

Social Network Isolation across the Transition to Middle School

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A dissertation submitted to the faculty of the University of North Carolina at Chapel Hill
in partial fulfillment of the requirements for the degree of Doctor of Philosophy in the
School of Education (School Psychology).

Chapel Hill
2009

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ABSTRACT

KATHRYN MURRAY: Social network isolation across the transition to middle school
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The objective of this study was to examine the concurrent and longitudinal social and behavioral correlates of social network isolation and the patterns of isolation across the transition to middle school. It was hypothesized that students who were isolated from the social network would also have difficulties with aspects of school and social-emotional functioning, including teacher-rated internalizing and externalizing behavior, self-reported school belonging, peer-rated sociometric status (including social preference and social impact), and teacher-rated participation in friendships. It was further hypothesized that isolation would remain stable; students who were isolated at one time point would be more likely to be isolated at future time points than would students who were integrated into the social network. Students who were not members of social groups identified by the Social Cognitive Mapping Procedure were considered isolated from the social network, and were the focus of the current study. The results of this study indicated that isolated students were at increased risk of difficulty on measures of school functioning (internalizing behavior, externalizing behavior, and school belonging) at some time points around the middle school transition, but not at others. Students who were isolated from the social network had increased risk of difficulty on measures of social functioning (social preference, social impact, and friendships) at all three time points around the transition. In addition, the results of this study suggested that students who were isolated

at one time point were more likely to remain isolated at future time points than would be expected by chance. Finally, the results of this study suggested that the experience of social isolation at one or more time points was significantly related to difficulties with school belonging after the transition, but not internalizing or externalizing behaviors, after controlling for initial levels of functioning. The results of this study suggest that the experience of social network isolation is related to some difficulties in concurrent and longitudinal functioning, and is related to increased risk of continued isolation. Limitations of the current study and implications for future research were discussed.

ACKNOWLEDGEMENTS

This dissertation was accomplished with the support of my colleagues, professors, family and friends. I would especially like to thank Jill Hamm for her support and guidance throughout the entire process and her invaluable feedback, which has contributed greatly to my growth as a writer. In addition, my committee members, including my chair, Steve Knotek, and Kim Dadisman, Man-Chi Leung, and Patrick Akos, made the dissertation process run smoothly and become a very positive experience for me. This dissertation would not have been possible without the hard work and support of my coworkers at the Center for Developmental Science, especially Kerrylin Lambert and Jana Thompson. In addition, I am grateful to my colleagues on internship, Susan Forde, Lily Iteld, and Ben Newman, and my supervisor Dr. April Miller for their encouragement and for helping me stay focused. I am most grateful to my parents, Patrick and Sarah Murray, for everything, including their unwavering support throughout my entire educational career. Finally I would like to thank my brother, Michael Murray, and my friends, especially Michael Pogoloff, Devon Hartford, Amanda Bock, and Alissa Montgomery for sharing in the celebration of my successes and for all of the love and support along the way.

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CHAPTER I

INTRODUCTION

Peer relationships are an important context for development, especially in early adolescence. This importance has been emphasized by developmental theory and well-documented by empirical studies throughout the past century. Relationships with peers are instrumental in the development of social competencies and have significant impacts on later adjustment. Children who successfully form friendships and who are generally well-liked by their peers tend to follow developmental trajectories of positive adjustment (Bagwell, 2004). Children with problems in peer relationships are at risk for a range of difficulties later in life including underachievement, school discipline problems, truancy, conduct disorders, and psychiatric illnesses (Ladd, 2005).

Rubin, Bukowski, and Parker (1998) describe four levels of analysis in the peer system: individual characteristics, social interaction, dyadic relationships, and group membership and composition. Research on peer relationships in the past decades has largely been focused on the individual level (e.g., personal attributes, such as popularity or aggression) or the dyadic relationship level (e.g., friendships). Bronfenbrenner asserted that in order to fully understand social development, one must investigate not only the individual's social status, but also the organization and structure of the larger social group of which the individual is a part (Bronfenbrenner, 1943). Cairns, Xie, and Leung (1998) similarly criticized the limited focus of modern developmental research on the individual or dyadic level. They suggested that in order to achieve an integrated perspective on social

development, research on peer relations should be broadened to include examination of the structure and dynamics of larger units of analysis, such as social networks.

Research using the developmental science framework has begun to expand the focus of studies of peer relationships. Developmental science involves the study of individual development over time, in which individual functioning is viewed in terms of the dynamic, interrelated systems within an individual (such as biological and cognitive systems), as well as the systems outside of the individual, including peer group systems (Farmer & Farmer, 2001). In contrast to attention to individual characteristics or dyadic relationships represented in the majority of peer relations literature, developmental science research has focused on understanding the larger social network context of development, which includes group-level dynamics.

The developmental science perspective informed a method of studying peer groups developed by Cairns and colleagues referred to as social network analysis (Cairns, Perrin, & Cairns, 1985). The social cognitive mapping (SCM) procedure was developed to provide information about the social structure within a whole classroom, grade, or school. Rather than providing information about individual affiliation patterns or about how an individual is perceived by the peer group, this procedure was developed to provide information about the social structure as a whole, as well as individuals' and groups' social status and characteristics (Cairns et al., 1985). The SCM procedure yields information about which students participate in which social groups and information about each student's social status within their group, and the status of individual groups relative to the peer group as a whole, referred to as *social network centrality* (Farmer, Van Acker, Pearl, & Rodkin, 1999).

Cairns, Xie, and Leung (1998) cite three major purposes of social network analysis: to identify groups of people who affiliate with one another, to study the relationships among groups, and to determine if there are some individuals who are not members of a group. Of these aims, relatively little is known about the third; individuals who are not members of social groups identified by social network analysis, often referred to as “isolates”. Given the importance of peer relations in development and successful adjustment during early adolescence, it is important to gain insight both into the characteristics of children who experience difficulty joining or participating in peer groups and the stability of social isolation over time. Students who are isolated from social networks, as determined by a lack of membership in any group identified by the SCM procedure, will be the focus of this study. Specifically, the present study is an investigation of the social and behavioral correlates and trajectories of social network isolation around the transition to middle school.

Conceptual Framework

Despite the research available on the functions and importance of group membership in development, very little theory or research has addressed the developmental implications for students who do not belong to a group. Students who do not belong to any group in the larger social network mapped by the SCM procedure are referred to as “isolates”. Although a very small number of studies have examined behavioral characteristics of students who are isolated from the social network in comparison to other levels of social position within the network, no studies to date have focused on children characterized as isolates exclusively. Thus, the causes and correlates of social network isolation are largely unknown, as is the extent to which social network isolation remains stable across the middle school transition period. Furthermore, there is little theoretical supposition regarding social network isolation.

Roeser, Eccles, and Sameroff (2000) described the importance of middle school as a context for early adolescent development and conceptualized multiple dimensions of functioning related to early adolescents' experiences in middle school. They described two general aspects of adolescents' experiences: psychosocial functioning related to schooling at the individual level (referred to as adolescent functioning) and the relationship between adolescent psychosocial functioning and their experiences in middle school (referred to as school social context). Roeser et al. further conceptualized adolescent functioning as being comprised of two dimensions: *school functioning*, which involves academic motivational beliefs and emotions, achievement, and school behavior, and *social-emotional functioning*, which includes feelings of psychological distress or well-being and the quality of peer relationships. The *school social context* is an indication of the ability of the social and learning environment at school to meet adolescents' needs for competence, autonomy, and quality relationships. An important focus of research on adolescents involves examining the extent to which instructional, interpersonal, and organizational processes in middle school meet the developmental needs of adolescents, and the impact of these processes on adolescent school and social-emotional functioning (Roeser, et al., 2000). Integration into the social network (i.e., belonging to a group) is an important interpersonal process that meets adolescents' developmental need for quality relationships. Since the need for social integration is especially crucial in the middle school years, it is expected that students who lack integration into the social network (i.e. social network isolates) will experience related difficulties in aspects of school and social-emotional functioning. The present study examines psychological and behavioral indicators of school functioning and peer relationship

aspects of social-emotional functioning in students who are isolated from the social network in school.

Developmental Significance of Social Network Integration

There is little theory that addresses the developmental significance of isolation from the social network. Although the importance of peer relations to school adjustment has been well-established, social network isolation has not been specifically described as a risk factor for negative adjustment. In fact, Cairns and Cairns (1994) suggested that the lack of a social group could even be a protective factor, since groups have the potential to influence deviant behavior. Theory does suggest, however, that participation in a social group is crucial to positive adjustment. The formation of meaningful peer relationships is one of the strongest indicators of psychological health in adolescents (Hall-Lande, Eisenberg, Christenson, & Neumark-Sztainer, 2007). Early adolescence is a particularly critical time for the development of peer relationships. Developmental theorists, such as Harry Stack Sullivan, have suggested that relationships with same-age peers become more significant during the preadolescent years (ages nine to twelve) and that these peer relationships satisfy children's emerging need for intimacy (Kingery & Erdley, 2007).

Another important change as children develop is the emergence of *peer groups*. Groups are voluntary, friendship-based, relatively stable, polydyadic social formations (Rubin, et al., 1998). By age 10 or 11, most children report belonging to a group and the majority of peer interactions reported occur in a group context. In addition, across the middle school years (from sixth to 8th grades), groups are perceived by students as increasingly important and increasingly positive (Crockett, Losoff, & Petersen, 1984). Groups tend to be highly stable in membership composition in the short-term (e.g., 3 to 6

weeks), but are markedly less stable across periods of one year or longer (Cairns, Xie, & Leung, 1998). Peer groups have characteristics that are not present at other levels of social interaction, including cohesiveness, hierarchy, heterogeneity, and the presence of group norms (Rubin, et al., 1998). Group members tend to be similar in terms of gender, age, race, and social class, although homogeneity in gender tends to decrease as children transition to adolescence, while homogeneity in race and social class tends to increase during this time (Cairns & Cairns, 1994). Group members also tend to share behavioral characteristics such as aggression, a phenomenon which has been termed *homophily* (Cairns et al., 1998). In addition, groups are delineated by boundaries of who is “in” and who is “out”, boundaries which are maintained through barriers to group entry and penalties of social and physical aggression for violating group norms (Cairns & Cairns, 1994).

As children transition into early adolescence, peer groups become an increasingly important feature of social functioning. The group is an important developmental context that shapes the behavior of group members and is directly related to adolescents’ psychological well-being and ability to cope with stress (Rubin et al, 1998). One important function of peer groups is to transmit social values to the younger generation (Cairns & Cairns, 1994). Although groups are related to larger social forces of the adult world, they are also uniquely representative of children’s peer culture (Adler & Adler, 1995). Furthermore, groups play an important role in acquiring social status and defining identity for early adolescents (Ladd, 2005). Finally, peer groups also function to contribute to the development of aspects of personality and behavior, such as self-esteem, personal identity, gender identity, drug use, and leadership (Cairns et al., 1998). Children who do not have

access to a group may lack an important developmental opportunity which may compromise their social functioning and identity formation.

The school environment is a significant context for peer group interactions, including the development of classroom and school-wide social networks. In a school, groups occur within larger *network units*, which comprise all individuals in certain settings (e.g., classroom, grade-level, etc.), including those who belong to a group and those who do not (Cairns, Gariepy, Kindermann, & Leung, 1996). All groups in a network unit collectively make up a *social network*. Although most students in a certain school network unit are members of at least one group, and thus integrated into the social network, some students are not members of any group, and are isolated from the social network. Previous research has not conceptualized social network isolation specifically as a risk factor for negative adjustment, but given the importance of social interaction during early adolescence, and the specific importance of interactions on a group level, it follows that students who are not members of any group and thus are isolated from the social network would be at risk for difficulties in school and social adjustment.

Social Network Isolation and Behavior

According to Roeser, et al., (2000) early adolescent school functioning is composed of behavioral indicators (such as internalizing and externalizing behaviors) and psychological indicators of school functioning, which involve students' beliefs and emotions related to their schooling experience. Although the processes of social network isolation remain largely unknown, a theoretical link has been established between an individual's behavioral characteristics and the processes of social isolation at the dyadic and individual characteristic levels. According to Rubin & Coplan (2004), social isolation can occur for different reasons,

including ostracism *by* the peer group, anxious withdrawal *from* the peer group, and social disinterest *in* the peer group. Moreover, two processes can characterize social isolation; active isolation and passive withdrawal (Rubin & Coplan, 2004). *Active isolation* is the process in which children experience a lack of social interaction because others choose not to play with him or her (i.e., the child is ostracized or excluded by others). Active isolation may be the result of externalizing problems (“acting out” behaviors, such as aggression and disruptiveness) that cause others to refuse to engage socially with the child (Rubin & Coplan, 2004). *Passive withdrawal* is the process in which children isolate themselves from the peer group. It has been suggested that passive withdrawal includes different two subtypes of children, characterized by either conflicted shyness or social disinterest (Coplan, Prakash, O'Neil, & Armer, 2004). The characteristic of conflicted shyness, also referred to as anxious solitude, reflects the simultaneous desire to participate in social interactions and wariness or anxiety around social interaction (Rubin & Coplan, 2004). Social disinterest, on the other hand, is characterized by a lack of interest in social interaction. Gazelle and Ladd (2003) proposed a “diathesis-stress model” to explain the relationship between passive withdrawal and active isolation, whereby individual characteristics related to shyness and withdrawal and forces of exclusion by the peer group act jointly on children. Children who are anxious and withdrawn may be rejected by their peers and then excluded from social activities as a result. In addition, as children get older, and solitary behavior becomes more non-normative, children who display this behavior become increasingly disliked and excluded by their peers (Gazelle & Ladd, 2003; Rubin & Mills, 1988).

It is unknown which, if any, of these processes operate for children who are isolated from the social network system. Two mechanisms of group formation include invitation

(being invited to join by a group member) or application (whereby an individual solicits membership; Adler & Adler, 1995). It is possible that students who are isolated from the social network fail to be either invited to join a group or fail to apply for group membership. The processes of active isolation and passive withdrawal associated with difficulty on the dyadic relationship level could also be at play for children who experience isolation from the social network. Active isolation (ostracism or rejection by peer group) could lead to a lack of invitations to join a social group from other students. Passive withdrawal (shyness or a lack of interest in social interaction) could lead to a lack of overtures by the isolated student to join a group. Therefore, children who are isolated from the social network may display some combination of externalizing behaviors that are associated with active isolation (e.g., aggressive or disruptive behaviors that are perceived as undesirable by the peer group) and internalizing behaviors associated with passive withdrawal (e.g. shyness or anxious behavior that inhibits children from initiating social interaction).

In addition to the idea that early adolescents' individual characteristics might lead to isolation, theory suggests that the experience of being isolated can lead to negative psychological outcomes, including internalizing and externalizing problems. The need to form significant social relationships (sometimes referred to as the need to belong) is a fundamental human motivation that has been well-established in psychological theory and empirical literature (Baumeister & Leary, 1995). When this need is not met, a wide range of psychological and behavioral problems can result (Osterman, 2000). Specifically, the experience of being rejected, excluded or ignored can lead to negative feelings of anxiety, depression, grief, jealousy, and loneliness. In addition, social psychologists have theorized that the experience of being socially excluded can lead to a hostile cognitive bias (a tendency

to interpret events as aggressive or hostile), which causes increased aggressive behavior (DeWall, Twenge, Gitter, & Baumeister, 2009). Understanding the implications for subsequent adjustment of students who are isolated from the social network at school could provide important insight into a group potentially at risk for negative outcomes that has been largely ignored by previous research.

Social Network Isolation and School Belonging

Psychological indicators of school functioning, such as school belonging, are also likely correlates of social network isolation. School belonging can be conceptualized as the extent to which students feel accepted, respected, included, and supported by others (including teachers and peers) in the school environment (Goodenow, 1993). The experience of belonging to one's school community is part of the basic psychological need to feel securely connected to others and is related to a student's experience of well being and health (Osterman, 2000). A sense of school belonging is especially critical to adolescents' school adjustment because it meets their developmental need for relatedness (Hamm & Faircloth, 2005). Research has shown that school belonging is related to academic outcomes such as GPA, dropping out, successful adjustment to school transitions, and school motivation, as well as psychosocial outcomes such as psychopathology, stress, and health problems (e.g. Anderman, 2002; Hamm & Faircloth, 2005).

