement variable (included in the descriptive section in the results chapter), each student's teacher attunement scores were classified according to the level of a teacher's attunement to a student's peer group memberships in relation to the average teacher attunement score. Extending past research in which children were classified into groups using a similar criteria (i.e., Farmer et al. 2002), teacher attunement scores that were half a standard deviation below the mean were identified as Low Teacher Attunement, and scores that were half a standard deviation above the mean were labeled as High Teacher Attunement. All other scores that fell close to the mean were identified as Moderate Teacher Attunement (see table 3). The goal for creating these groups was to retain the within teacher variation and to attend to the skewed nature of this variable. This goal was viewed as appropriate given that the

primary aim of the present study was to examine variation in children's peer experiences as a function of teacher attunement.

Each student received a single teacher attunement score; each teacher may have had a range of attunement scores indicating a higher attunement to some students' peer group memberships than to other students' peer group memberships. Descriptive information about the recoded attunement score is included in the Results chapter.

Data Analysis Strategy

Classrooms are social contexts in which students' social reputations and positions of social status develop. Differences in teacher practices can create variation within and between classroom contexts that support or inhibit the development of a child's reputation and social position within the classroom network. Children's social reputations and social status in the classroom are not independent observations and represent a nested data structure that can vary within and between teachers. Multilevel modeling procedures were employed in this study to account for the shared variance within teachers by separating the total variance of each dependent variable into between- and within teacher components. Hierarchical Generalized Linear Modeling (HGLM) for the nomination and dichotomized outcomes (i.e., peer nominations of popularity, peer nominations of leader, and social network centrality) and Hierarchical Linear Modeling (HLM) for continuous dependent variables (i.e., peer acceptance) were used to account for the nested structure of the data.

HGLM procedures. The following hypotheses requiring HGLM analytic techniques were proposed:

Teacher attunement will be associated concurrently with students' reputations as popular in the fall and in the spring after accounting for children's gender, minority status, grade, and intervention condition.

Teacher attunement in the fall will be associated with students' reputations as popular in the spring after accounting for children's gender, minority status, grade, fall nominations for popular, and intervention condition.

Teacher attunement will be associated concurrently with students' reputations as leader in the fall and spring after accounting for children's gender, minority status, grade, and intervention condition.

Teacher attunement in the fall will be associated with students' reputations as leader in the spring after accounting for children's gender, minority status, grade, fall nominations for leader, and intervention condition.

Teacher attunement will be associated concurrently with children's social network centrality in the fall and spring after accounting for children's gender, minority status, grade, and intervention condition.

Teacher attunement in the fall will be associated with children's social network centrality in the spring after accounting for children's gender, minority status, grade, fall social network centrality scores, and intervention condition.

A series of concurrent and longitudinal analyses employing multi-level modeling techniques were conducted. Because the dependent variables were not continuous, HGLM procedures were carried out to model the concurrent and longitudinal within-

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teacher probability that students with low and moderate teacher attunement versus students with high teacher attunement were nominated by their peers as popular and as leaders, and would occupy a socially central position within the classroom social network. The concurrent analysis accounted for student demographic characteristics including dummy-coded variables for gender (female = 1), minority status (White = 1), and grade, which included $1^{st} - 3^{rd}$ grades (1st grade served as the comparison) as well as intervention condition (intervention = 1). The longitudinal analysis accounted for the contributions of child demographic characteristics, baseline scores on each of the dependent measure, and intervention condition.

First, an unconditional model was estimated to partition the total variance in each of the dependent variables into Level 1 (within-teacher) and Level 2 (between-teacher) components. The variance at Level 1 is fixed with a value of $(\pi)^2/3$ in HGLM (Snijders & Bosker, 1999) and the Intraclass Correlation Coefficient (ICC), which represents the ratio of Level 2 (between–teacher) variance to the total variance in a given dependent variable, is not meaningful. Calculating ICCs is not a necessary step in modeling non-linear relationships as it is when modeling linear relationships (see Lee & Burkam, 2003). Thus, ICCs are not reported for the models estimated in HGLM.

For the dependent measures for which HGLM methods were employed, a "Student Controls" model was initially estimated to evaluate the relationship of student-level variables including child characteristics observed at Level 1 and teacher-level intervention condition at Level 2 to the number of nominations students are expected to receive for popular or for leader concurrently and longitudinally. In the concurrent Student Controls model, gender, minority status, and 2nd grade and 3rd grade were entered

at Level 1 and intervention condition was entered at Level 2. In the longitudinal Student

Controls model, gender, minority status, grade, fall scores on each of the dependent

measures were entered at Level 1 and intervention condition was entered at Level 2. The

concurrent Student Controls model was used to estimate within- teacher association

between student demographic characteristics and each of the dependent measures after

accounting for intervention main effects. The longitudinal Student Controls model was

used to estimate the within-teacher association between student demographics and each

of the dependent measures after accounting for fall scores on the dependent measures and

intervention main effects on the outcome variables. The intervention condition at Level 2

was included in the Student Controls model in order to account for intervention main

effects. All predictors in the Student Controls models with the exception of the

intervention condition were grand mean centered. Grand mean centering does not change

the parameter estimates, it assists in interpretation (Snijders & Bosker, 2000). Centering

variables enables the intercept to be interpreted as the predicted outcome score for an

"average" student who is female, white, and in either 2nd or 3rd grade.

Next, an "Attunement" model was estimated which included entering low teacher

attunement and moderate teacher attunement as fixed effects at Level 1. High teacher

attunement served as the comparison group. The teacher attunement variables were grand

mean centered and entered at Level 1 in each of the models estimated for the fall and

spring concurrent analyses and for the longitudinal models. The Attunement model was

used to estimate the concurrent relationship of the teacher attunement variables observed

at Level 1 to the number of peer nominations for popular and leader that participants

were expected to receive after including child demographic and intervention effects at

each time point. The longitudinal Attunement model evaluated the relationship of the fall teacher attunement variables observed at Level 1 to the number of popular and leader nominations that participants were expected to receive in the spring after accounting for child demographics, baseline scores on each of the dependent measures, and intervention condition.

Finally, an "Intervention by Attunement" model was estimated, which included the intervention condition as a cross-level interaction effect. The purpose of the Intervention by Attunement model was to account for possible cross-level interactions between the intervention condition and teacher attunement in each of the estimated associations between teacher attunement and children's peer experiences. The intervention variable (Level 2 variable) was entered onto the slope of each Level 1 teacher attunement predictor variable to estimate if there were differences between intervention and control teachers in the average effect of teacher attunement on each student level outcome at each time point.

Interpreting Coefficients

Modeling in HGLM more accurately estimates non-linear distributions. However, it complicates interpretation of the intercept term and the fixed "effects" associated with independent variables with significant coefficients. Thus, the log-odds coefficients have to be "undone" and converted into expected number of nominations. These are also referred to as expected counts, as is the case with peer nominations of *popular* and *leader,* and they are referred to as conditional probabilities as is the case with *social network centrality*. Both of these transformed values enable meaningful interpretation of significant coefficients (R.G. Croninger, personal communication,

March, 16, 2011). To accomplish this, coefficients are transformed into an expected number of nominations for the peer nomination outcomes and into conditional probability scores for the social network centrality outcome. The procedures for both of these transformations are similar, as is the process for interpreting the transformed coefficients. The primary difference between the coefficients for these models is that the variables that involve peer nominations (i.e., popular and leader) assume a Poisson distribution and represent an expected number of nominations received, whereas social network centrality assumes a Bernoulli distribution and represents a probability that students do or do not occupy a socially central position in the classroom social network.

Transforming coefficients. In the HGLM models presented below, the log-odds were deconstructed and then converted into interpretable expected counts for the peer nominations outcomes and interpretable conditional probability scores for centrality. These are referred to as "transformed values" to facilitate reading. To calculate these transformed values one of the following equations was solved depending on the outcome measure of interest. To calculate the transformed values associated with peer nominations for an average student, the student-level intercept coefficient and the coefficient associated with high teacher attunement were summed given the average number of possible nominators in a class. Solving the equation $y = \log (\text{count})$ yields the log odds of a count. To change the log count value into an expected number of nominations the equation $y=\log (\text{count})$ is solved for count where $\text{count}=\exp (y)$. This yields a transformed value reflecting an average students' expected number of nominations conditioned on teacher attunement. The log-odds probability of an average student's chances of occupying a central status position within the classroom social network was

transformed into an interpretable value by solving the equation y=log (p/(1-p)) where

p=1/(1+e $^{(-y)}$). These calculations convert the log-odds value of the significant

coefficients into a more meaningful transformed value. This transformed value

represents an average student's chances of being socially central conditioned on teacher

attunement.

Transformed values were calculated and compared for each of the independent

variables with significant coefficients. For dichotomous independent variables,

transformed scores were calculated for each of the groups and compared. When cross-

level interactions were significant, the transformed values calculated reflect the

differences found between intervention and control classrooms and follow the same

procedures for interpretation. Comparing these transformed scores helps to interpret the

magnitude of effects associated with the independent variables with significant

coefficients. To make this comparison, the following procedure was followed for each

outcome modeled in HGLM.

Interpreting transformed values. First, the log-odds probability was

transformed into a predicted count value or a predicted probability value. These log-odds

probabilities were converted into predicted values by evaluating a series of algorithms.

The intercept coefficient in the student-level model, which represents an "average"

student, was used in calculating the predicted values for each of the independent

variables. Then, these predicted values were converted into a transformed value, which

enables an interpretation of the magnitude of effect. The magnitude of effect was derived

by calculating the difference in the transformed values across the dichotomously coded

independent variables with significant coefficients.

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In the Attunement model, the point of reference for these comparisons is the transformed value of an average student with high teacher attunement. For example, the difference between the transformed value associated with the low teacher attunement coefficient or moderate teacher attunement coefficient is compared to the transformed value associated with the high teacher attunement coefficient. This difference in effect can be meaningfully interpreted. In addition, calculating the transformed values allows comparisons to be drawn between low and moderate teacher attunement. However, a significance test is not associated with such comparisons; interpretations of the magnitude of effects are speculative.

In the Intervention by Attunement model, the point of reference for drawing comparisons is the effect of the given teacher attunement variable across the intervention conditions. For example, the transformed value associated with an outcome for children with low teacher attunement in control classrooms is compared to the transformed value associated with an outcome for children with low teacher attunement in intervention classrooms.

HLM procedures. The following hypotheses requiring HLM procedures were proposed:

Teacher attunement will be associated concurrently with students' peer acceptance scores in the fall and spring after accounting for children's gender, minority status, grade, and intervention condition.

Teacher attunement in the fall will be associated with students' peer acceptance scores in the spring after accounting for children's gender, minority status grade, peer acceptance scores in the fall, and intervention condition.

Because the dependent variables involved in these hypotheses are continuous in nature, HLM techniques were employed to model the concurrent and longitudinal within teacher association between students with low and moderate teacher attunement versus students with high teacher attunement and children's social preference scores. The concurrent analysis accounted for student demographic characteristics including dummy-coded gender (female = 1), minority status (White = 1), and grade, which included 1st – 3rd grades (first grade served as the comparison) as well as intervention condition (intervention = 1). The longitudinal analysis accounted for the contributions of child demographic characteristics, baseline scores on each of the dependent measure, and intervention condition.

The models estimated in HGLM for social reputations and social network centrality were also estimated in HLM for social preference (See above for detailed explanations of procedure). The only difference in the analytic modeling of social preference was that as an initial step, an Unconditional model was estimated by entering social preference as the dependent variable separately for the concurrent and longitudinal hypotheses. For the fall concurrent analysis, fall social preference was entered as the dependent measure. For the spring concurrent analysis and the longitudinal analysis, spring social preference was entered as the dependent measure. The Unconditional model was estimated to partition the total variance in social preference into Level 1 (within-teacher) and Level 2 (between-teacher) components. The Intraclass Correlation Coefficient (ICC) represents the ratio of Level 2 (between–teacher) variance to the total variance in a given dependent variable. In addition, interpretation of significant fixed effects followed conventional HLM analytic techniques (Raudenbush & Bryk, 2002).

CHAPTER IV

RESULTS

Descriptive Analyses

Descriptive analyses were conducted on the data set using SPSS 16.0. These analyses included screening the data to assess normality, outliers, and missing values. The mean and standard deviation for the continuous teacher attunement at the individual peer group level variable are reported in Table 1. In the fall, teachers accurately identified 17% of a given student's peer group memberships. By the spring, teachers accurately identified 24% of a given student's peer group memberships. This score at the individual level is not readily comparable to results from past research because teacher attunement has been primarily measured at the peer group level. The mean and standard deviation coefficients for the teacher attunement at the peer group level variable used to derive the teacher attunement at the individual level variable used in the present study are included in Table 1. The mean teacher attunement at the peer group level score is consistent with past research (i.e., Neal et al. 2009; Pearl et al. 2007) and indicated that teachers were attuned to about 36% of students' peer group memberships in the fall and just over 40% of students' peer group memberships in the spring. In addition, the frequencies for the fall and spring teacher attunement at the individual level variables are presented in Table 2. The frequencies suggest that variation in teacher attunement scores was present during the fall and the spring as scores ranged from 0 to 1. In the fall, teachers did not identify any peer group affiliations for 151 students and they identified,

at least, some group memberships for 80 students. In the spring, teachers did not know any peer group memberships for 113 students, and identified some group memberships for 84 students. Although this reflects a modest improvement to teacher attunement from the fall to the spring, a majority of students had teachers who missed all of their peer group memberships in both the fall and the spring.

Three categories reflecting the degree to which teachers were attuned to students' peer group memberships were created: low teacher attunement, moderate teacher attunement, and high teacher attunement, because of the skewed nature of the teacher attunement variable. These categories were created in relation to the mean of the continuous teacher attunement value. Table 3 contains the values in and frequencies of each teacher attunement group in fall and in spring. Scores in the low attunement group ranged from 0 to .03 in the fall and from 0 to .07 in the spring, signifying that teachers were not aware of students' peer group memberships in the low teacher attunement group. In addition, high teacher attunement included an accuracy rate that was relatively higher, but still below 50% for both the fall and spring. Altogether, these findings suggest that teachers missed a substantial number of students peer group memberships including some of the peer group memberships of students who had relatively higher teacher attunement.

Table 4 contains the means, standard deviations, minimums, maximums, skewness, and kurtosis for peer nominations as popular and as leader and for peer acceptance measured in the fall. Table 5 contains the means, standard deviations, minimums, maximums, skewness, and kurtosis for peer nominations as popular and as leader and for peer acceptance measured in the spring. Both of the peer nomination

variables were non-linearly distributed as some students received a large proportion of a small number of nominations. Given this skewness in normality in both of the peer nomination variables, the number of nominations received given the average number of possible nominators in a class was used in the modeling of the relationships that involved each of the peer nominations. As discussed in the Plan of Analysis, HGLM procedures assuming a Poisson distribution were employed in substantive analyses, allowing for accurate modeling of relationships involving non-linear distributions. Peer acceptance was treated as a continuous variable in the present study. The values reported reflect the normal distribution of the peer acceptance variable.

Frequencies for the outcome variable social network centrality are reported in Table 4. This distribution for social network centrality ranges from 0 to 1, which is a non-linear distribution. HGLM procedures accurately model relationships that involve variables that are not normally distributed (Raudenbush & Bryk, 2002).

The longitudinal correlations among the variables in the present study are reported in Table 7. As shown, teacher attunement was moderately correlated with the outcome measures including peer nominations as popular, peer nominations as leader, peer acceptance, and social network centrality. In addition, the correlations among the outcome measures reflect an overlap, however, they suggest that there was unexplained variance in the outcomes.

Teacher attunement and student popularity

Hypothesis 1: Teacher attunement will be associated with students' reputations as popular concurrently in the fall and in the spring after accounting for child demographics and intervention effects. To test this hypothesis a series of log linear

HGLM analyses was conducted. These analyses model the log linear association between teacher attunement and peer nominations for popular above and beyond the contributions made from children's demographics and intervention condition separately for the fall and for the spring. The transformed values are reported with respect to the number of popular nominations the average student with low versus medium versus high teacher attunement is expected to receive in the fall and in the spring. The point of reference for interpreting the effects pertaining to teacher attunement is the average student with high teacher attunement.

Concurrent fall. The parameter estimates from the concurrent models for fall popularity are reported in Table 7. In the Student Controls model, there were no significant relationships among children's demographic information and peer nominations as popular. In the Attunement model, the coefficients associated with the low teacher attunement and the moderate teacher attunement variables were negative and significant, suggesting that students with low and moderate teacher attunement had a lower log odds of being nominated as popular compared to students with high teacher attunement. Calculation of the transformed values followed the procedures outlined in the Plan of Analysis. Students with low teacher attunement were expected to receive .93 popular nominations, students with moderate teacher attunement were expected to receive 1.5 popular nominations, and in contrast, students with high teacher attunement were expected to receive 2.25 popular nominations. Thus, students with high teacher attunement were about twice as likely to be nominated as popular as were students with low teacher attunement and 75% more likely than students with moderate teacher attunement after accounting for student demographics and intervention condition.

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Finally, in the Intervention by Attunement model a significant cross-level interaction effect was observed for the intervention condition term on the moderate teacher attunement slope, suggesting that students with moderate teacher attunement in control classrooms were expected to receive 1.79 nominations and students with moderate teacher attunement in intervention classrooms were expected to receive 1.18 nominations as popular. This indicates that students with moderate teacher attunement in control classrooms were 50% more likely to be nominated as popular than their counterparts in intervention classrooms. No other fall concurrent relationships were significant. In summary, as teacher attunement scores increased, the associated expected number of nominations as popular also rose.

Concurrent spring. Parameter estimates for the spring concurrent models for popularity are reported in Table 9. The intervention term at Level 2 was significant in the Student Controls model. This means that there were significant differences in peer nominations for popular in intervention and control classrooms such that children in control classrooms had a higher log odds probability of being nominated as popular. There were no other significant relationships found in the Student Controls model.

In the Attunement model, the intervention term at Level 2 was no longer significant, signifying that when teacher attunement was factored into the model, the intervention condition no longer had a significant effect on peer nominations as popular. The coefficient associated with the low teacher attunement variable was negative and significant, indicating that students with low teacher attunement were expected to receive 1.05 nominations as popular, whereas students with high teacher attunement were expected to receive 1.5 nominations as popular. This suggests that in the spring, students

with low teacher attunement were 50% less likely to be nominated as popular than were students with high teacher attunement. No other relationships were found in the Attunement model.

In the Intervention by Attunement model, the low teacher attunement term continued to be negative and significant. The intervention condition term on the low teacher attunement slope was positive and significant, which indicated a significant difference between intervention and control classrooms such that students with low teacher attunement in control classrooms were expected to receive .57 nominations whereas students with low teacher attunement in intervention classrooms were expected to receive 1.53 nominations as popular. This suggests that students with low teacher attunement in intervention classrooms were more than 90% more likely to be nominated as popular than students with low teacher attunement in control classrooms. No other relationships were significant in the Intervention by Attunement model.