Although no theory has specifically explored the relationship between school belonging and social network isolation, research findings suggest that affiliation with a peer group offers early adolescents interpersonal connections that support a sense of belonging to the larger school community (Faircloth & Hamm, 2009). A lack of perceived belonging to one's school environment is related to perceptions that one does not "fit in" at school and the

experience of social isolation (Goodenow, 1993). Difficulties with the peer context in school could impact youth's ability to adjust to the school environment and create difficulties in students' school engagement and sense of belonging (McMahon, Parnes, Keys, & Viola, 2008). Given the developmental significance of participating in social groups in early adolescence, it is likely that students isolated from the social network system will perceive a lack of belonging to their school social environment.

Social Network Isolation and Peer Relationships

In addition to examining early adolescents' school functioning, the present study will examine peer relationships as a correlate of social network isolation. Students who are not integrated into the social network may experience difficulty with other aspects of peer relations, such as having a low social status or fewer friendships. Social status can be conceptualized by three distinct dimensions: social network centrality, number of reciprocated friendships, and sociometric status (Gest, Graham-Bermann, & Hartup, 2001). Research has shown that although these three dimensions are related (i.e., investigators found moderate correlations in children's status across dimensions), each dimension is associated with a distinct behavioral profile (Gest, et al., 2001).

Social network centrality is an index of social status derived from the SCM procedure that is related to social network isolation. Centrality represents prominence in the classroom or school social structure; the more times that a student is recognized by his or her peers as belonging to a group, the higher that individual's centrality. Students identified as isolated from the social network have the lowest level of centrality, and will be the focus of the current study. The developmental significance of social network centrality has not been well-established in the literature, but researchers have suggested that centrality represents

social salience, whether positive or negative, and that centrality is a manifestation of social dominance, as children with higher centrality may have greater access to limited classroom resources, such as attention and recognition (Ellis & Zarbatany, 2007; Gest et al., 2001).

Friendships are relationships of strong affective ties between two individuals characterized by mutual affection, reciprocity, and commitment (Bagwell, 2004). Children who are isolated from the social network are not necessarily excluded from participation in dyadic relationships, but research does suggest a relationship between social network isolation and lower numbers of friends. Groups are friendship-based social organizations (Rubin, et al., 1998) and many friendships occur within the context of the group (Cairns, et al., 1995). Therefore, students who are isolated from the social network and who do not belong to any group may have fewer opportunities to participate in friendships.

It is important to investigate the possibility that children who are isolated from the social network have lower numbers of friends, because the impact of friendships on development and adjustment has been well-established. A review of the developmental significance of friendships presented findings that having friends in childhood is associated with positive psychological outcomes such as lower levels of depression, and higher self-esteem, especially during important transitions, such as the transition to middle school (Hartup & Stevens, 1997). Participation in friendships also protects children from certain risks, such as negative adjustment to school transitions (Hartup, 1996) and victimization by bullies (Goldbaum, Craig, Pepler, & Connolly, 2007). Although the relationship between social network isolation and risk for negative outcomes has not clearly been established, students who are isolated at the dyadic relationship level are at risk for multiple negative

outcomes. An important next step for research is to determine if students who are isolated from the social network also experience fewer friendships.

Sociometric status is conceptualized as how well a child is liked and/or disliked by his or her peers and is composed of two dimensions; social preference and social impact (Coie et al., 1982). *Social preference* is a measure of social status formed by a group consensus of how well-liked an individual is, based on the number of times the individual is nominated as liked-most by peers. *Social impact* is a measure of how salient an individual is to the group, based on total number of nominations received, regardless of whether these nominations signify being liked or disliked (Coie et al., 1982). Children who are well-liked by their peers (have high levels of liked-most nominations and low levels of liked-least nominations relative to their peers) are considered sociometrically *popular*, whereas children who are generally disliked (have low levels of liked-most nominations and high levels of liked-least nominations) are considered *rejected*. Children with high levels of both positive and negative nominations (liked most and liked least) are considered *controversial* and children with few total nominations are considered *neglected*. Research examining sociometric status has included studies that have used the continuous dimensions of social impact and social preference as well as studies utilizing the categorical dimensions of sociometric status. Although sociometric status is similar to social network analysis because both examine relations within a larger peer group, sociometric status is an indication about how students are perceived by members of the larger peer network rather than a reflection of actual affiliations. The relationship between sociometric status and social network integration has not been well-established. Children with low levels of social preference (i.e., children with rejected sociometric status) may lack social skills and thus may also have

difficulty becoming integrated into the social network. Sociometrically neglected children are conceptually similar to children who are isolated from the social network. Neglected children are largely ignored by their peer group (Crick & Ladd, 1993) and socially withdrawn and isolated (Morris, Messer, & Gross, 1995). Furthermore, there is a similarity in the dimensions captured by measurements of social impact and centrality; both are measurements based on total number of nominations by the peer group. Although these nominations are for different constructs (liked most/liked least versus who hangs around together), both centrality and impact tap into the social salience of individual students to the larger peer network. More salient members of the peer group are nominated more frequently for both constructs, whereas less salient members are considered neglected or socially isolated.

The developmental implications of sociometric status have been well-researched, including studies of the relationship between sociometric status and both concurrent social behavior and negative future adjustment (for a review, see Cillessen & Mayeux, 2004). Although the relationship between sociometric status and adjustment is complex and dependent on the social context, in general, research has indicated that rejection is associated with negative outcomes, whereas sociometric popularity is associated with positive outcomes. For example, research has found that children who are rejected by peers are at greater risk for school problems, anxiety, depression, externalizing behaviors, and poor self-concept (Sandstrom & Zakriski, 2004). Research on the developmental significance of neglected status (students with low levels of social impact) has been less conclusive about whether these students are at risk for negative adjustment, although neglected students tend to have different behavioral profiles than other groups (Parker & Asher, 1987).

Although there is a conceptual relationship between social network isolation and other aspects of social difficulties (i.e., friendlessness and rejected or neglected sociometric status), this relationship has not been empirically established. It is logical to conclude that, like children who experience difficulties with other aspects of social status (friendless and rejected and neglected children), children who are isolated from the social network of peer groups in their classroom or school would also be at risk for negative outcomes. However, social network isolation does not necessarily preclude students from participating in dyadic social relationships, including high-quality friendships. Given the importance of participating in groups for development and future adjustment, especially in early adolescence, students who do not participate in a group, even if they are successful at maintaining dyadic relationships may be at risk for negative outcomes. For example, results from a study of self-reported group belonging have shown that students with low levels of group belonging were at risk for internalizing and externalizing problems, regardless of the importance they placed on group membership (Newman, Lohman, & Newman, 2007). On the other hand, other investigators have suggested that some children may not be distressed by a lack of a large number of social contacts and may be satisfied with dyadic relationships (Crick & Ladd, 1993). It is also not known whether students who are isolated from the social network system tend to be disliked (sociometrically rejected) or neglected, although rejection by one's peers could provide a possible explanation for difficulties with social network integration. These ambiguities in research findings suggest a need for direct study of the relationship between social network isolation and both sociometric status and friendships.

Social Network Isolation and the Transition to Middle School

The school social context is an important factor in promoting healthy social-emotional and school functioning for early adolescents (Roeser, Eccles, & Sameroff, 2000). In early adolescence, many students experience a significant change in their school environment as they transition to middle school. Adjustment problems at this age may be related to this transition, because the middle school environment is often not well-matched to the developmental needs of early adolescents (Eccles, et al, 1993). For students who experience difficulties in relationships with their peers, the transition to middle school can be particularly problematic, leading to feelings of loneliness and decreased involvement in school (Kingery & Newman, 2007). In addition, the transition to middle school also involves a disruption in the established peer social networks. In elementary school, students form complex social structures; including peer groups and dominance hierarchies (Farmer, et al., 2007). When students transition to a new school setting in middle school, the pool of potential associates changes and expands, causing a reshuffling of previously established social networks. In addition, groups are influenced by the organizational characteristics of the contexts in which they are formed, including classrooms and schools. The context of group formation changes as students transition from elementary schools (smaller number of students, consistent grouping in classrooms) to middle schools (larger number of students, multiple classes during the school day; Adler & Adler, 1995).

It is not known, however, the impact that the transition to middle school has on social network isolation. The influx of new peers and reshuffling of groups that occurs when elementary schools converge into a single middle school may provide students who were not members of groups in elementary school the opportunity to become participants in groups in middle school. On the other hand, it is also possible that students who failed to participate in

groups in elementary school would continue to be excluded from the social network system following the middle school transition. Also, some students who were able to successfully integrate into the classroom social network in elementary school may experience social difficulties in the larger middle school environment. It is important to examine the dynamic trends in social network isolation across the middle school transition, which is a time of both risk and opportunity for students who are experiencing difficulties with social integration.

Isolation and Longitudinal School Functioning Outcomes

In addition to concurrent behavioral and psychological indicators of school functioning, students who are isolated from the school social network may also be at risk for longitudinal difficulties after the transition to middle school. Although no previous research or theory has established the relationships between social isolation and later adjustment, there has been an abundance of research that has established a link between other peer difficulties, including rejection and low numbers of friends, and long-term negative outcomes. Rejection by one's peers has been linked to later academic difficulties, including school dropout and negative attitudes towards school, even when controlling for initial levels of school performance (Rubin, et al., 1998). Similarly, studies have shown that students with fewer friends tend to show trends of negative school adjustment (Ladd, 2005). Rubin et al. (1998) concluded that peer rejection and lack of friends make school an unwelcoming environment, as well as failing to provide the necessary social supports for students to do well in school. In addition to academic outcomes, peer difficulties have been associated with negative longitudinal outcomes in psychological functioning, including internalizing and externalizing disorders (Rubin, et al., 1998). Students who are isolated from the social network may also

lack an important connection to their school environment and to a support network that could lead to negative school functioning outcomes across the transition to middle school.

Social Dynamics in Rural School Context

The current study was conducted in schools in rural Appalachian schools. Although rural youth face challenges common to all students transitioning into adolescence, rural early adolescents are at increased risk for negative outcomes due to the isolation and lack of resources of rural schools and communities (Perkins, LaGreca, & Mullis, 2002).

Furthermore, for rural youth, a sense of connectedness to their school social environment may be especially important, as rural schools are often viewed as the heart of the community. The sense of community and school belonging may be generally higher in rural areas, but children who are socially disadvantaged or troubled may experience an increased sense of marginalization in these settings (Bloom & Habel, 1998).

Aims of the Present Study

Research on social networks has made important contributions to our understanding of peer relationships and development by expanding the focus from individual characteristics or dyadic relationships to a focus on the larger context of the social network system. Little is known, however, about students who are excluded from the social network. The lack of integration in the social network faced by isolated students may put them at increased risk for difficulties with aspects of school and social-emotional functioning, including internalizing and externalizing behavior, school belonging, sociometric status, and participation in friendships. Furthermore, since the transition to middle school is a critical time in the formation of groups, it will be especially important to understand the dynamic trajectories of students who experience social network isolation across this transition.

The transition to middle school and early adolescence can be considered a time of great risk as well as a time of great opportunity (Roeser et al., 2000). Given the increased focus on participation in groups that are part of a larger school social network, it is crucial to understand the implications for students who do not succeed in participating in the social network. If social network isolation is associated with difficulties in school functioning and social-emotional functioning, helping isolated students to successfully integrate into the school social network could be a promising opportunity for intervention.

Research Questions

Specifically, this study will focus on the following research questions:

1. Do students who are isolated from the social network system differ from students not isolated from the social network system on measures of school functioning, including teacher-assessed internalizing and externalizing behaviors and self-reported school belonging, at time points prior to and after the transition to middle school?
2. Do students who are isolated from the social network differ from students not isolated from the social network on measures of social functioning, including peer-assessed sociometric status and teacher-reported friendships, at time points prior to and after the transition to middle school?
3. What is the nature of stability or change in isolation status over the transition to middle school?
4. Are experiences of social network isolation or integration across the transition to middle school related to school functioning (including internalizing behavior, externalizing behavior, and perceived school belonging) in the spring of sixth grade?

CHAPTER II

LITERATURE REVIEW

Participation in social groups as children transition into adolescence is central to healthy adjustment. Children with difficulties in peer relationships are at risk for a number of negative outcomes, including internalizing and externalizing problems. The body of research that has examined peer relations, however, has focused primarily on individual and dyadic relationship levels, rather than larger social networks. The research that has examined functioning at the larger group or social network level has, for the most part, excluded students who do not belong to a group. Given the important functions of group-level interactions, and their unique contribution to development, it is important to understand the correlates and consequences of not belonging to a group for socially isolated children.

The following literature review will examine research on social network analysis that has used the Social Cognitive Map (SCM) method, including the limited research that has been conducted on students who are isolated from the social network system. Although isolated students have not been the focus of research on social networks, several studies that have included isolated students provide evidence for patterns in their school functioning, including behavioral indicators (internalizing and externalizing behavior) and psychological indicators (sense of school belonging). No studies have directly assessed the relationship between social network isolation as determined by the SCM procedure and other aspects of social functioning (i.e. sociometric status and friendships), but literature that examines social functioning in relation to other aspects of social network analysis will be reviewed. Finally,

research that relates to the dynamics of social relationships around the transition to middle school will be reviewed, including studies that have examined the dynamics of difficulties with peers over time.

Social Network Analysis

The foundations of social network analysis are often attributed to the sociometry research conducted by J.L. Moreno in the 1930's (Cairns, et al., 1998). Moreno studied children's social ecologies to learn about the structure and dynamics of peer groups as well as the impact of the group on individual children. He used information he gathered from preschool-aged children from interviews and observations to draw "sociograms," which were graphic depictions of the patterns of interactions in a larger peer social network (Ladd, 2005). His method of analysis was useful in providing information about an individual group, but was not sufficient for statistical analysis that would lead to generalizations about social networks (Cairns, et al., 1998).

Although there was some early recognition that studying the ecology of the peer network was of great importance (e.g., Bronfenbrenner, 1943), the majority of the research on peer relationships since Moreno's work in the 1930's has focused on dyadic relationships and individual characteristics (Cairns, et al., 1998). Specifically, most early studies on children's peer interactions focused on direct observations of interactions and *sociometry*, a procedure developed to investigate patterns of social preference among group members. Although sociometric research uses the consensus of a peer group to gather information, the focus of the study is the individual, and the extent to which he or she is accepted or rejected by his or her peers (Ladd, 2005). Since that time, the concept of acceptance by one's peer

group (often referred to as *popularity*), has dominated the research literature on peer relationships (Rubin, et al, 1998).

In the 1970's and 1980's, however, several methods for the analysis of social networks were developed (see Cairns, et al., 1998, for descriptions). At this time, there was a renewed interest in the dynamics and functions of social groups in childhood and adolescence (Cairns, Perrin, & Cairns, 1985). A method of social network analysis, called Social Cognitive Mapping (SCM), was developed by R.B. Cairns and colleagues (Cairns, Perrin, & Cairns, 1985; Cairns, Gariepy, Kindermann, & Leung, 1996) whereby participants are asked to recall groups of children within a specific network unit, such as a grade-level or classroom. Network units are determined based on the pool of potential associates, which can differ depending on school configurations. In many elementary schools, children are primarily in contact with the group of students in their classroom. This classroom unit will often have the same teacher for multiple subjects and participate in activities throughout the school day together. In many middle schools, however, the network unit expands to the grade level. Students move to classes with different teachers for different subjects throughout the day and classes tend to be composed of students in one grade. Middle schools with larger student populations may be further separated within each grade level into teams. In contrast, smaller schools may have network units that include the whole school population when students of different grade levels have regular social contact. The configuration in the present study includes *classroom* network units at the elementary school level (i.e., fifth grade) and *grade* network units at the middle school level (i.e., sixth grade). In the SCM procedure, children are asked the question, "Are there people (in your class, school, etc.) who hang around together a lot?" and are asked to name the members of as many groups as they

can recall (Cairns, Gariepy, Kindermann, & Leung, 1996). The information gathered from each individual is then used to generate a composite map of group membership created by the consensus of all participating children in the network unit.

Much of the research on social networks using the SCM procedure has examined the within-group similarity of group members, referred to as *homophily* (e.g., Cairns, et al., 1998). Research has also examined the impact of group membership on deviant behavior early adolescence (e.g., Suldo, Mihalas, Powell, & French, 2008) and school outcomes in the late elementary school and middle school years (e.g., Kindermann, 1993; Ryan, 2001). Although a considerable amount of research has investigated the behavioral correlates and characteristics of group membership, very few studies have examined the effects of a *lack* of participation in a peer group.