The pattern in the spring that emerges across the intervention condition is similar: students with high teacher attunement experienced a social advantage in contrast to students with low teacher attunement. However, students with low teacher attunement in intervention classrooms were expected to receive significantly more popular nominations than were students with low teacher attunement in control classrooms.

In summary, these findings lend support for hypothesis 1a that teacher attunement would be associated with students' reputations as popular concurrently in the fall and in the spring after accounting for children's demographics and intervention condition.

Fall to spring longitudinal. *Hypothesis 1b: Teacher attunement in the fall will be associated with students' reputations as popular in the spring given the inclusion of*

fall nominations for popular, child demographics, and intervention effects. A series of HGLM analyses was conducted for peer nominations as popular. These analyses modeled the log linear relationship between fall teacher attunement and spring nominations as popular after accounting for children's demographics, popular nominations in the fall, and intervention condition.

Parameter estimates for the longitudinal models predicting spring nominations as popular are reported in Table 10. In the Student Controls model, fall nominations as popular was significant, after accounting for children's demographic variables such that fall nominations as popular predicted spring nominations as popular. No other relationships were significant in this model.

In the Attunement model, the coefficient associated with peer nominations in the fall continued to be significant. In addition, the coefficient associated with the fall low teacher attunement variable was negatively and significantly associated with spring nominations as popular after accounting for children's demographics, fall nominations as popular, and intervention condition. This means that students with low teacher attunement had a lower log odds probability of being nominated as popular as did students with high teacher attunement such that students with low teacher attunement in the fall were expected to receive .52 nominations as popular, whereas students with high teacher attunement were expected to receive .70 nominations as popular in the spring. Thus, students with high teacher attunement in the fall were expected to receive about 25% more nominations as popular in the spring than students with low teacher attunement in the fall after accounting for children's demographics, baseline scores, and intervention condition. No other relationships in the Attunement model were significant.

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Finally, in the Intervention by Attunement model no relationships were significant. In summary, the pattern of findings was consistent across the intervention condition: as teacher attunement scores increased in the fall, children's expected number of nominations as popular in the spring also rose.

In summary, the results from this set of HGLM analyses provide support for hypothesis 1b, that teacher attunement to students' peer group memberships in the fall would be associated with students' reputations as popular in the spring, after accounting for nominations as popular received in the fall, children's demographics, and intervention condition. Specifically, students with low teacher attunement in the fall were expected to receive significantly fewer nominations as popular in the spring than were students with high teacher attunement in the fall, after accounting for child demographics, fall nominations of popular, and intervention condition. This suggests that greater teacher attunement in the fall was associated with the social benefit of greater popularity in the spring.

Teacher attunement and leadership reputations

Hypothesis 2a: Teacher attunement will be associated with students' reputations as leader concurrently in the fall and in the spring after the inclusion of children's demographics and intervention condition. To test this hypothesis, a series of log linear HGLM analyses was conducted assuming a conditional Poisson distribution. These analyses modeled the log linear relationship between teacher attunement and peer nominations of leader for an average student conditioned on student demographics and intervention effects for the fall and spring separately. The transformed values are reported with respect to the expected number of nominations as leader the average

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student with low, medium, and high teacher attunement was expected to receive in the fall and in the spring. The point of reference for interpreting the effects pertaining to teacher attunement is the average student with high teacher attunement.

Concurrent fall. The parameter estimates for the fall concurrent models predicting peer nominations as leader are reported in Table 11. In the Student Controls model, no significant relationships were found. In the Attunement model, the coefficient associated with the low teacher attunement variable was negative and significant. This suggests that there were meaningful differences between low teacher attunement and high teacher attunement on peer nominations as leader in the fall such that students with low teacher attunement were expected to receive .75 nominations for leader and students with high teacher attunement were expected to receive 1.52 nominations for leader. Students with low teacher attunement were expected to receive almost 1 nomination less than students with high teacher attunement.

In the Intervention by Attunement model, the coefficient associated with the low teacher attunement term continued to be negative and significant. There were no significant cross- level interactions found in this model.

In summary, the pattern is consistent in the fall for peer nominations as leader: as teacher attunement scores increased, students were expected receive more nominations as leader. No other relationships were significant in the fall concurrent analysis.

Spring concurrent. The parameter estimates for the spring concurrent models for leader are reported in Table 12. In the spring Student Controls model, the coefficient associated with the gender term was positive and significant, signifying that girls were expected to receive 1.07 nominations as leader; in contrast, boys were expected to receive

.75 nominations. In addition, the coefficient associated with the minority status term was also positive and significant, indicating that White students were expected to receive 1.15 nominations as leader, which was in contrast to minority students who were expected to receive .74 nominations as leader. This signifies that girls were expected to receive about 25% more nominations than were boys, and White students were expected to receive about 30% more nominations as leader than were minority students. No other significant relationships were found in the spring Student Controls model.

In the spring Attunement model the coefficients associated with the gender and minority status terms continued to be significant, and the coefficients associated with the low teacher attunement and moderate teacher attunement terms were negative and significant. Significant differences were found between students with low teacher attunement and students with high teacher attunement and between students with moderate teacher attunement and students with high teacher attunement. Students with low teacher attunement were expected to receive .88 nominations as leader, students with moderate teacher attunement were expected to receive .78 nominations, and, in contrast, students with high teacher attunement were expected to receive 1.25 nominations for leader. Thus, students with high teacher attunement were expected to receive about 50% more nominations as leader than students with low and moderate teacher attunement.

In the Intervention by Attunement model, the coefficients associated with gender and minority status continued to be significant, and the coefficients associated with the low and moderate teacher attunement continued to be negative and significant. The cross-level interaction term associated with low teacher attunement was significant, signifying that students with low teacher attunement in intervention classrooms were

expected to receive 1.16 nominations as leader and students with low teacher attunement in control classrooms were expected to receive .60 nominations as leader. Thus, students with low teacher attunement in intervention classrooms benefitted when their teacher was not aware of their peer group memberships. In addition, the cross-level interaction term associated with moderate teacher attunement was also significant, indicating that students with moderate teacher attunement in intervention classrooms were expected to receive 1.01 nominations as leader and students with moderate teacher attunement in control classrooms were expected to receive .55 nominations as leader. Students with moderate teacher attunement in intervention classrooms benefitted when their teacher was aware of some of their peer group memberships whereas students in control classrooms did not.

In summary, students with high teacher attunement, in contrast to students with low teacher attunement, were expected to receive more peer nominations as leader in the fall and spring after accounting for child demographics and intervention condition. However, in the spring, high teacher attunement seemed to primarily benefit students in control classrooms whereas in the fall high teacher attunement was beneficial regardless of intervention condition. In addition, in the spring, students with low teacher attunement in intervention classrooms were expected to receive more nominations than students with low attunement in control classrooms. Given that low teacher attunement represents students whose peer group memberships were not known by the teacher, a lack of teacher attunement may have given students a concurrent advantage in intervention classrooms. Altogether, these results lend support for hypothesis 2a that teacher attunement associated with students' reputations as leader concurrently in the fall and in the spring conditioned on child demographics and intervention condition.

Fall to spring longitudinal *Hypotheses 2b: Teacher attunement in the fall will be associated with students' reputations as leader in the spring after including nominations as leader in the fall, children's demographics, and intervention condition.* To test this longitudinal hypothesis, a series of log linear HGLM models for conditional Poisson distributions was estimated to determine the log linear relationship between fall teacher attunement scores and spring peer nominations of leader for students conditioned on student demographics, fall nominations for leader, and intervention condition.

The parameter estimates for these longitudinal models predicting children's nominations for leader are reported in Table 13. In the Student Controls model, peer nominations as leader in the fall were significantly related to peer nominations for leader in the spring after accounting for child demographics and intervention condition, such that peer nominations as leader in the fall significantly predicted peer nominations as leader in the spring. No other relationships were significant in this model.

In the Attunement model, the coefficient associated with fall nominations as leader continued to positively predict spring nominations as leader. In addition, the coefficient associated with the fall low teacher attunement term and the moderate teacher attunement term were negative and significant, indicating that students with low teacher attunement were expected to receive .52 nominations as leader, students with moderate teacher attunement were expected to receive .38 nominations as leader, in contrast, students with high teacher attunement were expected to receive .88 nominations as leader, after accounting for student demographics, fall nominations for leader, and intervention condition. Thus, students with high teacher attunement in the fall were expected to receive about 50% more nominations as leader in the spring than students

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whose fall attunement scores fell in the low or moderate range. In the Intervention by Attunement model no cross-level interactions were significant.

Altogether, the findings from the short-term longitudinal analyses provide support for hypothesis 2b that teacher attunement in the fall associated with students' reputations as leader in the spring after accounting for contributions from nominations for leader in the fall, child demographics, and intervention condition.

Teacher attunement and students' social centrality

Hypothesis 3a: Teacher attunement will be associated with students' social network centrality concurrently in the fall and in the spring. To test this hypothesis a series of log linear HGLM models was estimated. Because social network centrality is a dichotomous variable, a Bernoulli distribution was appropriate to use in the estimation of these models. These models examined the concurrent within-teacher probability that teacher attunement associated with students' social network centrality status after accounting for gender, minority status, grade, and intervention effects for fall and for spring. The point of reference for interpreting the effects pertaining to teacher attunement is the average student with high teacher attunement.

Fall concurrent. Parameter estimates for the fall concurrent models predicting social network centrality are reported in Table 14. In the Student Controls model, no relationships were significant for fall. In the Attunement model, the coefficient associated with low teacher attunement was negatively and significantly associated with students' centrality scores during the fall, signifying that students with low teacher attunement had .34 chance of occupying a socially central position and students with high teacher attunement had a .64 chance of occupying a socially central position. Thus,

students with high teacher attunement versus students with low teacher attunement in the fall had about 50% greater likelihood of occupying a central position within the classroom social network during the fall. No other relationships were significant in this model. In the Intervention by Attunement model, the coefficient associated with low teacher attunement continued to be negatively and significantly associated with social network centrality.   No cross-level interactions were significant in the Intervention by Attunement model.

Spring concurrent. Table 15 contains the parameter estimates for the spring concurrent models predicting social network centrality. In the Student Controls model, no relationships were significant for spring. In the Attunement model, the coefficient associated with the low teacher attunement term and the moderate teacher attunement term evidenced a negative and significant relationship with social network centrality, indicating that students with low teacher attunement had a .26 chance of being socially central and students with moderate teacher attunement had a .38 chance of being socially central. In contrast, students with high teacher attunement had a .60 chance of occupying a socially central position. Students' chances for being socially central doubled when teachers were highly attuned to their peer group memberships. No other relationships were significant in the Attunement model.

In the Intervention by Attunement model, both of the teacher attunement intercepts remained negative and significant. In addition, the intervention condition term on the low teacher attunement slope was positive and significant, signifying that in control classrooms, student with low teacher attunement had a .17 chance of occupying a socially central position; this was in contrast to students with low teacher attunement in

intervention classrooms who had a .35 chance of occupying a socially central position. In addition, the moderate teacher attunement slope was positive and significant, such that students with moderate teacher attunement in control classrooms had a .31 chance of having social network centrality, which was in contrast to their counterparts in intervention classrooms who had a .45 chance of occupying a socially central position. In both of these cases, students in intervention classrooms were advantaged. Students with low teacher attunement in intervention classrooms chances of being socially central were double to their counterparts in control classrooms. Students with moderate teacher attunement in interventions classrooms had a 15% greater likelihood of occupying a central position than students with moderate teacher attunement in control classrooms.

In summary, students with high teacher attunement experienced a social advantage over students with low teacher attunement. Students with high teacher attunement were more likely to occupy a socially central position in the classroom social network than were students with low teacher attunement in the fall and spring. This was most striking in the fall. Moreover, in both the fall and the spring, a similar pattern was evident from the probability values associated with the teacher attunement variables: as students' attunement scores increased, children's chances of occupying a socially central position increased. However, this was not always the case in the spring as suggested by the intervention by attunement interactions. The spring concurrent findings suggested that students with low teacher attunement in intervention were more likely to occupy a socially central position than were students with moderate teacher attunement in control classrooms.

Fall to spring longitudinal. *Hypothesis 3b: Teacher attunement in the fall will be associated with students' social network centrality in the spring after accounting for children's demographics, fall centrality scores, and intervention condition.* To test this hypothesis, a series of log linear HGLM models with a Bernoulli distribution was estimated. This set of analyses examined the within-teacher probability that teacher attunement in the fall was associated with students' social network centrality scores in the spring after accounting for student demographics, fall centrality scores, and intervention condition.

Table 16 contains the parameter estimates for the longitudinal models predicting children's social network centrality scores in the spring. In the Student Controls model, the coefficient associated with centrality scores in the fall was significant such that fall social network centrality positively predicted spring social network centrality. No other relationships were significant in the Student Controls model.

In the Attunement model, the coefficient associated with the fall low teacher attunement term evidenced a negative and significant association with social network centrality scores in the spring, such that, after controlling for student factors and intervention condition, students with low teacher attunement had a .31 chance of occupying a socially central position. In contrast, students' chances of occupying a socially central position increased to .65 when their teachers were highly attuned to their peer group memberships. This suggests that the likelihood that students would occupy a socially central position doubled in the spring when their teachers were highly attuned to their peer group memberships in the fall.

In the Intervention by Attunement model, the coefficient associated with the fall low teacher attunement term continued to be negative and significantly associated with spring social network centrality.   The cross-level interaction term associated with the fall moderate teacher attunement variable was negative and significant, signifying that in control classrooms students with moderate teacher attunement had a .82 chance of occupying a socially central position, in contrast to students with moderate teacher attunement in intervention classrooms who had a .25 chance of having a socially central position.   Thus, students with moderate attunement in control classrooms were significantly more likely to have social network centrality than students with moderate teacher attunement in intervention classrooms. No other significant longitudinal relationships were found.

Altogether, these results lend support for hypothesis 3b that teacher attunement in the fall associated with students' social network centrality in the spring after accounting for children's demographics, fall centrality scores, and intervention condition. Specifically, students with low teacher attunement in the fall were less likely than students with high teacher attunement in the fall to experience social network centrality in the spring after accounting for children's demographics, fall centrality scores, and intervention condition. In fact, students with low teacher attunement in the fall had the lowest chances of being socially central in the spring.

Teacher attunement and peer acceptance

Hypothesis 4a: Teacher attunement will be associated with students' social acceptance concurrently in the fall and in the spring. To test this hypothesis, a series of separate concurrent HLM models was built. These models examined the concurrent

within-teacher association between teacher attunement and students' acceptance scores in fall and spring after accounting for gender, minority status, grade, and intervention effects.

Fall concurrent. The parameter estimates for the fall concurrent models for social acceptance are reported in Table 17. First, an Unconditional model was estimated, which indicated that there was not significant variance between teachers on social acceptance, χ^2 (19) = 8.13, p >.500. While the non-significant ICC (1%) suggests that HLM techniques were not required, HLM procedures were employed to account for the nesting of the data structure and to yield more accurate estimates of the within teacher variance (sigma squared) and provide unbiased estimates of the standard errors (Raudenbush, & Bryk, 2002).

In the Student Controls model, no relationships were significant. In the fall Attunement model, no concurrent relationships were significant. Given the non-significant findings in the Attunement model, an Intervention by Attunement model was not estimated. The final model explained 1% of the within teacher variance associated with children's social acceptance scores in the fall. After controlling for student demographic variables including gender, minority status, grade, and intervention condition, students' teacher attunement scores did not substantially explain the within teacher variance and add to the model fit.

Spring concurrent. Table 18 contains the parameter estimates for the spring concurrent models for social acceptance. First, an Unconditional model was estimated, which indicated that there was not significant variance between teachers on social acceptance, χ^2 (19) = 8.13, p >.500. HLM procedures were employed to account for the

nesting of the data structure which provides more accurate estimates of the within-teacher variance (sigma squared) and yields unbiased estimates of the standard errors.

In the spring Student Controls model no relationships were significant. In the spring Attunement model no relationships were significant. An Intervention by Attunement model was not estimated because there were no significant relationships found in the Attunement model. After controlling for student demographic variables and intervention condition, spring teacher attunement did not add to the model fit and did not significantly explain the within teacher variance.

Fall to spring longitudinal. *Hypothesis 4b: Teacher attunement in the fall will be associated with students' social acceptance in the spring net of contributions from fall social acceptance scores and student demographics.* To test this hypothesis, a series of longitudinal HLM models was estimated to evaluate the within-teacher association between teacher attunement and students' peer acceptance after accounting for contributions from students' demographics, peer acceptance in the fall, and intervention condition. Table 19 contains the parameter estimates for the longitudinal models for peer acceptance.

First, an Unconditional model was estimated, which indicated that there was not significant variance on peer acceptance between teachers, $\chi^2 (18) = 8.08$, p > .500. This was substantiated after calculating the ICC for peer acceptance, which indicated that 1.03% of the variance in peer acceptance was between teachers. However, HLM procedures were continued, as was the case with the concurrent analyses, to account for the nested data structure.

In the longitudinal Student Controls model, peer acceptance in the fall was positively related to children's peer acceptance in the spring. No other relationships were found. In the longitudinal Attunement model, peer acceptance in the fall continued to be positively related to children's peer acceptance scores in the spring. No other relationships were significant. Given the findings that no relationships were evidenced in the Attunement model, an Intervention by Attunement model was not estimated. After controlling for demographic variables peer acceptance in the fall, and intervention condition, teacher attunement scores did not substantially add to the model fit and explain the within-teacher variance of children's peer acceptance in the spring. The final model explained a negligible amount of the within-teacher variance associated with children's peer acceptance in the spring.

Summary

Altogether, the findings from the current study suggest that teacher attunement was associated with important dimensions of children's peer experiences within classrooms, but not to all the peer experiences measures. Specifically, the longitudinal analyses suggested that students with high teacher attunement in the fall were expected to receive more nominations as popular and as leader in the spring than were students with low teacher attunement in the fall. In addition, students with high teacher attunement in the fall were more likely to occupy a socially central position than were students with low teacher attunement in the fall. However, teacher attunement in the fall was not associated with peer acceptance in the spring.

The concurrent findings substantiate these results and indicate that high teacher attunement may benefit students' peer experiences in similar ways at the beginning and at

the end of the year. Students with high teacher attunement were expected to receive more nominations as popular and as leader in the fall and spring than were students with low teacher attunement in the fall and spring. Moreover, students with high teacher attunement were more likely to occupy a socially central position in the fall and spring than were students with low teacher attunement in the fall and spring. However, teacher attunement was not significantly associated with children's peer acceptance in the fall or in the spring. That said, the results indicate that students with high teacher attunement were more likely to be nominated as popular, to be nominated as a leader, and to occupy a socially central position than students with low teacher attunement.