Social Network Isolation

In addition to information on group membership, the SCM procedure yields information about individual students and groups based on the overall number of times they are nominated by their classmates as a member of a peer group, referred to as *centrality* (Gest et al., 2001). Information gathered about individual students from the SCM procedure results in four levels of centrality; *nuclear* (students nominated at a high frequency within their peer group and who are members of a group that is nominated with a high frequency), *secondary* (students who are nominated at an average frequency in a high frequency group or students who are nominated at high or average frequency in an average group), *peripheral* (students who are nominated with low frequency in a high or average frequency group or students who are members of a low frequency group), and *isolated* (students who are not identified as

belonging to a peer group; Farmer & Rodkin, 1996). Students at the isolated level of centrality are the same students who are identified as isolated by the SCM procedure.

Most of the research on social network centrality has focused on the characteristics of highly central group members. In general, findings demonstrate that highly central group members tend to have higher levels of desirable characteristics, such as leadership and prosocial behavior. For example, a study conducted among children in a residential treatment school aged 10 to 13 found that students with high levels of centrality were likely to be rated by peers as having high levels of prosocial behavior and athletic ability (Farmer, Stuart, Lorch, & Fields, 1993). In contrast, a study among 205 7- and 8-year-old children with lower levels of centrality have tended to demonstrate lower levels of desirable behaviors (such as prosocial skills and leadership) and higher levels of less desirable behaviors (such as social difficulties, aggression, and internalizing behaviors; Gest et al., 2001). Another study of 406 3rd through sixth graders found that girls with peripheral status tended to be more aggressive, a behavior which tends to be less acceptable for girls than boys (Farmer & Rodkin, 1996).

Students who are isolated from the social network have generally been marginalized in or completely excluded from research using social network analysis procedures. One possible reason for their omission from analysis is that the percentage of isolated students is often small (typically 10% or less of the total sample) and therefore may be hard to analyze statistically. Some studies have included isolated students through anecdotal description (e.g. Cairns & Cairns, 1994), while others have collapsed students of isolate and peripheral status into one low centrality group (e.g., Gest, et al., 2001; Cairns, Leung, Buchanan, & Cairns, 1995). The examination of isolated students in combination with peripheral students is

problematic, as these groups may have distinct characteristics. For example, one study found that isolated students tended to display more shy/withdrawn behaviors, whereas peripheral students (especially girls) tended to display aggressive behaviors (Farmer & Rodkin, 1996). Other studies have excluded isolated students entirely because they were examining the influence of group membership on individual students (e.g., Wentzel & Caldwell, 1997; Ellis & Zbaratany, 2007).

In addition to the SCM procedure for identifying isolates, R.B. Cairns and colleagues developed a nomination procedure for identifying students who are isolated from the group (Cairns, Perrin, & Cairns, 1985; Cairns & Cairns, 1994). Students are asked to identify any students “who do not seem to have a group” or “who stay by themselves a lot.” This procedure was developed as a verification procedure to determine whether students left out of groups on the SCM procedure were left out by accident (because they were forgotten) or intentionally (because they truly do not have a group; Cairns, Perrin, & Cairns, 1985). In a few studies using a small number of participants, isolates identified by the SCM procedure were also nominated as isolates by all or most of the larger peer network unit (Cairns & Cairns, 1994). In contrast, another study examining isolation measured by SCM and nomination procedures found that while these constructs were significantly negatively correlated, the correlation was only moderate in size. In addition, children with low centrality tended to have similar social and behavioral profiles as those students with isolation nominations, although there were item-level differences, which may suggest slightly different profiles (Gest, et al., 2001). The children left out by accident may be different than those who receive isolation nominations, in that students who are nominated by peers as isolated are salient enough to be recalled and named as isolates. Given the potentially

distinct constructs measured by the isolate nomination and SCM procedures, students who are isolated from the social network (as determined by the SCM procedure) will be the focus of the current study. Because the objective of the current study is to examine the functioning of students who are not integrated into the social network, it will be important to examine the students who are not nominated as belonging to a group, as well as those who are not salient to their peers enough to be nominated as isolated. The current study will examine several ways in which students who are isolated from the social network, defined as students not nominated into groups, may differ from students who are integrated into the social network, including aspects of school functioning and social-emotional functioning that are important to the adjustment of early adolescents.

Relationship between Friendship and Social Network Affiliation

Students who are isolated from the social network may be at risk for difficulties in participation in friendships. Students who are isolated from the social network are not necessarily excluded from participation in dyadic relationships (i.e. friendships), but research findings suggest that there is a relationship between participation in the social network system and friendships. Specifically, friendships often occur within the boundaries of a group as identified by the SCM procedure. A study by Cairns, et al. (1995) that compared friendship nominations with social network membership found that there was a significant overlap in peers who students' reported as friends and those who were identified by the SCM procedure as belonging to the same group. They also found that individual students tended to have a larger number of peers who were members of the same group than the number of reciprocated friendships (Cairns, Leung, Buchanan, & Cairns, 1995). Another study (Cairns, Perrin, & Cairns, 1985) reported a significantly higher likelihood of naming someone in

one's own group (as determined by the SCM procedure) as a "best friend" than there was of naming a best friend belonging to a different group. In addition, this study found that friendship nominations that occurred outside of a student's group were less likely to be *reciprocal* nominations of "best friend". Although friendship tended to overlap with group membership, this overlap was not absolute; almost a quarter of students in this study nominated best friends outside of their SCM group (Cairns, Perrin, & Cairns, 1985). Since many friendships seem to occur within the context of the social group, it is possible that students who are isolated from the social network have fewer opportunities to participate in friendships.

Other studies have demonstrated that number of friendships is related to social network centrality. Gest, Graham-Bermann, & Hartup (2001) found that there was a significant positive relationship between children's number of friends and their network centrality, although this association was only moderate in strength. This study also found that children with high levels of centrality had a significantly higher than chance likelihood of participating in a dyadic friendship and that among low-centrality children, friendship participation was lower than expected by chance (Gest, et al., 2001). However, the fact that 30% of low-centrality children did participate in friendships emphasizes that participation in dyadic relationships is not synonymous with high social network centrality (Gest et al., 2001). In addition, Gest, et al. (2001) found that nominations for network isolation were weakly and negatively related to number of friends. The findings from these studies suggest that there is a relationship between integration into the social network and dyadic friendships. None of these studies, however, directly examined students identified as isolates by the SCM procedure. Taken together, the findings suggest that students who are isolated from the

social network system may be more likely to have fewer friends than non-isolated students, but it is likely that isolated students will not completely lack friendships.

Relationship between Sociometric Status and Social Network Affiliation

It is likely that there is a relationship between social network isolation and sociometric status. Previous research has shown that the constructs of centrality and social preference are moderately related, but that they have important distinctions. Most of the research that has examined this relationship has not included students at the lowest level of centrality (i.e., those students who did not belong to a group). One exception is a study conducted at a residential treatment school for emotionally and behaviorally disturbed children, which found a strong relationship between measures of sociometric status and group membership. Specifically, sociometrically popular students were very likely to belong to a group, whereas students of neglected/rejected status were likely to be isolated (Farmer & Cairns, 1991). These findings, however, were based on a very specific population, and it is unknown the extent to which they are generalizable.

Other research on the relationship between sociometric status and social network centrality more generally has found a significant relationship between sociometric status and network centrality. One study found that rejected children were more likely to have low network centrality, whereas sociometrically popular children were more likely to have high network centrality (Gest et al., 2001). However, 18% of rejected children did in fact have high network centrality. This study also found that *nominations* for social network isolation were negatively correlated with peer acceptance and positively correlated with peer rejection (Gest et al., 2001). The relationship between sociometric status and social network centrality was also examined by a study that found that preadolescents categorized as

rejected were more likely to have lower centrality than students in other sociometric status groups, to belong to smaller social groups than other students, and to belong to groups comprised of other low status peers (Bagwell, Coie, Terry, & Lochman, 2000). These findings support the conclusion that although there is a relationship between social network centrality and sociometric status, these constructs are, in fact, distinct. Therefore, socially isolated children may be likely to have lower levels of social preference than children who are integrated into the social network. Given the moderate relationship that has generally been found in previous research between sociometric rejection and lower levels of centrality, including limited studies that specifically examined isolated status, it is expected that isolated students will have higher levels of peer rejection than non-isolated students, but that not all isolated students will be rejected.

In addition, much of the research on the relationship between sociometric status and centrality or group membership has focused on peer acceptance rather than social impact. The studies that have been conducted on social impact have found variable results regarding the relationship between neglected status (or students who are low on the dimension of social impact) and social network centrality. A study by Bagwell, et al. (2000) found that although children with rejected status had lower levels of social network centrality, children with neglected status did not differ from average children in levels of centrality. In contrast, findings by Gest, et al. (2001) indicated that neglected children tended to have lower centrality and were less likely to have at least one reciprocated friendship. Although the relationship between neglected sociometric status and social network isolation has not been well-established by the research literature, these two constructs are conceptually related. As discussed previously, both students who are sociometrically neglected and students who are

isolated from the social network have low levels of salience to their peers. Therefore a relationship between isolation from the social network system will be related to sociometric neglect or low levels of social impact.

School Behavioral Functioning and Social Network Isolation

Few studies have specifically examined behavioral aspects of school functioning in students isolated from the social network system. In general, research on social functioning in school suggests that students with social difficulties (e.g., rejection) tend to display higher levels of two types of problem behaviors: externalizing behaviors (such as aggression and disruptive behaviors) and internalizing behaviors (such as sadness, worrying, and withdrawal).

Social network isolation and externalizing behavior. One dimension of school functioning on which students who are isolated from the social network system may differ from non-isolated peers is externalizing behaviors, which include aggressive behaviors (such as getting into fights) and disruptive behaviors (such as getting into trouble in school). Several studies have examined the relationships between externalizing behaviors and centrality, with some attention to the experience of children identified as isolates. Research has shown that levels of aggression are not necessarily related to centrality and that aggressive students are also not necessarily different than nonaggressive students in terms of their participation in the classroom social networks. One study (Carins, et al., 1988) found that aggressive children in fourth and seventh grades did not differ from non-aggressive matched controls in terms of centrality; aggressive children were just as likely to participate at all levels of social network centrality (nuclear, secondary, peripheral, and isolated). Highly aggressive children were also no more likely than their matched peers to be

nominated as being isolated from the social network (Cairns, Cairns, Neckerman, Gest, & Gariépy, 1988). This finding was replicated by a more recent study by Bagwell, et al. (2000). A different study of 4th through sixth grade students found similar results, in that the proportion of isolated students (as determined by the SCM procedure) who displayed high levels of problem behavior (including aggressive and disruptive behavior) did not differ from those who displayed low levels of problem behavior (Farmer, et al., 1999). In addition, students with high levels of problem behavior were just as likely to hold nuclear positions as students with low problem behavior. These findings suggest that students who are isolated from the social network may not differ from their non-isolated peers in terms of levels of externalizing behaviors.

Other studies have reported conflicting findings regarding externalizing behaviors and social network isolation. One study found that aggression and disruptiveness in fact were associated with *higher* levels of network centrality (Gest, et al. 2001). This study also found that students nominated as isolates had high levels of certain aspects of aggression/disruptiveness (losing temper, bossy, gets into fights). Gest et al. (2001) suggested that aggressive children fall into two divergent categories; those who participate in widely recognized peer groups and those who are socially isolated. Another study examining behavioral configurations and network centrality found that girls with a “troubled” profile (aggressive and unpopular) were more likely to be isolated from the social network than would be expected by chance (Estell, et al., 2008). This finding suggests that the relationship between externalizing behaviors and network isolation may be stronger for girls, for whom aggressive and disruptive behaviors are less socially acceptable. Several studies on aggressive and externalizing behaviors have included students who are isolated

from the social network, but these studies have found conflicting results. Although the findings of some studies support the idea that students with high levels of externalizing behaviors are no more likely than their peers to be isolated, and in fact, may have higher levels of social network centrality, other studies have shown that some students who are isolated display high levels of externalizing behaviors.

Although little explanation has been offered to explain the mixed findings regarding the relationship between social network isolation and externalizing behaviors, the relationship between other peer difficulties (i.e., rejected and neglected sociometric status) has been much more widely studied. This research suggests that although many aggressive children may lack social skills and may use externalizing behaviors to meet their needs, that externalizing and aggressive behaviors can be adaptive and are considered acceptable in some social contexts (e.g., Stormshak, et al., 1999). For example, studies have shown that not all students who are perceived as aggressive are rejected, and that this association may be stronger for girls than for boys (Coie & Dodge, 1998). In addition, differences have been demonstrated in aggressive children between those who are aggressive and rejected (these children tend to be less effective at winning conflicts, tend to also be victimized, and tend to have other disruptive and argumentative behaviors) and children who are aggressive and not rejected (children who only differ from non-aggressive peers on aggression; Coie & Dodge, 1998). One explanation for the adaptive nature of aggression is that aggressive and disruptive behavior can serve functions, such as to maintain or improve one's social status, especially in classroom or school settings where aggressive or disruptive behavior is supported by the peer context (Farmer, 2000). It may be the case that students have varying degrees of success in using externalizing behaviors effectively to gain social status, and those

students who are unsuccessful at using aggression to improve their status may be isolated from the social network.

Furthermore, the relationship between externalizing behaviors and peer rejection and potentially social network isolation may change as students transition into adolescence. Research has shown that while externalizing problems tend to be associated with rejected status in childhood, that some behavior problems, such as delinquency and drug use, may be unrelated to peer rejection in late childhood and early adolescence, and that some problem behaviors may even receive support from the peer group (Pedersen, Vitaro, Barker, & Borge, 2007). Other research has demonstrated that aggression may be important in establishing dominance hierarchies after a major transition (e.g., the transition into first grade or to middle school, Coie & Dodge, 1998). According to Farmer, et al. (2007), the social context may be more supportive of aggression at times when there is uncertainty and the social hierarchy is not clearly defined, such as the transition to middle school. These findings suggest that the degree to which aggressive and disruptive behaviors are associated with social difficulties, such as network isolation, may depend on the context. For example, while externalizing behaviors may lead to isolation from the network in elementary school, this relationship may be reduced after the transition to middle school, where aggressive and disruptive behaviors are more acceptable.

In summary, there has been a great deal of research that has examined the relationship between externalizing behaviors and social status, including a few studies that have included students isolated from the social network. In general, research findings are inconclusive regarding the nature of the relationship between externalizing behaviors and social network isolation. Some studies have shown that there are no differences in externalizing behaviors

in students who are isolated from the social network as compared to students who are integrated into the network system, whereas other studies have shown that some students who are isolated from the social network display disproportionate levels of externalizing behaviors. There has been little explanation offered for these conflicting results in previous studies, but possible explanation may relate to the difference in acceptability of aggression in certain groups (e.g., boys) and at certain times (e.g., when the social system is disrupted, such as the transition to middle school).

Social network isolation and internalizing behavior. Internalizing problems include anxiety, fears, depression, and social withdrawal (Mash & Barkley, 2003). In general, children with peer relationship problems (such as children with rejected and neglected sociometric status and friendless children) are at increased risk for negative self-esteem and emotional distress, including depression and anxiety (Rubin, et al., 1998). In comparison with externalizing problems, internalizing problems have received less attention in the research literature, in part because internalizing problems are less behaviorally apparent (Rubin & Coplan, 2004).

Several studies have examined the relationship between social network isolation or centrality status, and internalizing problems. A study by Gest, et al. (2001) examined peer-rated social and behavioral correlates of social network centrality and nominations of isolation, finding that centrality was significantly negatively related to items assessing sensitivity (“feelings hurt easily”) and sadness (“usually sad”). Nominations of isolation were significantly positively related to these items. Another study examining behavioral correlates of different levels of centrality in 187 3rd grade girls found that girls who were isolated from the social network demonstrated higher levels of teacher-rated internalizing

behaviors than their non-isolated peers (Estell, et al., 2008). In keeping with these findings, isolated boys and girls were named as shy or withdrawn more frequently than their peers (Farmer & Rodkin, 1996). A slightly different study that examined self-reported group membership among 733 11- to 18-year olds (as opposed to group membership determined by consensus, like the SCM procedure) found that adolescents who reported belonging to a group had fewer internalizing problems (e.g., withdrawal, anxiety, depression) than did students who did not have a group, especially when they placed a high value on group membership (Newman, Lohman, & Newman, 2007). These studies suggest that students who are isolated from the social network, like students with other peer difficulties, tend to have higher levels of internalizing behaviors than their peers who are integrated from the social network. The relationship between social network isolation and internalizing behaviors appears to be consistent for both males and females, although this finding may be due to the fact that some studies did not differentiate between male and female populations.

Summary of school behavior of social network isolates. Although most previous research on social network analysis has not specifically identified behavioral characteristics of isolated students, information is available from several studies that suggests that students who are isolated from the social network system tend to be more shy, sensitive, withdrawn, and aggressive than students who are members of groups. Research that specifically examines characteristics of isolated children, however, is limited. Some of the research that does exist is confounded by methodological concerns, including the use of nominations of isolates rather than the SCM procedure and the collective grouping of students with low levels of centrality. Research on related social difficulties generally supports the conclusion that students with low social status have higher levels of internalizing and externalizing

behaviors, although there are differences in the behavioral patterns of students with students with difficulties in the distinct areas of social functioning.

Social Network Isolation and School Belonging

In addition to examining the behavioral indicators of school functioning in students who are isolated from the social network, it is important to examine psychological indicators of school functioning. Psychological indicators of school functioning, such as sense of school belonging, examine students' beliefs and values related to their experiences in school and represent a critical aspect of adolescents' school functioning. Students who are isolated from the social network at school may develop negative perceptions of their school environment, which could negatively impact their school engagement and performance as well as their psychological well-being. School belonging reflects the extent to which students feel connected to the social context of their school and has been related to academic and psychological functioning (Anderman, 2003). There is no current research available exploring the relationship between school belonging and social isolation, although one study has examined the relationship between group membership and school belonging. A study by Faircloth and Hamm (2009) found that membership in multiple groups enhanced school belonging for some students (i.e. seventh graders and African American students) and negatively impacted belonging for others (i.e. sixth graders and White students). This finding indicates that school belonging is related to social network affiliation, although it remains unknown how students with no group are impacted, as students who did not belong to any group were not included in this study. Research has, however, demonstrated that there is a relationship between school belonging and other aspects of social status. Findings from several studies suggest that sense of school belonging is related to perceived social support,

acceptance, and friendships in middle and high school (e.g., Anderman, 2002; Isakson & Jarvis, 1999; Vaquera & Kao, 2008; Hamm & Faircloth, 2005). Although these concepts are related to group membership, a direct link between social network isolation and perceived school belonging has not been established.

School belonging may be particularly important during the transition to middle school because experiencing changes in the school context could be a challenging socio-emotional task during adolescence (McMahon et al., 2008). Studies that have examined trends in school belonging in adolescence have shown that perceived school belonging tends to decline across the middle school years (Anderman, 2003) and across the transition to high school (Newman, et al., 2007). These declines in sense of school belonging may be related to the disruption of social support systems during school transitions. This interpretation is supported by both qualitative (Hamm & Faircloth, 2005) and quantitative (McMahon et al., 2008) studies, which have provided evidence that social support across the transition to high school was crucial to the development of a positive sense of school belonging. Although none of these findings directly examine the transition to middle school, similar processes of disruption of familiar social support systems may take place, with a compromise to sense of school belonging. Since a lack of perceived school belonging is a risk factor that contributes to disengagement from school and eventual drop out, and since it is known that children with peer difficulties and children engaged in school transitions tend to have lower perceived school belonging, it is important to examine the impact of social network isolation on school belonging during the transition to middle school.

Longitudinal Outcomes of Socially Isolated Students

The literature reviewed in the previous section described the body of research that suggests that students isolated from the social network system may experience difficulties in concurrent school functioning. In addition to negative *concurrent* school functioning, students who experience isolation from the social network across the transition to middle school may also experience more negative *outcomes* than students who are integrated into the social network. The experience of isolation from the social network at any point in the transition to middle school may contribute to trajectories of negative adjustment resulting in lower levels of school functioning in the spring of sixth grade. Although no previous research has specifically examined the longitudinal functioning of students who are isolated from the social network, research on students who have other difficulties in social functioning (especially rejected students) suggests that the experience of social difficulties can contribute to negative adjustment. Findings from early research on the outcomes of rejection has demonstrated that rejection in childhood predicts maladaptive outcomes in later childhood and adolescence, including school dropout, delinquency, and psychopathology (Parker & Asher, 1987). Other research suggests that rejection is predictive of both internalizing and externalizing problems (Bagwell, et al., 2000). For example, one study of children aged 9 to 12 demonstrated that children who were socially withdrawn and rejected were more likely to experience depression when they experienced negative treatment by peers (Boivin, Hymel, & Bukowski, 1995). Another longitudinal study followed a group of African-American students from the spring of 3rd grade to the spring of sixth grade and found that rejection in elementary school predicted internalizing and externalizing behaviors in the sixth grade (Coie, Lochman, Terry, & Hyman, 1992). Some explanations of the relationship between peer rejection and maladjustment could apply to students who are socially isolated;

specifically, that students who are rejected by their peers have fewer opportunities for socialization that would lead to the development of adaptive and appropriate behaviors (Bagwell, et al., 2000). The experience of being isolated from a social group, which may be related to concurrent maladaptive behaviors such as aggression or withdrawal, could limit students from opportunities to socialize with peers and develop social skills, resulting in increased levels of maladaptive behavior. Other explanations of the pathway from rejection to maladjustment may not be applicable to isolated students; i.e. that students who are socially rejected are compelled to join delinquent peer groups, where externalizing and delinquent behaviors are reinforced (Coie, et al., 1992).

In addition to behavioral indicators of school functioning, the experience of being isolated is likely to impact psychological indicators, including school belonging. Although no research reviewed directly examined the experience of social isolation in relation to outcomes of decreased school belonging, theory on the processes underlying school belonging suggests that students who do not feel that they fit in to the school socially (which could include students isolated from the school social network) are at risk for disengagement from the academic environment (Goodenow, 1993). Therefore, the experience of being isolated from social networks at a particularly critical time, during the transition to middle school, could lead to a decrease in belonging following the transition. Furthermore, research on other peer difficulties (including rejection and few friends) has shown that children who experience peer relationship problems have difficulty developing positive attitudes towards school and experience negative educational outcomes (Rubin et al., 1998).

In summary, although no studies were found that directly examine social network isolation and longitudinal outcomes, research on related peer difficulties and theories of

processes underlying school maladjustment indicate that children who experience isolation from the social network system concurrent with the transition into middle school, are at-risk for adjustment difficulties in school functioning, including increased externalizing and internalizing behaviors, and diminished school belonging.

Trends in Social Isolation across the Middle School Transition

No previous research has examined the effects of the transition from elementary school to middle school on isolation from the social network system. The transition to middle school can be difficult for many students, but for some, it marks the beginning of a downward spiral that leads to eventual academic failure and school dropout (Eccles et al., 1993). Furthermore, there are significant individual differences in students' adjustment to the middle school transition; some students show negative changes in social and behavioral adjustment, whereas others demonstrate no changes or even positive changes (Chung, Elias, & Schneider, 1998). Research indicates that social support can be a protective factor against potentially negative outcomes associated with school transitions (Hartup & Stevens, 1997; Newman, et al., 2007). Thus, the transition to middle school can be considered a critical period in social development and a time in which students who are isolated from the social network may be particularly vulnerable.

The transition from elementary to middle school represents a major shift in the context for the opportunities for interaction and the formation of relationships (Cairns, Xie, & Leung, 1998). In elementary school, children are typically in classrooms with a consistent group of students and a single teacher throughout the year. In middle school, however, children tend to transition from multiple classrooms throughout the school day, each with different teachers and groups of students. As children transition to middle school, they form

social groups from multiple classrooms based on similar interests, attitudes, and behaviors (Ladd, 2005). Children who remained in stable classroom configurations tended to have more stable social groups than those children in schools where teachers and students were rearranged from year to year (Cairns & Cairns, 1994). The transition to middle school represents a major disruption in the social network, which may represent an opportunity or a challenge for students who are isolated from the social network.

Given the challenges and opportunities associated with the transition to middle school, it is likely that some students will experience increasing social difficulties across the transition years, as well as associated problems in school functioning. Students with a lack of integration into the social network in late elementary school may experience continued difficulties across the transition to middle school, as evidenced through stability in their isolation status. Other students with a lack of integration before the transition may respond to the opportunity for change associated with a new school environment with improvement in social integration and school functioning. Although no previous studies reviewed have examined the trajectories associated with social isolation across the transition to middle school, research has examined trends in peer group membership and trends in other social difficulties.

Research on the stability of peer group membership has shown that peer groups tend to remain highly stable (i.e., composed of the same members) over short periods of time, but that they are less stable over longer time periods (e.g., Cairns, et al., 1995). Few studies have examined the impact of the relative instability of peer groups on students who do not belong to a group. In one study of 109 4th and fifth grade students (Kindermann, 1993), in a classroom of 25 children, 3 children were not members of a group initially, but at the

assessment at the end of the school year, all students were integrated into the social network. It is possible that the fluid composition of social groups may give isolated children the opportunity to establish group membership over time. Furthermore, other research suggests that perceived importance of peer group membership increases over the middle school years (Crockett, Losoff, & Peterson, 1984) and that students who place a high importance on group membership are more likely to exhibit school functioning problems if they do not experience group membership (Newman, Lohman, & Newman, 2007). If students are able to become integrated into social groups after the transition to middle school, it is likely that these positive trajectories towards integration would be associated with more adaptive school functioning as integration becomes more important.

Other research supports the conclusion that students who are isolated from the social network are likely to remain isolated over time. Several aspects of social status tend to remain stable over time, especially for students with social difficulties. Cairns & Cairns (1994) reported relatively stable centrality from the 7th grade to the 8th grade year, which they attributed to personal characteristics, such as social skills and motivation. Another study found evidence for the short-term stability of centrality; individuals with a peripheral or isolate status had about a 60% chance of continuing to have a peripheral or isolate status 3 weeks later. These individuals had a smaller chance of transitioning to secondary status and an even smaller chance of moving to nuclear status (Cairns, et al., 1995). Further evidence for the stability of social network isolation comes from the relatively large body of research has demonstrated that social status tends to remain stable over time, especially for children with rejected status. In addition, social status (especially rejected status) tends to become more stable as children get older (Ladd, 2005). These findings suggest that students who are

isolated from the social network (at the lowest level of centrality) may continue to remain isolated over time, perhaps due to personal characteristics that contribute to their low status. Qualitative studies have illuminated potential mechanisms for the stability of isolation status. For example, Evans & Eder (1993) found that socially isolated and rejected students in middle school, once isolated, tended to be viewed as having other negative characteristics, which created a stigma that was difficult to remove. In addition, several studies have specifically documented the stability of social status across the middle school transition, especially peer rejection (e.g., Kingery & Erdley, 2007; Hardy, Bukowski, & Sippola, 2002; Bukowski & Newcomb, 1984). Taken together, these findings support the trend for students who are socially isolated to remain so over time.

Although there is no previous research to illuminate the potential effects of the middle school transition on trajectories of social network isolation, the studies reviewed suggest that children experiencing social network isolation across the middle school transition may be at increased risk for negative adjustment. There is conflicting evidence, however, as to whether students who are isolated at the end of elementary school will remain so in middle school. On one hand, there is opportunity for joining a group during the social reshuffling during the transition to middle school, as evidenced by the instability of social groups when the school structure is changed. If students do follow this positive trajectory of integration as they transition to middle school (a time during which the perceived importance of belonging to a social group increases), it is likely that they will experience positive school adjustment. In contrast, students isolated from social networks in elementary school may continue to face difficulty joining a group in middle school due to enduring personal characteristics or lasting negative reputations.

Social Dynamics in Rural Settings

According to Blanton, et al. (1993), although there is a growing awareness that rural areas may be a unique context for social interactions, there is little research that has investigated the social dynamics of rural children and adolescents. Although several studies have been conducted that examine social dynamics in rural settings (e.g., Farmer, et al., 2009; Estell, et al., 2007), it is unclear precisely how social interactions in rural education are distinct from other settings. One study that compared rural and urban students found that the grade-level differences in social acceptance found in urban students were not present in rural students, and that rural students in fifth and sixth grades had overall higher levels of social acceptance than their urban peers (Blanton, et al., 1993). This finding, however, may be confounded by the fact that students in rural schools were in small classroom settings in K-6 schools and most of the urban students were in traditional middle school settings. The current study will add to the body of research literature exploring the social dynamics in rural schools.

Current Study

Although research on social networks has not focused students who are categorized as isolates, the studies that have included isolated students provide evidence that these students are at risk for difficulties in school and social-emotional functioning. Despite these limitations, research has shown that children who are isolated from the social network are at risk for problems in school functioning, including behavioral indicators (internalizing and externalizing behaviors) and psychological indicators (sense of school belonging). The transition to middle school represents a critical period in terms of the influence of social groups on development. Although trends in social network isolation have not been assessed

across the transition to middle school, this transition may be a time of increased risk or increased opportunity for students who experienced social isolation in elementary school and across the middle school transition.

The following research questions and hypotheses will be addressed by the current study:

Question 1: Do students who are isolated from the social network system differ from students not isolated from the social network system on measures of school functioning, including teacher-assessed internalizing and externalizing behaviors and self-reported school belonging, at time points prior to and after the transition to middle school?

Although the literature on externalizing behaviors (including aggressive and disruptive behaviors) presents conflicting findings, findings from one study on isolated students and a large body of literature on the related construct of rejection suggest that students who are isolated from the social network may be more disruptive than students who are integrated into the network. *Hypothesis 1A: Students who are isolated from the social network system will display higher levels of externalizing behaviors than students who are integrated into the social network at each time point.*

In addition, studies that have included students who are isolated from the social network system have found that these students demonstrate higher levels of internalizing behaviors, such as sadness, anxiety, and shy or withdrawn behaviors. *Hypothesis 1B: Students who are isolated from the social network will display higher levels of internalizing behaviors than students who are integrated into the social network at each time point.*

Although none of the research reviewed has specifically examined the relationship between sense of school belonging and social network isolation, research on related peer

relationship constructs suggests that students with social difficulties may also experience lower levels of sense of school belonging than students without social difficulties.

Hypothesis 1C: Students who are isolated from the social network will report lower levels of perceived school belonging than students who are integrated into the social network at each time point.

Question 2: Do students who are isolated from the social network differ from students not isolated from the social network on measures of social functioning, including peer-assessed sociometric status and teacher-reported friendships, at time points prior to and after the transition to middle school?

The relation between social network isolation and sociometric status or friendship has not been directly addressed by previous studies. However, previous research has found a moderate relationship between social network centrality and other measures of social status, including sociometric status and dyadic friendships, suggesting that these constructs are related. *Hypothesis 2: Students who are isolated from the social network will have fewer teacher-reported friends, lower social impact, and lower social preference, as compared to students who are not isolated from the social network system.*

Question 3: What is the nature of stability or change in isolation status over the transition to middle school?

Although previous research has not directly examined trends in the stability of social isolation across the transition to middle school, research has shown that other types of negative social status tends to remain stable over time, especially as children get older.

Hypothesis 3: Students who are isolated from the social network in fifth grade will tend to

remain isolated in fall and spring of sixth grade. Students who are isolated in the fall of sixth grade will tend to remain isolated in the spring of sixth grade

Question 4: Are experiences of social network isolation versus integration across the transition to middle school related to school functioning in the spring of sixth grade?

Based on theory and research suggesting that social difficulties, such as social network isolation, are related not only to concurrent adjustment but to future outcomes as well, the experience of being isolated from the social network across the transition to middle school is likely to result in lower levels of adaptive school functioning in the sixth grade, even after controlling for initial levels of school functioning in the fifth grade. *Hypothesis 4: Students who experience isolation across the transition to middle school will have lower levels of school functioning (higher internalizing and externalizing behaviors and lower school belonging) than students who are socially integrated in the spring of sixth grade, after controlling for initial levels of school functioning in the spring of fifth grade.*

CHAPTER III

METHODS

The current study was part of a longitudinal investigation conducted by the National Research Center on Rural Education Support; the Rural Early Adolescent Learning Project (Project REAL). Project REAL was designed to help teachers promote the academic, behavioral, and social adjustment of rural youth transitioning to adolescence, especially those who are having difficulty in school. This project provided professional development to sixth grade teachers to enhance the academic performance, social relationships, and behavioral engagement of all students with special focus on students at risk for academic, social or behavioral difficulties. Participants in the project attended schools that were pilot sites for Project REAL and attended schools designated by random process as either intervention or matched control schools. Data from the current study were tested for intervention effects, and in the absence of any, the samples from interventions and control schools were combined for analysis.