CHAPTER 5

DISCUSSION

The purpose of the current study was to examine the role of the teacher in children's peer experiences in the early elementary classroom. Specifically, this study investigated the association between teacher attunement to students' peer group memberships and several dimensions of children's peer experiences including children's social reputations, peer acceptance, and social network centrality in early elementary classrooms concurrently and over the course of a school year. This is one of the first studies to focus on the role of teacher attunement in the peer experiences of children in early elementary school and to measure teacher attunement to the peer group affiliation of individual students, rather than simply to groups. Overall, the results of the current investigation offer evidence for the claim that teachers in early elementary classrooms act as an invisible hand to influence children's peer experiences through their attunement to children's peer group memberships concurrently and across the school year (Bierman, 2011; Farmer et al. 2011; Hamm et al. 2011).

According to a *developmental science* perspective, teachers' invisible hand guides the social processes children experience with one another in the classroom context and contributes to children's adjustment. Teachers' invisible hand refers to subtle and discreet teaching processes which teachers enact to influence children's social adaptation within the classroom setting (Cairns & Cairns, 1994; Farmer et al., 2011). Accordingly, teacher attunement to children's peer group memberships is one example of the invisible

hand, which may be an important skill for teachers to develop in order to more effectively facilitate young children's productive peer experiences (Hamm et al., 2011).

Bierman's (2011) conceptual model of effective teaching processes identified teacher attunement as a feature of the teaching ecology that potentially influences children's peer experiences, which, in turn, may affect student adaptation to school. Along these lines, Gest and Rodkin (2011) positioned teachers' understanding of students' peer group affiliations as a facet of social management practices that teachers implement to influence significant factors of the peer setting and, in turn, children's adjustment. Other scholars have conceptualized teacher attunement as an aspect of teacher involvement and a means by which teachers may address children's basic need for relatedness (Hamm et al., 2011). These explanations of teacher attunement complement one another; that is, attuned teachers may be able to create an environment in which productive and positive peer experiences are encouraged and supported through teaching practices that are responsive to children's psycho-social needs and classroom relationship experiences. With an accurate understanding of children's peer group memberships, teachers may use their invisible hand to support positive and productive peer experiences.

This study used both a cross-sectional and a short-term longitudinal design to examine the role of teacher attunement in children's peer experiences after accounting for the contributions of children's demographic characteristics, intervention condition, and baseline scores on each of the outcome measures in the longitudinal analyses. The primary aim of the current study was to determine the role of teacher attunement in young children's peer experiences, including children's reputations as popular and as a leader, children's peer acceptance, and children's social network centrality.

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Discussion of Study Findings

Teacher attunement appears to play a significant role in the peer experiences of children in early elementary school. Three important conclusions can be drawn from the findings in the current study that support the significance of teacher attunement to early elementary schoolchildren's peer experiences. First, the high incidence of low teacher attunement in the present study suggests that early elementary school teachers are not strongly aware of children's peer group affiliations and may be missing an opportunity to support students' productive peer experiences. Second, the importance of teacher attunement early in the school year was evident, given that the pattern of findings was similar across the concurrent and longitudinal analyses. Specifically, it is likely to be valuable for teachers to attune to students' peer group memberships throughout the school year, but the beginning of the school year may provide teachers with an opportunity to contribute to children's peer experiences when peer groups are beginning to form, which may benefit children's peer experiences over the course of the school year. Third, the overall pattern of significant and non-significant findings in this study highlight the complexity involved in teacher influence and underscore the facilitative role of teacher attunement in important dimensions of children's peer experiences, i.e., those aspects of children's peer experiences that are informed by their affiliation patterns.

Low Teacher Attunement

The overall purpose of the current investigation was to determine the role of teacher attunement in early elementary children's peer experiences. As a first step toward this objective, a description of the teacher attunement variable was undertaken. Findings from the present study indicate that the majority of students had teachers who did not

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adequately attend to their specific peer group affiliations as represented by their low attunement classification. Low teacher attunement was a pervasive problem in that over half of the students had teachers who failed to accurately identify a single member of their peer group. This was a surprising finding given that teachers in elementary school place a strong importance on children's social development (Howes & Ritchie, 2002) and have ample opportunity to observe peer exchanges as they are constrained by classroom placement (Cairns & Cairns, 1994).

Given that low teacher attunement was associated with fewer nominations for popular and leader, and with a reduced likelihood of being socially central, a lack of teacher attunement may constrain teachers' ability to manage aspects of the classroom environment which can have negative results on student engagement and learning. McFarland (2001) found that when teachers did not account for the role of students' peer group memberships in their teaching more students became disengaged from and willing to undermine learning. Teacher attunement to children's peer group memberships may facilitate teachers' ability to manage children's reputation and social position to foster and encourage engagement of all students.

Although findings from one investigation indicate that elementary teachers possess an average knowledge of their students' peer group memberships (Pearl et al., 2007), the elementary teachers in the present investigation had low attunement, overall. The findings from studies of differences in teacher attunement across the elementary grades have clearly indicated that teachers in the later elementary grades have a more accurate knowledge than teachers in the earlier elementary grades (Gest, 2006; Neal et al., 2009), thus corroborating the findings from present study. It is possible that early

elementary teachers may not recognize or value the role of peer groups in young children's social adjustment. With this in mind, the high incidence of low teacher attunement to children's peer group memberships found in the present study may represent a missed opportunity for teachers to positively influence the peer experiences of their students and, in turn, children's social adaptation. This finding is even more striking given that scholars have suggested that younger children are more open to teacher influence than are adolescents (see Bierman, 2011; Chang et al., 2007; Hughes et al., 2001) and thus, important inroads that teachers might make in affecting positive outcomes for children may be lost.

Creating Contexts through Teacher Attunement

The findings from the present study call attention to the role of teachers in guiding children's peer experiences during the early elementary grades. Prominent developmental and intervention scholars emphasize the important role of teachers in supporting children's positive and productive peer experiences (Farmer, Lines, & Hamm (Eds.) *Journal of Applied Developmental Psychology*, special issue, 2011). Productive and supportive affiliations are believed to emerge from regular, enjoyable, and direct peer interactions (Doll et al., 2004; Cairns & Cairns, 1994), and elementary school teachers are in a position to support children's affiliations early in the school year that foster productive peer experiences later in the school year, as students remain with the same teacher from fall to the spring.

The findings from the current study suggest that teacher attunement in the fall continued to be a significant factor in children's peer experiences in the spring even after the contributions from children's baseline scores were considered. This is a significant

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finding in that it demonstrates that it may be especially important for teachers to develop an understanding of their students' peer group memberships early in the school year in order to shape students' peer experiences later in the school year. This extends previous research findings that demonstrate the longitudinal benefits of teacher attunement with students in middle school (Hamm et al., 2011), to include children in the early grades of elementary school. One reason why teacher attunement in the fall may benefit children's peer experiences in the spring is that more attuned teachers may be able to create a classroom environment throughout the year that supports positive and productive dimensions of children's affiliation patterns and, in turn, important dimensions of their peer experiences. Hamm et al (2011) suggested that teacher attunement may enable teachers to create responsive environments in which students receive the support they need from teachers to navigate the classroom social dynamics. In such classroom environments, children are more likely to better manage the developmental demand of fitting in with peers. This may be particularly relevant for young children as they are just beginning to confront these more complex social demands.

The finding that the negative association between low teacher attunement and children's peer experiences was accentuated in control classrooms in which teachers did not receive professional development and in which there was no change to teachers' understanding of children's peer group memberships is in line with recent studies suggesting that teacher attunement may be one skill enabling teachers to create responsive classroom contexts (Hamm et al. 2011). Differences in the effects of low teacher attunement on children's peer experiences were found between the intervention and control classrooms at the end of the year, such that students with low teacher

attunement in control classrooms were less likely to experience benefits in their peer experiences than were students with low teacher attunement in intervention classrooms. Previous findings have suggested that children's peer experiences vary in relation to the classroom context (Chang, 2003). Furthermore, previous research has indicated that teachers make significant contributions to classroom contexts that enable students' to form supportive and caring relations with classmates (i.e., Chang, 2003; Hamm et al., 2011). In fact, Hamm et al. found that high attunement positively and significantly influenced students' social-affective perceptions of the classroom context (Hamm et al., 2011). It may be that students in control and intervention classrooms experienced different classroom contexts that emphasized and enabled them to engage in different kinds of experiences with their peers contemporaneously as well as over the course of the school year.

Teachers' decisions in the classroom are a significant factor in children's selection into peer groups, as teachers' instructional and organizational decisions constrain children's affiliative patterns (Hamm & Zhang, 2010; Rodkin & Hodges, 2003). Specifically, teacher attunement at the beginning of the year may position teachers to guide children into productive and teacher-sanctioned peer groups contemporaneously and over the course of the school year. This may be another important feature of the short-term benefits of teacher attunement found in the current study. Research has documented the supportive role of children's peer experiences during the transition into kindergarten (i.e., Ladd, 1990) and, more generally, during the early elementary grades (i.e., Ladd & Buhs, 2001; see Ladd, 2005). For instance, children who entered kindergarten with many friends and who were more successful at maintaining their peer

connections reported an increase in liking school. In addition, when children were able to make new connections in their classrooms during the year, they did better in school (Ladd, 1990). It may be that when teachers are able to facilitate maintaining and establishing new peer affiliations during the transition into elementary school and, more generally, during the early elementary grades, children's adjustment is optimized. Attunement to children's peer group memberships may allow teachers to help students to keep their positive and productive ties as well as support new connections with classmates at the beginning of the year, which may help to ensure they have peer experiences that are positive and productive later in the school year. This suggests that teacher attunement at the beginning of the year may make it possible for teachers to support children's transition into new classrooms that also work to foster children's social integration and social reputations at the end of the school year.