Participants

The sample used in the present study represents the first two cohorts (Cohort 1 and Cohort 2) of participants in two states in rural Appalachia. All middle and elementary schools participating in the study had one of three National Center for Education Statistics (NCES) locale codes that designated them as small town or rural. In addition, the schools participating in the study each had relatively high levels of poverty. A NCES report on rural education, which used the percentage of students eligible for free or reduced-price lunch as a

proxy for the poverty level within a school, characterized schools with percentages of 50% and above had moderate-to-high poverty (Provasnik, et al., 2007). The percentage of students at the four middle schools in the current study who were eligible for free or reduced-price lunch were close to or within this category with percentages of students receiving free/reduced lunch that ranged from 48.9% to 68.0%.

Participants were recruited from all fifth grade classrooms in eleven elementary schools in two school districts. Cohort 1 participants were recruited in the spring of 2005 and cohort 2 participants were recruited from the same schools in the spring of the following year. These participants were followed across the transition to one of four middle schools in the same districts. Data were collected for participants in the spring semester of the fifth grade year (wave 1) and then the fall and spring semester of the sixth grade year (waves 2 and 3). For the present study, a pooled sample from both cohorts was used.

In wave 1, when the students were in elementary school, social cognitive mapping data are collected with the classroom as the network unit. Elementary school students tend to remain in the same classrooms throughout the day, and thus most of their social interaction occurs with other students in their classrooms. In waves 2 and 3, when students were in sixth grade, the network unit was expanded to include all students in the same grade at their school. The network unit was expanded from the classroom because the students in middle school tend to attend multiple classes with different students in the school day, and thus have a large pool of potential associates.

From a total of 1105 fifth grade students invited to participate in the project, 683 had parent permission to participate (61.8%). Of the non-participating students, approximately 15% of parents actively refused to allow their children to participate and approximately 22%

of students did not return parental consent. Of the 683 students with parental consent, 55 were excluded from the analysis because the Social Cognitive Mapping Procedure used in the current study requires participation rates of 50% or higher in each network unit (in this case, classroom). A criterion of at least 50% participation out of the network unit being assessed has been established by previous research to ensure reporting accuracy (Cairns, et al., 1995). In wave 1, 8 out of a total of 54 classrooms were excluded from analysis due to participation rates of less than 50%. The final sample in wave 1 consisted of 628 students. Of the 628 students included in the wave 1 sample, approximately 49% were female and 51% were male. Ethnicity was known for 618 of the 628 students participating in wave 1: 90% were White, 9% were African American, and less than 1% were all other ethnicities.

The sample changed at each time point, with the addition and attrition of participants. At wave 2 (fall of sixth grade), the sample size increased to 686 students. At this time, 164 additional students were invited to participate in the study, 31 of whom returned parental consent to participate. Students who did not return parental consent in wave 1 were re-invited to participate in the study in wave 2, which resulted in an additional 21 participants. However, after the fifth grade year (wave 1), 49 former participants did not attend the middle school and thus were not included in future waves of the study. No students in waves 2 or 3 were excluded from analysis due to low levels of participation in their network unit. Waves 2 and 3 were conducted in sixth grade, where students did not spend most of their time at school in the same classroom. Therefore, social network analysis was conducted within grade rather than within classroom. There were no grades for which student participation was less than 50%.

The sample in wave 3 consisted of 721 students. In wave 3, 29 participants discontinued enrollment at their middle schools. In addition, 42 new students were invited to participate in wave 3, 5 of whom returned parental consent. In addition, students who did not return consents in previous waves were re-invited to participate, which resulted in an additional 54 participating students. The sample of participants described above (628 in wave 1, 686 in wave 2, and 721 in wave 3) was used to test the hypotheses that involve concurrent analyses (i.e., hypotheses 1 and 2). Concurrent school adjustment was examined separately for each wave.

Hypotheses 3 and 4 involve longitudinal analysis from spring of fifth grade through spring of sixth grade. Across the three waves, a total of 593 students had parent permission to participate in the study and were not excluded from the SCM analysis due to low participation rates. This total sample represented a 62% consent rate. For the longitudinal analyses of stability of isolation status across the middle school transition (i.e., hypotheses 3 and 4), only these 593 students with data in all three waves were included.

Procedure

For each school participating in Project REAL, a letter was sent home to the parents of all students in fifth grade for consent for their child's participation. For students with permission to participate, data were collected from teachers and students (including self-report and peer nominations). Student data were collected by a group administration of a survey at the participants' schools. All students with parental consent to participate were assembled in a location (such as the cafeteria or a classroom) to complete surveys. Typically, at least two trained administrators would conduct the survey; one administrator read the survey aloud (including instructions for completing the survey and each survey item)

and additional administrators would circulate the area to ensure that participants were following instructions (e.g., not copying from each other, not skipping questions, etc.) and to answer any student questions. Participants were informed that their answers would be kept confidential and were instructed not to share answers or talk with other students. Participants were also informed that the survey was voluntary and that they did not have to answer any questions for which they did not know the answer or were not comfortable answering. Student participants were compensated with a small item (i.e., a pencil). In addition to student surveys, teachers were given surveys to complete about participating students in their class (or in one of their classes for middle school, typically their homeroom class). Teachers returned their completed surveys at their convenience by mail. Teachers were compensated with \$50 per semester for their participation.

Measures

Social network isolation. To determine whether or not a student was a member of a social group (non-isolate) or did not belong to a social group (isolate), the *Social Cognitive Mapping* (SCM) procedure was used. Students who were isolated from the social network did not belong to any groups identified by the SCM procedure, whereas students who were integrated into the social network were identified as members of one or more of these groups. Following procedures established by Cairns and colleagues (e.g., Cairns, Leung, Buchanan, & Cairns, 1995), participants were asked, “Are there some kids in your class, grade, or school who hang around together a lot? Who are they?” As explained previously, students in fifth grade were asked to name groups within their classrooms, whereas students in the sixth grade were asked to name groups within the sixth grade. Students were instructed to list from free recall as many groups as they could think of in their network unit.

This information was used to create a composite social “map” by aggregating individual perceptions of the social network (Cairns, Gariepy, Kinderman & Leung, 1996). SCM procedures have been used extensively in school social network analysis in the United States and other countries.

This measure provides information on the affiliation pattern for each student participant, as well as the structure of the social network as a whole. In addition, the total number of times that a student was nominated can be used to calculate indexes of social network centrality, whereby students are classified as nuclear, secondary, peripheral, or isolated (Estell, Farmer, Pearl, Van Acker & Rodkin, 2003).

First, a *recall matrix* is created, which summarizes information gathered from respondents on the group membership of students in their class, grade, or school. Next, a *co-occurrence matrix* is created, which displays the number of times that each student is named as part of the same cluster as each other student. A third matrix, the *correlational matrix*, is then created to show the similarity of “person profiles” of each pair of respondents. The SCM computer program is used to arrange persons into clusters (Cairns, Gariepy, Kinderman & Leung, 1996). Students who are not identified as belonging to any group as part of this procedure are considered isolates.

The social networks identified by SCM procedures have been validated by observational and survey data, and analysis of students’ classroom interaction patterns (Cairns & Cairns, 1994; Cairns, Leung, Buchanan, & Cairns, 1995; Gest, Farmer, Cairns, & Xie, 2003; Rodkin, Farmer, Pearl, & Van Acker, 2000). Three-week test-retest reliability coefficients indicate high short-term stability of children’s peer groups (i.e., 90% of groups maintain a majority of their members over this period; Cairns, Leung, Buchanan, & Cairns,

1995). Evidence of validity has been found through comparison of the social-cognitive maps with independent measures of social organization, affiliation, and centrality, through the similarity of cluster compositions from year-to-year, and through comparisons of SCM findings with those of traditional sociometric measures (Cairns, Gariepy, Kinderman & Leung, 1996).

Sociometric status. Students' sociometric status was assessed by nominations of peers whom they liked most and liked least. Students are also asked to nominate up to three peers that they like most ("Name the three classmates you like the most.") and like least ("Name the three classmates you like the least."). The nominations for liked most and liked least can be used to determine a students' sociometric status, which includes social preference and social impact. Sociometric data can be used as an indication of children's social functioning and as a predictor of future adjustment (Coie, Dodge, & Coppotelli, 1982). For the current study, two variables were calculated from sociometric nomination data. *Social preference* was calculated as participants' standardized number of nominations received for being most liked (LM) minus their standardized number of nominations for being least liked (LL). *Social impact* was calculated by adding participants' standardized number of nominations received for being most liked (LM) to their standardized number of nominations for being least liked (LL). Students with high social preference are considered *popular*, whereas students with low social preference are considered *rejected*. Students with high social impact are considered *controversial*, and those with low social impact are considered *neglected* (Coie, Dodge, & Coppotelli, 1982). The continuous dimensions of sociometric status (i.e., social preference and social impact) were used in the in the current study. A meta-analysis of studies using sociometric status reported that continuous sociometric ratings yielded from

these measures had good test-retest reliability and moderate to high long-term stability (Jiang & Cillessen, 2004). Other investigations into the short-term (two months or less) reliabilities of sociometric measures have found reliabilities of .60 to .90 (Bukowski & Newcomb, 1984).

Internalizing and externalizing behavior. Measures of internalizing and externalizing behavior were obtained by teacher report using the *Interpersonal Competence Scale-Teacher* (ICS-T). The ICS-T is an 18-item questionnaire that teachers complete for each participating student in their class. Each item contains a descriptor related to a specific social or behavioral characteristic of children and adolescents. For each item, teachers rate the student on a 7-point Likert scale with 3 anchors; one on each extreme and one in the middle (e.g., *Never Argues, Sometimes, Always Argues*). The ICS-T is a method for assessing social development of children and adolescents through adult ratings (Cairns, Leung, Gest, & Cairns, 1995).

The ICS-T yields scores for the following factors: Externalizing (also referred to as “Aggression”; argues, trouble at school, fights), Popularity (popular with boys, popular with girls, lots of friends), Academics (spelling and math), Affiliative (AFF; smile, friendly), Olympian (appearance, sports, wins), and Internalizing (INT; shyness, sad, worry; Cairns, Leung, Gest, & Cairns, 1995). Of these subscales, the Externalizing and Internalizing scales were used for this study. Following the procedure described in Cairns, et al. (1995), the Externalizing and Internalizing subscales were created by averaging the 3 items that constitute each subscale (Cairns, Leung, Gest, & Cairns, 1995). Possible scores for each subscale range from 1 to 7, with higher scores indicating higher levels of internalizing behaviors. The Externalizing scale was reversed; thus, higher scores on this scale reflect lower levels of teacher-reported externalizing behaviors.

Three-week test-retest reliability coefficients for the ICS-T are moderately high (i.e., .80-.92), and median test-retest r across the factors are .81 for girls and .87 for boys. One-year coefficients are moderately strong (i.e., .40-.50; Cairns et al., 1995). Other research has found Cronbach's Alpha coefficients from .81 to .95 for these factors (with "shy" retained as a single item indicator; Estell, Farmer, Pearl, Van Acker, & Rodkin, 2008). The ICS-T has convergent validity with direct observation, student records, and peer nomination measures (Cairns & Cairns, 1994; Cairns et al., 1995; Leung, 1996; Rodkin et al., 2000).

Friends. Information about participants' number of friends was gathered from a single item on the *Interpersonal Competence Scale- Teacher* (ICS-T). For each item, teachers rate participating students on a 7-point Likert scale with 3 anchors; one on each extreme and one in the middle. A single item was used to rate friendship quantity, in which teachers were asked to rate each student's amount of friendships on a scale of 1 to 7, with a score of 7 corresponding to "lots of friends", a score of 4 corresponding to "some friends", and a score of 1 corresponding to "no friends". The friendship item is not used in calculating ICS-T subscales used elsewhere in this study (i.e., Internalizing and Externalizing subscales). As described previously, the total ICS-T scale is robust with respect to internal coherence, test-retest reliability, construct validity, concurrent validity, and predictive validity. No psychometric data are available for the single friend item.

School belonging. School belonging was measured by Hagborg's (1998) *Psychological Sense of School Membership-Brief* (PSSM-B) scale. Designed as a short version of Goodenow's (1993) original measure, the PSSM-B includes 11 items that focus on the affective tie students feel toward their schools. The PSSM questionnaire was developed

to evaluate students' sense of belonging or psychological membership in the school or classroom.

On this scale, students rate, on a 5-point response scale ranging from 1 (*completely false*) to 5 (*completely true*), their agreement with statements such as "I am treated with as much respect as other students." Items on this scale include those that involve sense of belongingness in relation to school community in general (e.g., "I feel a real part of my school"), as well as perceived support from teachers (e.g., "Most teachers at my school are interested in me."), and peers (e.g., "Other students like the way I am."). An average of a student's responses to the 11 items on this scale is computed as an index of the student's sense of school belonging. Higher scores on this index indicate higher levels of belonging.

Hagborg (1998) found that the PSSM-B demonstrated high internal consistency; Cronbach's alpha for the scale has ranged from .71 to .88 across diverse samples of early adolescents, including rural early adolescents (e.g., Hagborg, 1998; Hamm, Farmer, Robertson, Dadisman, Meece, & Song, in press). Strong retest reliability has also been demonstrated ($r = .78$; Hagborg, 1998). Evidence of criterion validity was found through the use of a median sample split and correlational analysis comparing high and low groups on measures of academic achievement and motivation, as well as a strong correlation of the PSSM-B with a measure of educational aspirations (Hagborg, 1998). Evidence of construct validity was found through contrast-group comparisons and correlations with multiple theoretically related constructs, including social status, motivation, and grades (Goodenow, 1993).

Data Analysis Plan

Statistical analyses in the current study were conducted using SPSS 16.0 for Windows. Descriptive statistics and correlations among variables were reported. Before testing the hypotheses, an analysis was conducted to examine any effects of the intervention on the social network isolation variable. The results of this analysis are reported in the following chapter.

Hypothesis 1: Students who are isolated from the social network will display higher levels of externalizing and internalizing behaviors and lower levels of perceived school belonging than students who are integrated into the social network at each time point.

To test this hypothesis, a one-factor multivariate analysis of variance (MANOVA) was conducted for each time point (spring of fifth grade and fall and spring of sixth grade). In each MANOVA, isolation status (students who are isolated from the social network versus non-isolated students) was the independent variable and internalizing behaviors, externalizing behaviors, and perceived school belonging were the dependent variables. In instances when the MANOVA revealed significant multivariate effects, follow-up univariate tests were conducted to further analyze these differences. Support for this hypothesis was shown by significantly higher means on each of the dependent variables among the isolated group when compared to the non-isolated group for each time point.

Hypothesis 2: Students who are isolated from the social network will have fewer teacher-reported friends, lower social impact, and lower social preference, as compared to students who are not isolated from the social network system at each time point.

To test this hypothesis, a one-factor multivariate analysis of variance (MANOVA) was conducted for each time point (spring of fifth grade and fall and spring of sixth grade). In each MANOVA, isolation status (students who are isolated from the social network versus

non-isolated students) was the independent variable and social preference, social impact, and amount of teacher-reported friends were the dependent variables. In instances when the MANOVA revealed significant multivariate effects, follow-up univariate tests were conducted to further analyze these differences. Support for this hypothesis was shown by significantly higher means on each of the dependent variables among the isolated group when compared to the non-isolated group for each time point.

Hypothesis 3: Students who are isolated from the social network in fifth grade will tend to remain isolated in fall and spring of sixth grade. Students who are isolated in the fall of sixth grade will tend to remain isolated in the spring of sixth grade.

First, descriptive statistics were reported regarding trends in isolation at each time point as well as across waves. To describe isolation trends, groups were created based on the trends in isolation. For each group, percentages of the total sample that fall into each category were reported. To test the stability of isolation, 3 chi-squared contingency table analyses were conducted. The first contingency table compared isolation *across the transition*, and contained 2 variables; isolation status in fifth grade and isolation status in fall of sixth grade. Each variable has 2 levels; isolated or non-isolated. The second contingency table examined the stability of isolation status *across the first year of middle school*; in the fall of sixth grade and isolation status in the spring of sixth grade. The third contingency table examined the stability of isolation status from the *first time period to the last time period*; isolation status in fifth grade and in the spring of sixth grade. The hypotheses were supported if students who are isolated in the first of each of the time points tested are disproportionately likely to remain isolated at the second of each time point tested, as evidenced by a significant chi-squared statistic. To account for the repeated measures

conducted, the alpha level was adjusted (the original level of .05 was divided by 3 for each contingency table).

Hypothesis 4: Students who experience isolation across the transition to middle school will have lower levels of school functioning (higher internalizing and externalizing behaviors and lower school belonging) than students who are socially integrated in the spring of sixth grade, after controlling for initial levels of school functioning in the spring of fifth grade.

To test this hypothesis, hierarchical linear regression was used. Each dependent variable (internalizing behavior, externalizing behavior, and perceived school belonging at the spring of sixth grade) was tested in a separate analysis. The fifth grade score for the dependent variable was entered in the first independent variable block. R-square was calculated, and the beta weight for the variable was expected to be significant and positive. The second independent variable block included the isolation variable. Students who were isolated in one or more time periods were placed in one group, and students who were integrated into the social network at all three timepoints for each dependent variable were placed into a second group. Support for the hypothesis was evidenced first, by a significant R-squared change for the second block, and then by a significant beta weight for the independent variable.

CHAPTER IV

RESULTS

Preliminary Analysis

Preliminary analyses were conducted to confirm that there were no treatment effects of the intervention on isolation status. A two-way contingency table analysis was conducted to compare the number of isolated students in intervention and control schools in the fall and spring of sixth grade. Analyses were not conducted for the fifth grade time point, because the intervention was conducted with sixth grade teachers during the summer before the participants' sixth grade year. Treatment status (intervention or control) and isolation status were not found to be related at either time point ($\chi^2(1, n = 686) = .00, p=.99$ in wave 2, $\chi^2(1, n = 721) = 3.29, p=.07$ in wave 3). Since treatment status and isolation status were not related, treatment status was excluded from further analyses and the pooled sample was used, including students at both intervention and control schools. Analyses conducted previously by the Project REAL research team discerned no significant differences by intervention status on the social and behavioral outcomes of interest in this study (J.V. Hamm, personal communication, November 11, 2009). Descriptive statistics are presented in Table 1 for each of the dependent variables in each time point.

Preliminary analyses were also conducted to determine the demographic characteristics of students who were isolated from the social network. In the pre-transition year, there were 34 students identified as isolated by the SCM procedure, which represented 5.4% of the total sample of participants at that time point. Isolated students were distributed

across 10 out of the 11 participating elementary schools, ranging from 1 to 7 isolated students at each school. More isolated students were male (59%) than female (41%). The majority of the isolated students were White (91%; 6% African American; 3% unknown ethnicity), which is consistent with the ethnic composition of the overall sample. In the fall of the post-transition year, there were 87 students identified as isolated by the SCM procedure, which represented 12.5% of the total sample of participants. Students were evenly distributed across the 4 middle schools (ranging from 10.8% to 16.2% of total school population). Again, more isolated students were male (65%) than female (35%). Also, the majority of isolated students were White (87%; 9% African American; 1% Hispanic; 2% unknown ethnicity). In the spring of the post-transition year, there were 67 students identified as isolated by the SCM procedure, which represented 9.3% of the total sample of participants. Isolated students were found at each of the 4 middle schools, although the distribution was less even than in the fall (ranging from 5.6% isolated to 13.0%). The distribution of isolated students in the spring of sixth grade was similar to previous time points in terms of gender (64% male, 36% female) and ethnicity (85% White, 12% African American, 1% Hispanic, 2% unknown ethnicity).

Analysis of Social Network Isolation and School Functioning

Hypothesis 1: Students who are isolated from the social network will display higher levels of externalizing and internalizing behaviors and lower levels of perceived school belonging than students who are integrated into the social network at each time point. To test this hypothesis, a one-factor multivariate analysis of variance (MANOVA) was conducted for each time point (spring of fifth grade and fall and spring of sixth grade). In each MANOVA, isolation status (students who are isolated from the social network versus

non-isolated students) at the particular time point was the independent variable, and internalizing behaviors, externalizing behaviors, and perceived school belonging were the dependent variables.

The first MANOVA was conducted to examine concurrent school functioning among isolated and non-isolated students in the spring of the pre-transition year. Significant differences were found in the omnibus test (Pillai's Trace=.02, $F(3, 561) = 4.69$, $p < .01$). Tests of normality were non-significant, suggesting that the assumptions of normality were met (specifically, that the observed covariance matrices and error variances of the dependent variables were equal across groups). Univariate tests revealed significant differences in isolates and non-isolates for each of the dependent variables ($F(1, 563) = 3.95$, $p < .05$ for externalizing behaviors; $F(1, 563) = 7.65$, $p < .01$ for internalizing behaviors; and $F(1, 563) = 5.30$, $p = .02$ for school belonging). Isolated students had higher levels of externalizing and internalizing behaviors and lower levels of school belonging than their integrated peers in the spring of fifth grade (means for each dependent variable are included in Table 1). These results suggest that hypothesis 1 was supported in the pre-transition time point.

The second MANOVA was conducted to examine concurrent school functioning among isolated and non-isolated students in the fall of sixth grade. Significant differences in the two groups were found (Pillai's Trace =.948, $F(3,650) = 3.97$, $p < .01$). Tests of normality were non-significant, suggesting that the assumptions of normality were met (specifically, that the observed covariance matrices and error variances of the dependent variables were equal across groups). Univariate tests were then conducted, which revealed significant differences in isolates and non-isolates on two of the three dependent variables ($F(1, 652) = 11.25$, $p < .01$ for internalizing behaviors; $F(1, 652) = 7.58$, $p < .01$ for school

belonging). The univariate test was not significant at the .05 level for externalizing behaviors ($F(1, 652) = 3.00, p = .08$). Isolated students had higher levels of internalizing behaviors and lower levels of school belonging than their integrated peers in the fall of sixth grade (means for each dependent variable are included in Table 1). These results suggest that hypothesis 1 was generally supported in the fall of sixth grade. Students who were socially isolated in the fall of the sixth grade displayed higher levels of internalizing behaviors and lower levels of school belonging than their integrated peers, but the two groups did not significantly differ in terms of externalizing behaviors.

The third MANOVA was conducted to examine concurrent school functioning among isolated and non-isolated students in the spring of sixth grade. Tests of normality were non-significant, with one exception. The Levene's Test statistic was significant for the school belonging variable ($p = .03$), suggesting that there may have been a difference in the error variance of that variable across groups. Given the acceptability of all other tests of normality, the decision was made to proceed with the MANOVA while using caution in the interpretation of the results. Significant differences in the groups were not found for the spring of sixth grade (Pillai's Trace=.01, $F(3,688) = 1.79, p = .15$). These results do not provide support for hypothesis 1 in the spring of sixth grade. That is, isolated students and their integrated peers did not differ on indicators of school functioning in the spring of the year following the transition to middle school.

Analysis of Social Network Isolation and Social Functioning

Hypothesis 2: Students who are isolated from the social network will have fewer teacher-reported friends, lower social impact, and lower social preference, as compared to students who are not isolated from the social network system at each time point. Similar to

the analyses conducted for Hypothesis 1, a one-factor multivariate analysis of variance (MANOVA) was conducted for each time point (spring of fifth grade and fall and spring of sixth grade). In each MANOVA, isolation status (students who are isolated from the social network versus non-isolated students) at each time point was the independent variable, and social preference, social impact, and amount of teacher-reported friends were the dependent variables.

First, a MANOVA was conducted to examine differences among socially isolated and socially integrated students on indicators of concurrent social functioning in the spring of fifth grade. The omnibus test revealed significant differences between the two groups (Pillai's Trace = .07, $F(3,593) = 14.99$, $p < .01$). The Levene's Test statistic was significant for the social impact variable ($p = .02$), suggesting that there may be a difference in the error variance of that variable across groups. In addition, the Box's Test of Equality of Covariance Matrices was also significant ($p < .001$), which indicates that the observed covariance matrices of the dependent variables may not be equal across groups. Given the acceptability of all other tests of normality and the sensitivity of Box's M Test, the decision was made to proceed with the MANOVA while using caution in interpreting the results. Univariate follow-up tests revealed significant differences between isolated students and integrated students for each of the dependent variables ($F(1, 595) = 33.96$, $p < .01$ for teacher-reported friends; $F(1, 595) = 25.29$, $p < .01$ for social preference; and $F(1, 595) = 5.46$, $p = .02$ for social impact). In general, isolated students had lower levels of social preference, social impact, and teacher-reported friends than their integrated peers in the spring of fifth grade (means for each dependent variable are included in Table 1). These results provide support for hypothesis 2 at the pre-transition time point. That is, students who were isolated from the

social network system were rated as less liked (lower social preference) and had fewer overall ratings (lower social impact), and had fewer friends than did their peers who were integrated into the social system prior to the middle school transition.

The second MANOVA was conducted to examine concurrent social functioning among isolated and non-isolated students in the fall of sixth grade. Significant differences between the 2 groups were found (Pillai's Trace = .86, $F(3,659) = 20.68$, $p < .01$). The Levene's Test statistic was significant for the social impact variable ($p = .015$) and the teacher-rated friends variable ($p = .026$), suggesting that there may be a difference in the error variance of those variables across groups. In addition, the Box's Test of Equality of Covariance Matrices was also significant ($p < .001$), which indicates that the observed covariance matrices of the dependent variables may not be equal across groups. Given the acceptability of other indicators of normality and the sensitivity of Box's M Test, the decision was made to proceed with the MANOVA while using caution in the interpretation of the results. As with the first time point, univariate tests revealed significant differences in isolates and non-isolates on each of the social functioning dependent variables ($F(1, 661) = 22.57$, $p < .01$ for teacher-rated friends; $F(1, 661) = 27.42$, $p < .01$ for social preference; and $F(1, 661) = 28.563$, $p < .01$ for social impact). Means for each dependent variable are included in Table 1. In support of hypothesis 2, these results suggest that isolated students had lower levels of social preference, social impact, and teacher-reported friends than their integrated peers in the fall of sixth grade, following the transition into middle school.

The third and final MANOVA examined concurrent social functioning in the spring of the post-transition year. As with previous time points, significant differences were found between isolated and integrated groups in the spring of sixth grade (Pillai's Trace = .066,

$F(3,700) = 16.54, p < .01$). The Box's Test of Equality of Covariance Matrices was significant ($p < .001$), which indicates that the observed covariance matrices of the dependent variables may not be equal across groups. Once again, the decision was made to proceed with the MANOVA while using caution in the interpretation of the results. The results of univariate follow-up tests revealed significant differences in isolates and non-isolates on social functioning dependent variables at this time point ($F(1, 702) = 50.12, p < .01$ for ICST friends; $F(1, 702) = 53.71, p < .01$ for social preference; and $F(1, 702) = 33.01, p < .001$ for social impact). Means for each dependent variable are included in Table 1. Thus, in support of hypothesis 2, at the end of the middle school transition year, isolated students had lower levels of social preference, social impact, and teacher-reported friends than their integrated peers.

Stability of Isolation Status

Hypothesis 3: Students who are isolated from the social network in fifth grade will tend to remain isolated in fall and spring of sixth grade. Students who are isolated in the fall of sixth grade will tend to remain isolated in the spring of sixth grade. First, to describe the trends in isolation, descriptive statistics were examined at each time point. Of the 609 students who were longitudinal participants (had parental consent to participate, were present for each wave and not excluded from SCM analysis due to low participation rates), the majority of these students ($n = 503, 83\%$) were integrated into the social network prior to, during, and at the end of the middle school transition year. Of the 106 students who were isolated at some time point, the majority of students ($n = 74, 70\%$) were only isolated in 1 of the 3 time points. Only a small proportion ($n = 27, 25\%$) were isolated at 2 of the 3 time points, and the small remainder ($n = 5, 5\%$) were isolated at all time points before, during,

and after the transition. A small number of students who were isolated in fifth grade only or spring of fifth grade and fall of sixth grade ($n = 15$, 14% of students who were ever isolated) became integrated into the social network by the spring of the post-transition year, reflecting for some, a positive trajectory towards integration. However, a larger proportion of students who were integrated before the middle school transition, or both prior to the transition and early in the transition year ($n = 43$, 41% of students who were ever isolated), then became isolated in later time points, reflecting for this subset of students, negative trajectories towards isolation.

Next, to test for the stability of isolation, three chi-squared contingency table analyses were conducted. To account for the repeated measures conducted, the alpha level was adjusted to equal .017 (.05 was divided by 3 for each contingency table). The first contingency table compared isolation across the transition, and contained two variables; isolation status in fifth grade and isolation status in fall of sixth grade. Each variable had two levels; isolated or non-isolated. Isolation status at the two time points was found to be significantly related ($\chi^2(1, N = 560) = 25.45, p < .01$). Of the 25 students isolated prior to the middle school transition year, 60% were integrated at the beginning of sixth grade. Of the 535 students who were integrated prior to the middle school transition, the vast majority (91%) continued to be integrated at the start of sixth grade. Although students who were isolated prior to the middle school transition year were more likely to become integrated at the beginning of the sixth grade than to remain isolated, the chance of being isolated in the fall of sixth grade was much higher for students who were isolated at the prior time point (40%) than it was for students who were integrated in at the prior time point (9%). To provide further information about the results of the contingency tables, the EXACON

procedure of the SLEIPNER program, version 2.0, was used to determine if each individual cell of the contingency table was significantly different from the expectation, as well as the direction of the difference (Bergman & El-Khoury, 2002). The results of this procedure yielded significant values in each cell ($p < .001$), which indicates that each cell of the contingency table that compared isolation status prior to and at the beginning of the middle school transition was significantly different from the expected values. Students who were integrated in the spring of fifth grade were significantly more likely than chance expectation to be integrated in the fall of sixth grade and significantly less likely than chance expectation to be isolated at the fall of the middle school transition year. Students who were isolated in the spring of fifth grade were significantly less likely to be integrated in the fall of sixth grade than would be expected by chance and significantly more likely to be isolated at the fall of the transition year.

The second contingency table examined the stability of isolation status between the fall and spring of the middle school transition year. Isolation status at the two time points was significantly related ($\chi^2(1, N = 560) = 49.65, p < .01$). Of the 57 students isolated in the fall of sixth grade, 67% were integrated and 33% were isolated in the spring of that year. Of the 503 students who were integrated in the fall of sixth grade, 94% continued to be integrated in the spring and 6% were isolated. Again, the students who were isolated in fall of sixth grade were more likely to become integrated in the spring, but had a higher likelihood than those integrated in fall of sixth grade to continue to be isolated the spring. The results of the EXACON procedure for this contingency table yielded statistically significant values in all cells ($p < .001$). Students who were integrated in the fall of sixth grade were significantly more likely to be integrated in the spring of that year than would be expected by chance and

significantly less likely to be isolated. Students who were isolated in the fall of sixth grade were significantly less likely to be integrated in the spring than would be expected by chance and significantly more likely to be isolated.

The third contingency table examined the stability of isolation status from the first time period to the last time period; isolation status in fifth grade and in the spring of sixth grade. Isolation status at the two time points was found to be significantly related at the alpha level of .017 ($\chi^2(1, N = 560) = 32.98, p < .01$). Of the 25 students isolated prior to the middle school transition, 60% were integrated in the spring of the transition year and 40% were isolated. Of the 535 students who were integrated prior to the transition year, 93% continued to be integrated in the spring of sixth grade and 7% were isolated. Although there was a greater likelihood that students isolated initially would become integrated by the end of sixth grade, the chance of being isolated in the spring of sixth grade was much higher for students who were initially isolated in the spring of fifth grade (40%) than it was for students who were initially integrated (7%). The results of the EXACON procedure for this contingency table yielded statistically significant values in all cells ($p < .001$). Students who were integrated in spring of fifth grade were significantly more likely to be integrated in spring of sixth grade than would be expected by chance and significantly less likely to be isolated. Students who were isolated in the spring of fifth grade were significantly less likely to be integrated in spring of sixth grade than would be expected by chance and significantly more likely to be isolated at that time point.

In summary, the results of each of these contingency analyses support hypothesis 3, with findings that suggest that isolation status tends to remain stable across time periods. The first contingency table analysis supported the hypothesis that students who were isolated

from the social network in the fifth grade were more likely to remain isolated in the fall of sixth grade than would be expected by chance. The second contingency table supported the hypothesis that students who were isolated in the fall of sixth grade were more likely than expected to remain isolated in the spring of sixth grade. Finally, the third contingency table supported the hypothesis that students who were isolated in the fifth grade were more likely than expected to remain isolated in the spring of sixth grade.

Isolation and Longitudinal School Functioning Outcomes

Hypothesis 4: Students who experience isolation across the transition to middle school will have lower levels of school functioning (higher externalizing and internalizing behaviors and lower school belonging) than students who are socially integrated in the spring of sixth grade, after controlling for initial levels of school functioning in the spring of fifth grade. To test this hypothesis, three analyses were conducted (one for each dependent variable: externalizing behavior, internalizing behavior, and perceived school belonging at the spring of sixth grade) using hierarchical linear regression. Students who were isolated in one or more time periods across the transition to middle school were compared to students who were integrated into the social network at all three timepoints for each dependent variable. For each analysis, the data were examined for normality, homoscedasticity, and linearity by examining the spread of scores on the dependent variables and plots of residuals. No significant deviations from these assumptions were found. Multivariate outliers were also examined using the Mahalanobis distance variable. Although there were several large values (indicating cases with unusual combinations of independent variables), these cases were all found to have scores within the acceptable ranges for these variables, and were therefore included in the analyses.