The results from the current study extend the finding that peer group processes are important for teachers to consider to support pro-social behavior (Bierman, 2004; Farmer, 2000; Farmer et al., 2006), and because they are a frequently neglected feature of behavioral interventions, the present findings highlight a complementary strategy that teachers may employ to influence peer social processes that support pro-social behaviors, and, in turn, student adaptation. The results from the present investigation build on prior research indicating that children's affiliation patterns undergird their success in the peer social system (Gest, Sesma, et al., 2006; Lease, Musgrove, & Axelrod, 2002; Rodkin & Farmer, 1996) and suggest that teachers who are attuned to students' peer group memberships may promote productive aspects of children's peer experiences such as

students' social reputations and integration with their peers concurrently and, more importantly, over the course of the school year.

Teacher Attunement and Children's Peer Experiences

The role of teacher attunement in children's peer experiences has only recently begun to receive attention in educational theory and research (i.e., Bierman, 2011; Farmer et al., 2011; Rodkin & Gest, 2010; Hamm et al. 2011). According to these more recent conceptualizations, teachers may impact children's peer experiences through multiple teaching processes that include teacher attunement to children's peer group memberships (Bierman, 2011; Rodkin & Gest, 2011).

The pattern in the findings that emerged is noteworthy given that scholars have suggested that children's peer experiences become differentiated during 2nd and 4th grades (Xie et al., 2006), the developmental period under investigation in the current study. In the current study, teacher attunement was associated with key dimensions of children's social experiences with their peers, but it was not associated with all of the aspects of children's peer experiences that were examined. Only the peer experiences informed by children's affiliation patterns (i.e., popularity, leadership, and social network centrality) evidenced a significant relationship with teacher attunement concurrently and across the school year. Teacher attunement was not associated with students' peer acceptance scores concurrently or longitudinally.

The finding of differential effects of teacher attunement on children's peer experiences build on research that indicates that multiple social processes are available to children to socially engage peers (i.e., Farmer & Rodkin, 1996; Rodkin et al., 2000) and suggest that teachers may impact these pathways in distinct ways. For example, children

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carve out their social positions and their reputations with their peers through their peer affiliations (Farmer, 2000). The results from the current study suggest that teachers can support children's social reputations and social positions when they are attuned to children's peer group memberships. As attuned teachers likely take into account the role children's peer group memberships play in supporting and constraining student adjustment (Hamm et a., 2011), teachers may likely foster children's social reputations and integration into peer groups through effectively implementing grouping strategies such as encouraging new friendships (Gest & Rodkin, 2011). It may be that attuned teachers successfully impact children's social reputations and social network centrality and help children to navigate the social demands in the classroom through their teaching practices that support positive and productive peer group affiliations.

The null findings regarding teacher attunement and peer acceptance illustrate that teacher attunement may benefit some dimensions of student adjustment, but other aspects, such as student likeability, may depend on other teacher behaviors. Teacher attunement may not have been related to peer acceptance concurrently or across the school year because teacher attunement may enable teachers to structure and manage children's affiliations, which may inform peer experiences such as children's social reputations and social network centrality (Farmer and Rodkin, 1996; Lease et al., 2002; Xie et al., 2006). Student characteristics such as being cooperative, helpful, nice, and prosocial correlate with being accepted (see, Asher & McDonald, 2009). Teachers may impact group attitudes of acceptance through the relationships they build and preferences they feel for students, which are readily observed by classmates (Chang, 2003; Chang et al., 2007; Hughes et al., 2001; Taylor, 1989). Teacher attunement may be more important

for those aspects of children's peer experiences that build on children's affiliative patterns.

An alternative explanation for the null findings may have to do with the fact that peer acceptance consists of two dimensions – preference and impact (i.e., Cillessen & Bukowski, 2009; Newcomb & Bukowski, 1983), and only the preference dimension was included in the present study. The social impact dimension of peer acceptance representing children's visibility was not included in the current analyses. It stands to reason that teacher attunement may not be associated with the preference dimension of peer acceptance as it reflects the valence of children's connections. Other teacher behaviors such as teachers' likes and dislikes may inform this aspect of children's peer acceptance. However, teacher attunement to children's peer group memberships may be related to the dimension of children's peer acceptance that corresponds to the degree to which children are noticed. This explanation for the null findings regarding peer acceptance is consistent with the idea that teacher influence is a multi-dimensional construct. This explanation suggests that teacher attunement, one aspect of teacher influence, may not be associated with the dimension of children's peer acceptance that embodies how children feel about one another but that teacher attunement may be important to that aspect of children's peer acceptance that stands for the degree to which children are visible to classmates. Accordingly, teachers may have a complex role in supporting children's social adjustment.

Implications for Classroom Practices

Teacher attunement to children's peer group memberships can inform classroom practices that affect children's social adaptation in the early elementary grades. For

teachers to effectively help young children navigate the social task of making and maintaining productive peer associations, an accurate understanding of children's peer group memberships is needed (Cairns & Cairns, 1994; Farmer, et al., 2006). It is essential for teachers to recognize the role of peer groups in young children's social adjustment and the utility of aligning peer group membership information with instructional procedures (Rodkin & Gest, 2010). Teaching practices such as management of children's social status, promoting new friendships, and separating students with troubling and disruptive behaviors are more likely to succeed when teachers incorporate an accurate understanding of children's peer group memberships into their teaching efforts (Gest & Rodkin, 2011; Hamm et al., 2011; Kindermann, 2011). The findings from the current study should encourage teachers to attend to children's peer group memberships and to use their understanding of this key aspect of classroom social dynamics to inform practices to support prosocial behaviors through positive and productive peer affiliations. In addition, instructional procedures bolstered by classroom management practices such as attending to children's peer group affiliations and the role they play in student adjustment are likely to ensure that more children are part of a friendship network by giving children ample opportunity to engage with a range of classmates (Farmer, 2000; Farmer et al., 2006; Rodkin & Gest 2010).

Scholars have suggested that multiple processes may be available for teachers to affect children's peer experiences in the classroom (Bierman, 2011; Farmer, 2011; Rodkin & Gest, 2010). Empirical studies show that teachers' accurate awareness of children's peer group memberships as well as their behavioral management practices can impact the social experiences children have in the classroom with their peers (Gest &

Rodkin, 2011; Hamm et al., 2011). The results of the current investigation should give confidence to teachers to attune to young children's peer group memberships as a legitimate feature of their efforts to influence their students' social adjustment. In addition, it is important for teachers to realize the multiple ways they may affect the diverse dimensions of children's peer experiences. On one hand, teachers may devote time and energy to developing warm and nurturing relationships with students in an attempt to affect peer acceptance as well as support positive behaviors (Chang et al., 2007; Farmer et al., 2011; Luckner & Pianta, 2011). On the other hand, teachers may infuse an accurate understanding of children's peer group memberships into their classroom procedures to influence children's reputations and social integration into the classroom network as well as to shape and reinforce positive behaviors (Farmer, 2000; Farmer et al., 2011). Teaching practices should capitalize on these complementary roles and take a broader view of teachers' influence on children's peer experiences, because such a perspective offers teachers more opportunities to affect students' peer experiences, and, in turn, students' social adjustment. In addition, pre-service and in-service professional development should address classroom social dynamics including teacher attunement to children's peer group memberships and its relationship to student-level and classroom-level factors relevant to supporting student adjustment (Hamm et al., 2011).

Strengths, Limitations and Future Directions

Teacher attunement to peer group memberships is a growing and compelling area of research, as it has the potential to substantively inform teaching practices that foster student adjustment. In the present study, the measurement of teacher attunement at the student-level represents a unique aspect and an important contribution to educational

research and to classroom practices. Teacher attunement has primarily been measured at the peer group-level (i.e., Farmer et al., 2010; Hamm et al., 2011; Pearl et al., 2007) which leaves open the possibility that teachers may not actually place a given student in an identified peer group. For example, teacher attunement scores can reflect higher teacher knowledge of some students' peer group memberships. Students whose peer group memberships are not known by the teacher can receive higher teacher attunement scores when they are members of a teacher-identified peer group. In such a circumstance, scores are suggestive of a greater teacher attunement to children's peer group memberships than teachers actually have. Identification of attunement at the student-level provides a more fine-tuned measure of teachers' understanding of students' peer group memberships in that every possible connection among group-mates is taken into account in the calculation. As such, this methodology represents a step forward in the measurement of teacher attunement and it may enable research on this topic to progress and more precisely identify the role of teacher attunement in supporting children's social adaptation.

Another strength of this study involved important aspects of the design and the analytic approach. First, the measurement of teacher attunement at the beginning of the year while statistically controlling baseline scores on the outcomes and the measurement of children's peer experiences at the end of the year increase the confidence in the direction of influence. That is, the longitudinal design of the current study increased the confidence that teacher attunement influenced children's peer experiences. Second, the sample for this study involved 20 classrooms and children were nested in peer groups in those classrooms. This sample size enabled multi-leveling modeling procedures such as

HLM. HLM procedures more accurately estimates models drawn from nested data structures such as the data set for the current study. When nesting in data is accounted for in the modeling procedures, the standard errors yielded are unbiased and confidence in the accuracy of the estimation of the modeled relationships is increased. In addition, the transformations of the log odds coefficients which were yielded in the modeling of the relationships that involved outcomes with a non-linear distribution reflects a strength of this study because it facilitated meaningful interpretation of the magnitude of effects conditioned on teacher attunement.