The first analysis focused on externalizing behavior at the end of the middle school transition year (see Table 2). The fifth grade score for teacher-rated externalizing behavior variable was entered in the first independent variable block. In the second block, the dummy-coded variable for isolation status was entered, with a value of 1 assigned to students who experienced social network isolation during at least one time point and a value of 0 assigned to students who were integrated into the social network at all three points. Results of the regression analyses indicated that externalizing behavior prior to the transition year was a strong and significant predictor of externalizing behavior at the end of the middle school transition year, as rated by different teachers. Initial levels of externalizing behavior accounted for 34% of the variance in post-transition externalizing behavior. The addition of the isolation status variable did not account for a significant improvement of fit. Thus, the results of this model indicated that the experience of isolation at any point during the middle school transition did not contribute significantly to externalizing behaviors in the spring of sixth grade, above and beyond the effects of initial levels of externalizing behavior.

The next analysis focused on the effects of isolation on internalizing behavior at the end of the middle school transition year (see Table 2). The fifth grade score for teacher-rated internalizing behavior variable was entered in the first independent variable block. In the second block, the dummy-coded variable for isolation was entered. Results of the regression analyses indicated that internalizing behavior prior to the transition year was a significant predictor of internalizing behavior at the end of the middle school transition year, as rated by different teachers. Initial levels of internalizing behavior accounted for 15% of the variance in post-transition internalizing behavior. As was the case with externalizing behaviors, the addition of the isolation status variable did not account for a significant improvement of fit

for the internalizing behavior analysis. Similarly to the previous analysis, the results of this model indicated that the experience of isolation at any point during the middle school transition did not contribute significantly to internalizing behaviors in the spring of sixth grade, above and beyond the effects of initial levels of internalizing behavior.

Finally, hierarchical linear regression analyses were used to test for the effects of social isolation on students' sense of school belonging at the end of the middle school transition year (see Table 2). Parallel to previous analyses for this hypothesis, the fifth grade score for self-reported school belonging was entered in the first independent variable block. In the second block, the dummy-coded variable for isolation was entered. Results of the regression analyses indicated that self-reported levels of school belonging prior to the transition year was a significant predictor of school belonging at the end of the middle school transition year, accounting for 39% of the variance in post-transition internalizing behavior. The addition of the isolation status variable accounted for an additional 1% of the variance in sixth grade school belonging, which was a small but significant improvement of fit. Thus, the results of this model indicated that the experience of isolation at any point during the middle school transition did contribute significantly to self-reported school belonging in the spring of sixth grade, above and beyond the effects of initial levels of school belonging.

In summary, the hypothesis that the experience of isolation would contribute to adjustment outcomes in the spring of sixth grade was not supported for externalizing or internalizing behaviors, but was supported for students' sense of school belonging.

CHAPTER V

DISCUSSION

Although many previous studies had established the link between social status and current and longitudinal adjustment, the current study appears to be the first to focus specifically on the adjustment of students who are isolated from the social network at school. As a group, students who were isolated from the social network differed from students who were integrated into the social network in terms of school functioning, including internalizing behaviors, externalizing behaviors, and school belonging; and in terms of social functioning, including social preference, social impact, and amount of friends. In addition, the dynamic adjustment of early adolescents was examined at a time that research has shown to be critical to development and adjustment; the transition to middle school. Trends of stability were found in isolation status across the middle school transition, although many isolated students became integrated into the social network at some point during this period. Finally, the impact of the experience of being isolated at any time point on longitudinal school functioning outcomes was also examined. The experience of social isolation at any time point had a negative effect on school belonging in the spring of sixth grade after controlling for initial levels of belonging.

Previous research and theory had not specifically identified isolation from the social network as a risk factor for negative adjustment. Even though the developmental significance of belonging to a group in early adolescence has been established, little attention

has been paid to the possible implications for students who lack group affiliation. It has even been suggested that isolation from the social network could be a protective factor, since peer groups can influence deviant behavior (Cairns & Cairns, 1994). Although the current study did not address the impact of the peer group on deviant behavior, findings do suggest that students who are isolated from the social network are at risk for negative school adjustment, including concurrent school and social functioning and longitudinal difficulties in school belonging.

Social Network Isolation and School Functioning

Students who were isolated from the social network were compared to students who were integrated into the social network with regards to level of concurrent school functioning, including externalizing behavior, internalizing behavior, and school belonging at each time point across the transition. As hypothesized, significant differences were found, with isolated students displaying higher levels of teacher-reported externalizing and internalizing behaviors and lower levels of self-reported school belonging prior to the middle school transition. In the fall of the sixth grade, significant differences were found in internalizing behaviors and school belonging, but not in externalizing behaviors. In the spring of sixth grade, significant differences were not found between the two groups, which did not support the hypothesis that isolated students would differ from integrated students in terms of school functioning.

These findings add to the complexity of the existing body of research related to social isolation and externalizing behaviors. Although some previous studies had found no relationship between isolation status and externalizing behaviors (e.g., Cairns, et al. 1988), other research findings indicate that isolated students display higher levels of externalizing

behaviors (e.g. Gest, et al., 2001). The pattern of findings in the current study could be explained by the fact that as students transition into adolescence, externalizing behaviors become more normative (Farmer, et al., 2007). Research on the related construct of rejection has shown that externalizing problems tend to be associated with rejected status in childhood, but that externalizing behaviors may be unrelated to social rejection or even supported by the peer group in early adolescence (Pedersen, Vitaro, Barker, & Borge, 2007). Similarly, the results of the current study suggest that social network isolation was associated with externalizing problems in late elementary school, but not after students transitioned to middle school. In addition, as Gest, et al. (2001) suggested, there are two types of aggressive children: those who use aggression effectively and are socially dominant, and those who use aggression ineffectively, contributing to their exclusion. For some children, aggressive behaviors can serve adaptive functions (i.e., to maintain or improve social status), especially in school settings when aggressive or disruptive behavior is supported by the peer context (Farmer, 2000). These aggressive behaviors can also function to reestablish the social order at times when it is disrupted, particularly during school transitions (Farmer, 2000). Therefore, the use of aggression tends to be less adaptive and socially acceptable in elementary school, which may contribute to the findings that isolated students had higher levels of externalizing behaviors in the spring of fifth grade. However, as students transition to middle school, some students are able to use aggressive and disruptive behaviors effectively to establish their social dominance, while others continue to display externalizing behaviors that contribute to their social exclusion. The teacher ratings used in this study would not be able to distinguish the adaptiveness or effectiveness of students' use of externalizing behaviors, which may have contributed to a lack of significant differences

between the levels of externalizing behaviors of students who are socially isolated and those who are integrated into the social network system after the transition to middle school.

With regards to internalizing behaviors, differences between children who were socially isolated versus those who were socially integrated prior to and early into the middle school transition were consistent with previous research that has established a relationship between social isolation and specific internalizing problems, including sadness, anxiety, and shyness/withdrawal (Gest, et al., 2001; Estell, et al., 2008; Farmer & Rodkin, 1996; Newman, et al., 2007). Children with higher levels of internalizing behaviors, especially shyness, may have been isolated from the social network because their withdrawn behaviors made them less likely to make efforts to join a social group (Rubin & Coplan, 2004). It is also possible that the experience of social isolation may have contributed to negative emotions, such as sadness and anxiety, for isolated students in the first two time points. Previous research has established a link between feelings of social isolation and negative outcomes such as internalizing problems (e.g., Hall-Lande, et al., 2007). Since the current study did not address the underlying mechanisms of isolation, it is not possible to determine which, if any, of the above explanations for the connection between isolation and internalizing problems is at play. However, some researchers have suggested that both explanations for the process of social isolation may be simultaneously occurring; isolation can be seen as both a cause and a consequence of maladjustment, including internalizing problems (Laursen, et al., 2007).

At the end of the middle school transition year, it is possible that isolated and non-isolated students did not differ because, as students transition to adolescence, internalizing symptoms become more prevalent. For example, some research has shown that the typical

age of onset of depressive disorders occurs around age 11, when most students would be in sixth grade (Mash & Barkley, 2003). Interestingly, a review of the mean levels of internalizing behaviors indicated that while isolated students showed a downward trend across the transition to middle school of decreasing levels of internalizing behaviors at each time point, integrated students showed a trend of increasing internalizing behaviors from fifth to the spring of sixth grade. The reasons for this trend remain unknown, but it is inconsistent with previous research that suggests that withdrawn and shy behaviors become increasingly non-normative as children get older, leading to peer exclusion (e.g. Gazelle & Ladd, 2003). Another possible explanation for these findings is that teacher ratings did not capture the full experience of the isolated students. Research on internalizing disorders in children indicates that different sources (i.e., teachers, children, and parents) provide discrepant reports of internalizing symptoms, and that multiple sources of information are needed to provide the most valid picture (Mash & Barkley, 2003). More research, however, is needed to fully explain this phenomenon.

Although previous studies have established a connection between a lack of social support and decreased in school belonging, the current study appears to be the first to directly establish that social network isolation is directly related to lower levels of school belonging in the fifth grade and fall of sixth grade. Students who are isolated from the social network may be missing out on an important developmental need for relatedness and may feel that they are not accepted, respected, included, and supported by others in the school environment (Goodenow, 1993). This failure of the school environment to meet the needs of isolated students puts them at risk for experiencing negative academic outcomes, including declining motivation and school dropout, and negative psychosocial outcomes, such as mental and

physical health problems (Anderman, 2002). The lack of significant differences in school belonging in the spring of sixth grade may be related to the previous research findings that school belonging tends to decline during a single year in middle school for most students (Anderman, 2003; Hamm & Faircloth, 2005). An examination of the mean levels of school belonging from the current study reveals that both isolated and integrated students showed trends of decreasing school belonging from the fall to the spring of sixth grade. Previous research has established that the middle school environment is a poor fit for early adolescents' developmental and social needs (e.g., Eccles, et al., 1993). Since the middle school environment tends to be larger and more impersonal, emphasizes competition rather than cooperation, and tends to have a less supportive school social climate, most students tend to experience a decline in school belonging in middle school (Juvonen, 2007). It is possible that although isolated students felt a lower sense of school belonging enduring since before the transition, integrated students experienced a normative decline in school belonging upon transitioning to middle school, contributing to a lack of significant differences between these groups by the end of the transition year.

Social Network Isolation and Social Functioning

In addition to findings that suggest isolated students were at risk for maladaptive school functioning, findings from the current study also suggested that students who were isolated from the social network were also at risk for difficulties with concurrent social functioning, including social preference, social impact, and teacher-reported amount of friendships. At each point associated with the middle school transition, isolated students had lower levels of social preference, social impact, and teacher-reported friends than their integrated peers.

In keeping with research that has found a relationship between sociometric status and social network centrality (e.g., Farmer & Cairns, 1991; Gest et al., 2001), findings from the current study indicate that isolated students were lower on both social preference and social impact. The current study is unique, however, in that it examined students who were isolated as measured by the SCM procedure in a general education population across the transition to middle school. Students who were isolated from the social network exhibited lower levels of social preference, meaning that they were less likely than their integrated peers to receive favorable nominations from their peer group. Isolated students also had lower levels of social impact, meaning that they were less salient to the peer group, receiving a lower level of any nominations at all. These findings support the conclusion put forth by Gest, et al. (2001) that sociometric status and social network centrality are related, but distinct, constructs. Students who experienced difficulty integrating into the social network were more likely to experience other difficulties with the peer group, including lower levels of acceptance and salience to the peer group, but not all students who were isolated necessarily had these difficulties, as some isolated students had levels of social preference and impact that would place them in the average sociometric category.

The finding that socially isolated students had lower levels of teacher-reported friendships is consistent with previous findings that friendships are related to group membership (Cairns, et al., 1995) and that number of friends is related to social network centrality (e.g. Gest, et al., 2001). Also similar to the results of previous studies (Gest, et al., 2001), findings from current study indicate that social network isolation did not preclude students from forming dyadic friendships, as the average teacher rating was lower for isolated students, but did not indicate that all isolated students had no friends. It is important

to note that the current study reported number of friendships as rated by teachers, which has been shown to capture a slightly different construct than when the children themselves nominate their friends (Hartup, 1996). Also, the construct of reciprocated or mutual friendship (where both members of a friendship dyad nominate each other as friends), which is used in much of the literature on friendship, has been shown to be a distinct construct from unilateral nominations (Hartup, 1996). Regardless of the limitations in measurement, the finding that isolated students have lower levels of reported friendships is important because friendships have been established as important factors in psychological adjustment, especially during transitions (Hartup & Stevens, 1997). Also, friendships protect students from certain risks, such as victimization by bullies (Goldbaum, et al., 2007).

Stability of Isolation Status

In addition to concurrent school and social functioning characteristics of isolated students, longitudinal analyses were conducted to examine the stability of isolation status across the transition to middle school. Specifically, students who were isolated from the social network prior to the transition to middle school were more likely than expected by chance to remain isolated in both the fall and spring of the year prior to the transition. Also, students who were isolated from the social network in the beginning of the sixth grade tended to remain isolated at the end of that year, at a level greater than chance expectation. It is important to note that these findings do not indicate that once a student became isolated that he or she would be unable to integrate into the social network; in fact, only a third of students who were initially isolated before the transition continued to be isolated from the social network in both time points following the transition. The descriptive data also suggested that it was much more common for students to be isolated at a single point during the middle

school transition period than it was for students to be isolated across two or more time points during this transition. In summary, although experiencing isolation from the social network system early in the middle school transition period was associated with a greater likelihood of subsequent isolation, it was not the case that once a student was isolated they were stuck in isolation; in fact, most isolated students were able to become integrated at later time points.

Although the current study was the first to directly examine trends in isolation across the transition to middle school, the trend of stability found was consistent with previous research demonstrating the stability of other measures of social status. Previous research has shown that centrality tends to be stable to across school years, especially for children of lower levels of centrality (e.g. Cairns & Cairns, 1994) and that rejected sociometric status also has long-term stability (e.g., Kingery & Erdley, 2007). The relative instability in membership of peer groups (e.g. Cairns, et al., 1995), coupled with the reshuffling that occurs around school transitions (Farmer et al., 2006), may have provided many students who were isolated from the social network in late elementary school the opportunity to become integrated later during the transition period. These findings suggest that the transition to middle school provides an opportunity for some students to become integrated into the social network, but that many isolated students are at risk of experiencing continued difficulty integrating into the social network.

Isolation and School Functioning Longitudinal Outcomes

Longitudinal analyses were also conducted to examine the impact of the experience of being isolated at one or more time points on school functioning outcomes. Results of these analyses revealed that the experience of being isolated had a negative impact on school belonging in the spring of sixth grade, even after controlling for initial levels of school

belonging. The longitudinal relationship between other types of peer difficulties and negative school adjustment and attitudes has been established (Rubin, et al., 1998), but the current study is the first to suggest that social network isolation puts students at risk for maladaptive school functioning outcomes. Students who are unsuccessful at integrating into the social network at school may not experience fulfillment of their need for relatedness and social support at school, which undermines their feelings of belongingness to their school environment. Although the findings described previously establish the concurrent relationship between social network isolation and diminished school belonging, these longitudinal findings are especially critical because they demonstrate that the experience of being isolated, even at only one time point across the middle school transition, has a lasting impact on school belonging. Low levels of school belonging put isolated students at risk for experiencing a negative trajectory associated with lack of belonging to the school environment, including disengagement from school and eventual dropout. It is also important to consider the implications for students who are integrated into the social network. Social network integration could be an important protective factor that serves to buffer the negative impacts of the transition to middle school on sense of school belonging.

Findings from the current study indicated that the experience of being isolated did not have an impact on behavioral indicators of school functioning (including internalizing and externalizing behaviors) after controlling for initial levels of behavior. These findings could be due to the fact that internalizing and externalizing behaviors represent relatively stable individual characteristics which *underlie* social isolation. As described previously, students with high levels of internalizing behaviors, especially shyness and social withdrawal, may be less likely to make overtures to join a group, contributing to their isolation. Students with

high levels of externalizing behaviors may lack social skills which would make them appealing partners for social interaction with their peers, and may be excluded from participating in groups as a result (Rubin & Coplan, 2004). If these internalizing and externalizing behavioral traits are enduring facets of certain individuals' personalities, the experience of isolation from the social network would not be expected to have a significant impact on levels of these behaviors the following year. A similar hypothesis was generated regarding the related construct of rejection; Rubin, et al. (1998) suggested that the predictive relation between early peer rejection and later internalizing and externalizing problems found in the literature could be attributed to the behaviors that led to rejection initially.