Several limitations deserve discussion. The teaching processes responsible for the relationships found between teacher attunement and children's peer experiences were not directly measured. As such, the mechanisms through which teacher attunement work to shape children's class-based peer experiences is inferred. Teaching practices, such as teacher support or teachers' grouping strategies, represent possible pathways through which teacher attunement functions to shape children's peer experiences and as such future research that focuses on the role of teacher attunement in children's peer experiences should include the measurement of such teacher behaviors and practices. Specifically, future research could include observations of teachers' behaviors and practices as well as student reports about their teachers' practices. It will be important to explain how teacher attunement works relative to other teaching practices in order to inform teachers' behaviors and practices, and, in turn student adjustment. However, the results of the current investigation are corroborated by findings from recent research that do measure possible mechanisms (i.e., Gest & Rodkin, 2011; Hamm et al., 2011).

A related limitation is that only survey assessment procedures were used in the current study. Although 1st graders were interviewed individually, the use of surveys may have posed cognitive challenges to the younger participants. However, peer nomination procedures to assess children's social behaviors and peer relationships have been successfully used with samples as young as kindergarten (i.e., Estell, 2007) and with children in early elementary school (Farmer, et al., 2009). Future research could include observational measures and more diverse assessment tools of children's peer experiences. Employing such multi-method procedures and more diverse measures to assess the linkages between teacher attunement and children's social experiences with their peers in the classroom may help to highlight developmental aspects in the role of teacher attunement.

Importantly, future research should examine how teacher attunement works in relation to student aggression to influence children's peer experiences, and in particular, student popularity. Research has shown that there are two sub-types of popular children: aggressive-popular and non-aggressive popular (i.e., Estell et al., 2002). Because aggressive children are more likely to be perceived as popular in classrooms where peer groups have a more hierarchical structure (Ahn et al., 2010); and peer norms tend to favor aggression in classrooms in which aggressive children are perceived as popular (Rodkin, et al., 2000), it is important for future research to examine contextual influences such as children's behavior and classroom factors that might influence the role of teacher attunement in children's peer experiences.

The premise of the present study was that teachers influence the social experiences children have with one another. However, the direction of the observed

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relationships may be reversed such that children's peer experiences may impact teacher attunement levels. For example, teachers may have more opportunity to attune to the peer group memberships of children who are highly embedded in the classroom or to attune to the peer group memberships of children who are popular or are leaders because of the prominence and visibility these social positions hold within the classroom network. In addition, reciprocal influences between teachers and children are likely (Bronfenbrenner & Morris, 2006), such that the direction of influence between teacher attunement and children's peer experiences may change over time. This means that teacher attunement may be important to children's peer experiences early in the school year and by the end of the school year children's peer experiences may exert influence on the extent to which teachers' attune to children's peer group memberships. Although intervention research that is designed to disentangle the direction of influence within a year and across school years is necessary, the longitudinal design and the covariates included in the analytic modeling in the present study increase confidence in the interpretation that teacher attunement makes important contributions to early elementary school children's peer experiences.

Concluding Statement

In conclusion, this study provides initial evidence that teacher attunement to children's peer group memberships is an important factor in teacher influence on children's social adjustment during early elementary school. In addition, the findings suggest that a lack of teacher attunement may represent a missed opportunity for early elementary teachers to shape important dimensions of young children's peer experiences and it highlights a multi-dimensional aspect to the role of the teacher in children's social

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experiences.   Importantly, the results of the current study buttress recent calls to broaden

pre-service and in-service programs related to classroom management to include the role

of teacher attunement in supporting children's social adjustment in the classroom (Hamm

et al., 2011).

Table 1

Teacher Attunement Means and Standard Deviations for Fall and Spring

	Fall		Spring	
Independent Variables	n	Mean (SD)	n	Mean (SD)
Continuous Teacher Attunement*	241	0.17 (.28)	226	0.24 (.33)
Continuous Teacher Attunement**	241	0.37 (.33)	226	0.41 (.35)

Note. * = variable measured at the individual level; ** = variable measured at the peer group level

Table 2

Teacher Attunement Frequencies in Fall and Spring

Attunement Values	Fall	Spring
0	151	113
0.1	2	0
0.17	1	3
0.2	18	1
0.25	5	11
0.29	3	6
0.3	13	0
0.33	0	6
0.4	5	3
0.43	0	2
0.5	22	12
0.6	0	2
0.67	0	11
0.7	8	0
0.75	0	8
0.8	0	5
1	13	14

Note: n= 241 (fall); n= 197 (spring); frequencies are for
the continuous teacher attunement variable

Table 3

	Fall	Spring
Group	**Range (F)**	**Range (F)**
Low Teacher Attunement	0-.03 (151)	0.0-.7 (113)
Moderate teacher Attunement	.10-.30 (42)	.1-.40 (30)
High Teacher Attunement	.31-1.0 (48)	.45-1.0 (54)

Teacher Attunement Groups

Table 4

Fall Means, Standard Deviations (S.D.), Skewness, and Kurtosis of Peer Experiences

D.V.	n	Mean	SD	Minimum	Maximum	Skewness	Kurtosis
Leader	276	42.87	55.38	.00	285.71	1.54	2.677
Popular	276	51.4	66.14	.00	357.14	1.71	3.23
P.A.	276	0.11	1.55	-4.15	3.98	-.146	0.05

Note. D.V. = dependent variables; P.A. = peer acceptance; S.D. = standard deviation

Table 5

Spring Means, Standard Deviations (S.D.), Skewness, and Kurtosis of Peer Experiences

Dependent Variables	n	Mean	SD	Minimum	Maximum	Skewness	Kurtosis
Leader	276	45.75	65.95	0	391.3	2.4	7.4
Popular	276	60.36	77	0	428.57	1.8	3.7
Peer Acceptance	276	0.21	1.5	-4.50	3.55	-.410	0.192

Table 6

Frequencies for Social Network Centrality

Variable	Fall	Spring
Central (1)	102	90
Not Central (0)	139	136

Note. n=241 in the fall; n=226 in the spring

Table 7

Longitudinal Correlations Between Variables

Variable	1	2	3	4	5
Teacher Attunement	.446**	.288**	.251**	.052	.288**
Popular		.487**	.602**	.376**	.450**
Leader			.411**	.269**	.355**
Peer Acceptance				.622**	.168**
Social Network Centrality					.357**

*$p \leq .05$. **$p \leq .01$. ***$p \leq .001$.

Table 8

Fall Fixed Effects Estimates for Concurrent Models Predicting Popularity

	Popularity		
	Student Controls	Attunement	Intervention
Independent Variables	C (SE)	C (SE)	C (SE)
Intercept	-3.0 (.12)***	-.3.0 (.12)***	-3.0 (.13) ***
Level 1 (student)			
Gender (Female)	-.10 (.12)	-.02 (.14)	.00 (.14)
Ethnicity (White)	.29 (.16)	.13 (.16)	.13 (.16)
Grade 2	-.14 (.22)	-.15 (.23)	-.19 (.24)
Grade 3	.16 (.24)	.20 (.25)	.11 (.27)
Low Attunement		-.84 (.16) ***	-.76 (.21)***
Moderate Attunement		-.41 (.20) *	-.04 (.27)
Level 2 (class)			
Treatment (Level 2)	.12 (.12)	.1 (.19)	.08 (.20)
Intervention x L A			-.203 (.33)
Intervention x M A			-.78 (.39)*

Note. L A = low teacher attunement; M A = moderate teacher attunement; C= log-odds coefficients

*p< .05 **p<.01 ***p<.001

Table 9

Spring Fixed Effects Estimates for Concurrent Models Predicting Popularity

Independent Variables	Popularity		
	Student Controls C (SE)	Attunement C (SE)	Intervention x Attunement C (SE)
Intercept	-3.0 (.10)***	-2.9 (.11)***	-2.9 (.12)***
Level 1 (Student Level)			
Treatment (Level 2)	.28 (.13) *	.32 (.18)	.34 (.19)
Gender (Female)	.00 (.11)	.14 (.12)	.15 (.13)
Ethnicity (White)	.17 (.14)	.11 (.17)	.1 (.17)
Grade 2	-.10 (.17)	-.05 (.22)	.01 (.24)
Grade 3	.20 (.17)	.20 (.24)	.35 (.26)
Low Attunement		-.50 (.15)**	-.75 (.20)***
Moderate Attunement			.65 (.3)*
Level 2 (Class Level			
Intervention (Class)	.28 (.13) *	.32 (.18)	.34 (.19)
Intervention by L.A.			-.22* (.28)
Intervention by M.A			-.26 (.40)

Note. L.A. = low teacher attunement; M.A. = moderate teacher attunement; C= log-odds coefficients; *p< .05 **p<.01 ***p<.001

Table 10

Fall Fixed Effects Estimates Predicting Spring Popularity

	Popularity		
	Student Controls	Attunement	Intervention X Attunement
Independent Variables	C (SE)	C (SE)	C (SE)
Intercept	-3.04*** (.11)	-3.03*** (.09)	-3.0 (.10)***
Level 1 (student)			
Gender (Female)	.08 (.11)	.10 (.12)	.10 (.12)
Ethnicity (White)	.09 (.15)	.07 (.15)	.07 (.15)
Grade 2	-.09 (.20)	-.08 (.16)	-.06 (.17)
Grade 3	.17 .21)	-.01 (.18)	.01 (.20)
Fall Popular	.62*** (.07)	.62*** (.08)	.63 (.10)***
Low Attunement		-.29* (.14)	-.19 (.19)
Moderate Attunement		-.34 (.19)	-.44 (.37)
Level 2 (class)			
Intervention	.22 (.16)	.16 (.13)	.13 (.14)
Intervention x L.A			-.22 (.28)
Intervention x M.A			.17 (.37)

Note. L.A = low teacher attunement; M.A= moderate teacher attunement; C= log-odds coefficients*p< .05 **p<.01 ***p<.001

Table 11

Fixed Effects Estimates for Concurrent Models Predicting Fall Leader

	Leader		
	Student Controls	Attunement	Intervention x Attunement
Independent Variables	C (SE)	C (SE)	C (SE)
Intercept	-3.16 (.14) ***	-3.1 (.13)***	-3.1 (.13) ***
Level 1 (student)			
Gender (Female)	-.03 (.13)	.15 (.15)	.15 (.15)
Ethnicity (White)	-.04 (.16)	-.07 (.17)	-.06 (.17)
Grade 2	-.21 (.26)	-.18 (.24)	-.18 (.25)
Grade 3	.18 (.28)	.32 (.23)	.30 (.27)
LA		-.66 (.17) ***	-.56 (.21)**
MA		-.24 (23)	-.23 (.31)
Level 2 (class)			
Intervention	-.07(.21)	-.11 (.20)	-.15 (.21)
Intervention x LA			-.30 (.36)
Intervention x MA			-.10 (.43)

Note. LA = low attunement; MA = moderate attunement; C= log-odds coefficients

*p< .05 **p<.01 ***p<.001

Table 12

Spring Fixed Effects Estimates for Concurrent Models Predicting Leader

	Leader		
Independent Variables	Student Controls C (SE)	Attunement C (SE)	Intervention x Attunement C(SE)
Intercept	-3.82 (.21)***	-3.3 (.13)***	-3.2 (.14)***
Level 1 (student)			
Gender (Female)	.25 (.12)*	.53 (.15) **	.41 (.15)**
Ethnicity (White)	.62 (.19)**	.50 (.21)*	.45 (.21)*
Grade 2	.17 (.25)	.13 (.27)	.07 (.30)
Grade 3	.42 (.26)	.33 (.28)	.42 (.30)
LA		-.38 (.23)*	-1.1 (.22)***
MA		-.22 (.23)	-1.3 (.34)**
Level 2 (class)			
Intervention		.28 (.21)	.33 (.20)
Intervention x LA			1.3 (.34)***
Intervention x MA			1.3 (.48)**

Note. LA = low attunement; MA = moderate attunement; C= the log-odds coefficients

*p< .05 **p<.01 ***p<.001

Table 13

Fall Fixed Effects Estimates Predicting Spring Leader

Independent Variables	Leader		
	Student Controls Coefficient (SE)	Attunement Coefficient (SE)	Intervention X Attunement Coefficient (SE)
Intercept	-3.34*** (.11)	-3.33*** (.11)	-3.3 (.12)***
Level 1 (student)			
Gender (Female)	.25* (.12)	.20 (.13)	.19 (.13)
Ethnicity (White)	.60** (.19)	.47* (.19)	.47 (.19)*
Grade 2	.19 (.21)	.14 (.21)	.15 (.20)
Grade 3	.36 (.22)	.33 (.21)	.35 (.22)
Fall Leader	.54*** (.08)	.44*** (.09)	.44 (.09)***
Low Attunement		-.44** (.15)	-.5 (.2)*
Moderate Attunement		-.85 (.24)	-1.1 (.4)**
Level 2 (class)			
Intervention	.23 (.16)	.32 (.16)	.36 (.16)*
Intervention x L.A			.15 (.3)
Intervention x M.A			.35 (.5)

Note. Log-odds coefficients are reported; L.A = low teacher attunement; M.A= moderate teacher attunement

*p< .05 **p<.01 ***p<.001

Table 14

Fixed Effects Estimates for Concurrent Models Predicting Fall Social Network Centrality

	Social Network Centrality		
	Student Controls	Attunement	Intervention x Attunement
Independent Variables	C (SE)	C (SE)	C (SE)
Intercept	-.36 (.19)	-.3 (.22)	-.22 (.24)
Level 1 (student)			
Gender (Female)	-.01 (.27)	0 (.29)	.03 (.3)
Ethnicity (White)	.08 (.32)	-.1 (.34)	-.07 (.34)
Grade 2	0 (.36)	.01 (.41)	-.07 (.43)
Grade 3	.13 (.41)	.03 (.48)	-1.22 (.51)
Low Attunement		-1.22 (.38)**	-1.21 (.48)
Moderate Attunement		-.27 (.48)	.78 (.74)
Level 2 (class)			
Intervention	.14 (.3)	-.1 (.35)	-.05 (.37)
Intervention x LA			-.05 (.78)
Intervention x MA			-1.8 (1)

Note. LA = low attunement; MA = moderate attunement; C= log-odds coefficients

*p< .05 **p<.01 ***p<.001

Table 15

Fixed Effects Estimates for Concurrent Models Predicting Spring Social Network Centrality

	Social Network Centrality		
	Student Controls	Attunement	Intervention x Attunement
Independent Variables	C (SE)	C (SE)	C (SE)
Intercept	-.44 (.21)	-.1 (.33)	-.61 (.35)
Level 1 (student)			
Gender (Female)	-.31 (.28)	-.34 (.41)	-.25 (.35)
Ethnicity (White)	-.13 (.37)	-.42 (.66)	-.40 (.42)
Grade 2	-.19 (.44)	-.30 (.72)	-.45 (.7)
Grade 3	.13 (.46)	-1.8 (.42)***	.13 (.75)
Low Attunement		-1.1 (.52)	-3.0 (.6)***
Moderate Attunement		.04 (.56)	-2.6 (1.26)**
Level 2 (class)			
Intervention	.04 (.34)	-.61 (.34)	.1 (.57)
Intervention x LA			2.9 (.9)**
Intervention x MA			2.6 (1.26)*

Note. LA = low attunement; MA = moderate attunement; C= log-odds coefficients

*p< .05 **p<.01 ***p<.001

Table 16

Fall Fixed Effects Estimates Predicting Spring Social Network Centrality

	Social Network Centrality		
	Student Controls	Attunement	Intervention X Attunement
Independent Variables	Coefficient (SE)	Coefficient (SE)	Coefficient (SE)
Intercept	-.44 (.24)	-.4 (.24)	-.27 (.27)
Level 1 (student)			
Gender (Female)	.35 (.32)	-.34 (.35)	.31 (.36)
Ethnicity (White)	-.35 (.41)	-.48 (.42)	-.62 (.42)
Grade 2	-.18 (.5)	-.16 (.49)	-.15 (.51)
Grade 3	.23 (.54)	.14 (.53)	-.05 (.57)
Fall Centrality	1.6 (.32)***	1.37 (.42)***	1.30 (.34)***
Low Attunement		-1.30 (.42)**	-1.30 (.52)*
Moderate Attunement		-.41 (.56)	1.34 (.93)
Level 2 (class)			
Intervention	.09 (.4)	-.05 (.39)	-.16 (.42)
Intervention x L.A			-.84 (.9)
Intervention x M.A			-3.60 (1.3)**

Note. L.A = low teacher attunement; M.A= moderate teacher attunement; C= log-odds coefficients

*p< .05 **p<.01 ***p<.001

Table 17

Fixed Effects Estimates for Concurrent Models Predicting Fall Social Acceptance

	Social Acceptance	
	Student Controls	Attunement
Independent Variables	β (SE)	β (SE)
Intercept	.09 (.12)	.17 (.13)
Level 1 (student)		
Gender (Female)	.05 (.20)	.07 (.21)
Ethnicity (White)	-.57 (.19)	-.54 (.21)
Grade 2	.27 (.27)	.17 (.24)
Grade 3	-.31 (.23)	-.29 (.24)
Low Attunement		-.69 (.26)
Moderate Attunement		-.47 (.34)
Level 2 (class)		
Intervention	.05 (.20)	.07 (.21)

Note. LA = low attunement; MA = moderate attunement

*p< .05 **p<.01 ***p<.001

Table 18

Fixed Effects Estimates for Concurrent Models Predicting Spring Social Acceptance

Social Acceptance

Independent Variables	Student Controls β (SE)	Attunement β (SE)
Intercept	.13 (.122)	.22 (.14)
Level 1 (student)		
Gender (Female)	-.17 (.19)	.11 (.23)
Ethnicity (White)	.34 (.23)	.38 (.28)
Grade 2	-.24 (.24)	.43 (.29)
Grade 3	-.31 (.26)	-.47 (.32)
Low Attunement		-.38 (.26)
Moderate Attunement		-.10 (.36)
Level 2 (class)		
Intervention	.18 (.19)	.12 (.24)

Note. LA = low attunement; MA = moderate attunement

*p< .05 **p<.01 ***p<.001

Table 19

Fall Fixed Effects Estimates Predicting Spring Social Acceptance

	Social Acceptance	
	Student Controls	Attunement
Independent Variables	β (SE)	β (SE)
Intercept	.14 (.10)	.14 (.10)
Level 1 (student)		
Gender (Female)	.18 (.15)	.21 (.17)
Ethnicity (White)	.17 (.18)	.16 (.19)
Grade 2	-.04 (.19)	-.02 (.20)
Grade 3	-.07 (.21)	-.15 (.23)
Fall Social Acceptance	.62*** (.05)	.62*** (.05)
Low Attunement		.04 (.21)
Moderate Attunement		-.11 (.28)
Level 2 (class)		
Intervention	.14 (.15)	.17 (.17)

Note. L.A = low teacher attunement; M.A= moderate teacher attunement

*p< .05 **p<.01 ***p<.001

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