Limitations

The current study was an analysis of students who were isolated from the social network and was limited by issues related to methodology, sample size, and demographic characteristics. With regards to methodology, the SCM procedure used in the current study used different units of analysis in the pre-transition (i.e., spring of fifth grade) versus post-transition (i.e., fall and spring of sixth grade) time points. The classroom was the network unit in late elementary school, as most of elementary students' interactions take place within that pool of potential associates, whereas the grade level was the unit of analysis after the transition to middle school, because middle school students attend multiple classes with peers in their same grade. Although this discrepancy was planned, it makes interpretation of SCM results across the middle school transition period difficult. Specifically, when students transitioned to middle school, there was a large difference in the number of students who were labeled as isolated through the SCM procedure (5% in spring of fifth versus 13% in fall of sixth and 9% in spring of sixth). It is possible that the increase in the proportion of isolated

students at the beginning of the middle school transition year is, in part, a reflection of the fact that in middle school the grade-level network unit has a larger pool of students, and some students were not yet known by their peers, rather than truly isolated. However, the relatively small proportion of students who were characterized as isolated from the social network system early in the transition year indicates that most students were recognized as members of social groups in the fall of sixth grade and that isolation was relatively uncommon even at that point. In addition, to add support to the idea that students who were isolated from the social network in the fall of sixth grade are likely to be truly isolated rather than simply forgotten, an analysis was conducted comparing the number of peer nominations of isolation between isolated versus integrated students at that time point. Results of statistical analyses, available from the author, indicated that integrated students had significantly fewer nominations of isolation as compared to students identified as isolated by the SCM procedure. It is also possible that the rise in isolation in the fall of sixth grade was directly related to the transition and the associated reshuffling of social groups. Although most students were able to find a social group by the fall of sixth grade, it is possible that finding a group took a little longer for some students, which may have contributed to the decline in percentage of isolated students from fall to spring of sixth grade. Finally, it is also possible that the middle school environment itself contributed to the increase in isolation. Middle school environments do not provide the same opportunities for social interaction with a consistent group of peers as elementary schools, which can be detrimental to early adolescents' social development (Juvonen, 2007). Upon transitioning to middle school, at a time when close and stable peer relationships become increasingly important, students are in a school environment with a large new group of peers, where they have contact with multiple

different sets of classmates throughout the school day. Thus, the middle school environment may be one in which social network integration is especially challenging for many students.

In addition to limitations with SCM methodology, this study was also limited by other measurement issues. Specifically, the construct of friendship was measured by a single, teacher-reported item in this study. As described previously, the standard in much of the research on friendship is to use reciprocated nominations by students, which is a slightly different construct than both teacher-nominated and unilateral nominations of friendship (Hartup, 1996). Furthermore, the use of a single item to measure a construct limits the reliability and validity of the measurement.

Additionally, this study was limited by the fact that students identified as socially isolated were treated as a homogenous group and compared to students who were not isolated from the social network. In reality, it is likely that isolated students are a heterogeneous group. For example, although isolated students as a group demonstrated higher levels of both internalizing and externalizing behaviors in the spring of fifth grade, individual isolated students may display divergent characteristics. Some students may display high levels of one or the other problem behaviors, while other may have high levels of both. On one hand, internalizing and externalizing disorders are conceptually opposed (internalizing disorders are considered “overcontrolled” problems with feelings directed at the self, whereas externalizing disorders are considered “undercontrolled” problems with behaviors directed at others; Mash & Barkley, 2003), and some students may have internalizing presentations whereas others display more externalizing behaviors. In addition, research on the related construct of rejection has identified two sub-types of rejected children; those who demonstrate aggressive behaviors, versus those who show withdrawn behaviors (Cillessen &

Mayeux, 2004). However, it is not uncommon for students to exhibit symptoms of both internalizing and externalizing behaviors. In both clinical population and general population studies, there are high rates of co-occurrence of internalizing and externalizing behaviors in children and adolescents, which may be due to the presence of multiple disorders (comorbidity) or the multiple presentation of symptoms associated with a single disorder (Gjone & Stevenson, 1997). Findings from the current study do not distinguish between different patterns of behavior within individual students. Although the current study found trends of increased internalizing and externalizing behaviors that hold true for isolated students as a homogenous group, it is not likely that all isolated students exhibit the same pattern of behavior. Some students may even have adaptive patterns of adjustment despite their lack of integration into the social network, possibly due to the presence of protective factors, such as close relationships with teachers, family support, or dyadic friendships. To gain a more complete understanding of the behavioral profiles of students who are socially isolated, it will be important for future studies to explore the configurations of these variables in individual isolated students, and how these configurations contribute to risk of future maladjustment. Future studies could use techniques such as person-centered analysis to examine patterns of adjustment in students who are socially isolated across the transition to middle school (Chung, et al., 1998).

Additionally, the small number of isolated students constrained the potential to examine trends in isolation over time. Although there is some evidence to suggest that stable patterns of peer difficulties can increase behavioral difficulties over time (e.g. Rubin, et al., 1998), the number of children who were stable in their isolation across all points of measurement during the middle school transition period was too small to apply many

statistical procedures. Studies with a larger sample of isolated students in the future may be able to clarify the differential adjustment outcomes of students with different trends in isolation status.

Relatedly, the small number of isolated students prevented consideration of potential gender differences. Research shows that boys and girls may be differently affected by school transitions (Chung, Elias, & Schneider, 1998) and that there are gender differences in trends in internalizing and externalizing disorders. For example, some research indicates that girls experience higher rates of depression and social withdrawal than boys beginning in early adolescence and that girls exhibit higher rates of anxiety disorders than boys throughout childhood and adolescence (Mash & Barkley, 2003). There is also evidence that there are differences in the social acceptability of aggressive behaviors and shy/withdrawn behaviors for boys and girls (Estell, et al., 2008; Rubin & Coplan, 2004). Therefore, boys might be excluded from social groups for displaying behaviors which are less socially acceptable for males (e.g., internalizing behaviors), whereas isolated girls may be isolated due to different behaviors, such as aggression, which is less socially acceptable for females in some cultural contexts. It will be important for future studies to examine if the risks and mechanisms of social isolation are different for boys and girls.

This research was also limited by the homogenous ethnic composition of its sample. Ethnicity and culture are an important influence on social norms, including the importance of belonging to a group and the consequences of isolation (Mash & Barkley, 2003). For example, a study of Cuban and Canadian children revealed that children from a more group-oriented culture (in Cuba) were more likely to be distressed by social isolation than children from a more individually-oriented culture (in Canada; Valvidia, et al., 2005). The current

study involved primarily Caucasian students from a rural Appalachian region. Previous research on rural schools has shown that rural youth may face unique challenges and demonstrate unique social dynamics (Blanton, et al., 1993). The school social community may be particularly important for rural children, as many rural environments offer few other opportunities for social interaction (Perkins, et al., 2002). The importance of belonging to a group in rural schools is not currently established, but it is possible that isolation from the social network at school could be particularly detrimental to children in rural environments, as there are limited opportunities for socialization outside of school. Additionally, children are likely to be socially isolated if they violate social norms, which vary in different cultural settings. Therefore, the correlates and consequences of social isolation found in the current study may be specific to the culture of the geographical region or ethnicity of its participants. Further research is needed to determine if the findings of the current study are generalizable to other regional and ethnic populations.

Future Research

The current study was the first to specifically focus on students who are isolated from the social network, and is a step toward identifying factors associated with social network isolation. Many questions regarding the mechanisms involved in social isolation and outcomes for these students remain.

As described in the limitations of the current study, children identified as isolated from the social network system were treated as a homogenous group. Future research should examine differences among isolated students, particularly in relation to the different possible mechanisms involved in isolation. Although an examination of the causes of social isolation were beyond the scope of this study, the findings that isolation was associated with both

increased internalizing and externalizing behaviors is in concordance with the both of the mechanisms of social isolation outlined by Rubin & Coplan (2004). The processes of active isolation (which may be the result of externalizing behaviors that cause others to refuse to engage with a child) and passive withdrawal (which may be related to internalizing behaviors that cause children to isolate themselves from peers) both may be at play for students who are isolated from the social network. The current study, however, represents only initial steps toward understanding the mechanisms that underlie and outcomes associated with isolation from the social network.

The literature reviewed in the current study revealed distinct procedures used for identifying students who were socially isolated; the SCM procedure and the nomination procedure. The SCM procedure was the focus of the current study, because it has been more well-established in terms of psychometric properties, and conceptually, this study was focused on students who were not integrated into the social network, even if they were not salient enough to their peer group to be nominated as isolates. Given the potential different constructs measured by the nomination versus the SCM procedure for identifying students who are socially isolated, it will be important for future research to examine the extent to which the procedures identify divergent groups of students. For example, future studies should determine if there is a correlation between students nominated as not belonging to a group and isolated students as determined by the SCM procedure. In addition, the two methodologies for identifying isolated students may be associated with different behavioral and social profiles. For a student to receive peer nominations for isolation implies that the student is salient enough to be recalled by the peer group. Students who are *nominated* as isolated could have higher levels of social impact, and thus would be more likely to fall into

the rejected sociometric category, whereas students who are identified as isolated by the *SCM procedure* and not nominated may have lower levels of social impact, and be more likely to be sociometrically neglected.

Findings from the current study indicated that a significant proportion of isolated students were at risk for difficulties in school and social functioning. Many socially isolated students, however, did not demonstrate these difficulties. It will be important for future research to examine risk and protective factors in students who are socially isolated. For example, while isolated students have lower levels of friendships, most isolated students are not totally friendless. Previous research has established that participation in friendships can moderate the association between social isolation and psychological problems in young children (Laursen, et al, 2007) and adolescents (Hall-Lande, et al., 2007). One avenue of research could be to explore factors such as number and quality of friendships, or negative outcomes such as victimization, in relation to social isolation to see if participation in even a few dyadic friendships acts as a protective factor for isolated students. In addition, future research could explore the possible interaction effects of sociometric status in isolated students. Since research has established the negative impacts of rejected status, whereas the impacts of neglected status have been less clear, it is possible that sociometric status could mediate outcomes for children who are isolated from the social network.

Additionally, the current research was limited to the examination of individual characteristics associated with isolation. School social climate can contribute to individual students' social functioning. For example, the extent to which students who display certain behavioral characteristics are rejected by their peers depends on the acceptability of those behaviors in the peer social context (Stormshak, et al., 1999). In addition, several school

variables, including school social climate, school size, grade-level configuration, and demographic characteristics of the student population are also likely to impact the school social network. For example, Anderman (2002) suggested that in schools with a social climate where many students feel that they do belong, those who feel isolated may experience even greater maladjustment. Therefore, schools with overall high levels of belonging could be contexts where socially isolated students are particularly at risk for negative outcomes. There were not enough schools in the sample used in the current study to examine school characteristics. Future research that considers the role of the school context would add a crucial piece to understanding social isolation in school.

Implications for Intervention

The transition to middle school is a time of stress and anxiety for most students, but for some particularly vulnerable students, it can mark the beginning of a pathway of negative adjustment (Eccles, et al., 1993). Students without adequate social support, including students who are isolated from the school social network, are particularly at risk during this transition (Kingery & Newman, 2007). Schools should support the developmental needs of all students, as well as provide additional support services for students who are at risk for greater difficulties (Roeser, et al., 2000). Universal supports should provide buffers against transition stress which would benefit all students, including those who are isolated from the social network. One possible way to decrease stress associated with the transition to middle school is teacher support. Teachers can work to create a supportive environment by connecting with students to ease them through school transitions (Cotterell, 2007). Teachers can also decrease the tendency to show favoritism towards students with positive reputations and increase positive contact towards students who are having difficulty with social

interactions (Osterman, 2000). Also, organizational changes to the school environment should be implemented that encourage students' bonding with peers and with the school, such as block scheduling and smaller class sizes (Osterman, 2000). Additional school-level changes, including cooperative learning curricula and anti-bullying programs which promote environments of emotional safety should be put into place to foster a supportive school social climate (Juvonen, 2007).

In addition to universal supports, which offer the potential to benefit all students transitioning to middle school, targeted interventions are needed for students who are isolated from the social network and experiencing related difficulties in adjustment. Teachers and administrators who are aware of individual students who are isolated from the social network can intervene to provide positive attention and opportunities for peer interaction (see case study of isolated student described in Cairns and Cairns, 1994). Since students who are isolated at any time point are at risk for lower levels of school belonging after the transition to middle school, it is important to intervene with these students to provide increased opportunities for school bonding, such as increased supportive contact with school staff and increased inclusion in school activities and groups (Goodenow, 1993). Students could be paired with a mentor from the school staff and encouraged to join extracurricular activities at school to increase their sense of attachment to the school environment and lower risks of disengagement and dropout. In addition to difficulties with school belonging, children who are isolated across the transition to middle school are also at risk for difficulties with internalizing and externalizing behaviors. Regardless of whether these difficulties are the antecedents or consequences (or both) of social isolation, the use of effective, evidence-based interventions targeting the particular difficulties of individual students would likely increase

these students adaptive school functioning. Depending on the needs of individual students, interventions targeting the reduction of externalizing behaviors (e.g. the Coping Power Program; Lochman, Wells, & Lenhart, 2008) and internalizing behaviors (e.g. the Coping Cat Program for anxiety; Kendall & Hedtke, 2006) could be beneficial. Since the transition to middle school can result in multiple pathways of adjustment for students who struggle with social relationships, school psychologists can be instrumental in determining the needs of individual students and implementing interventions suited to these needs (Chung, et al., 1998).

Conclusion

The current study adds to the body of literature based on a developmental science framework, which focuses on the larger peer network, but adds a unique contribution in its focus on students who are isolated from the social network system. Although previous research and theory has established the importance of belonging to a group in early adolescence, the developmental significance of a lack of integration into a group is not well-understood. This study was a preliminary examination of the trends of isolated students in terms of concurrent school and social functioning, longitudinal school functioning, and the stability of isolation status.

The transition to middle school is a time of stress for many students, and a time that can be especially distressing for students with difficulties in peer relationships. Although social network isolation was not previously identified as a risk factor contributing to the negative adjustment of students around the transition to middle school, the current study demonstrates that there are several indicators of adjustment difficulties associated with isolation. Future research is needed to develop a more complete understanding of the

trajectories of risk and resilience for students who are socially isolated. The risk factors illuminated in the current study, however, indicate the need for universal and selected interventions to improve the positive adjustment for students who are isolated from the social network at school.

Table 1

Descriptive Statistics

Variable	Isolate Status	<i>n</i>	Mean	Standard Deviation	Skewness	Kurtosis
Wave 1						
Teacher-rated Externalizing	Integrated	542	5.40	1.62	-0.84	-0.33
	Isolated	23	4.71	1.83	-0.05	-1.44
Teacher-rated Internalizing	Integrated	542	3.23	1.21	0.35	-0.11
	Isolated	23	3.96	1.53	0.03	0.38
School Belonging	Integrated	542	3.75	0.75	-0.77	0.61
	Isolated	23	3.38	0.88	-0.34	-0.69
Teacher-rated Friends	Integrated	566	5.21	1.47	-0.38	-0.76
	Isolated	31	3.61	1.67	0.21	-0.38
Peer nominated Social Preference	Integrated	566	0.21	1.50	-0.38	0.31
	Isolated	31	-1.28	1.59	-0.83	-0.47
Peer nominated Social Impact	Integrated	566	0.13	1.11	0.60	0.25
	Isolated	31	-0.24	1.51	0.94	-0.10
Wave 2						
Teacher-rated Externalizing	Integrated	575	5.84	1.42	-1.25	0.83
	Isolated	77	5.53	1.62	-1.09	0.28
Teacher-rated Internalizing	Integrated	575	3.39	1.16	0.25	0.08
	Isolated	77	3.86	1.12	0.08	-0.58
School Belonging	Integrated	575	3.77	0.79	-0.58	-0.13
	Isolated	77	3.50	0.79	-0.62	0.74
Teacher-rated Friends	Integrated	580	4.95	1.33	-0.21	-0.45
	Isolated	83	4.22	1.23	-0.15	0.62
Peer nominated Social Preference	Integrated	580	0.22	1.46	-.647	5.04
	Isolated	83	-0.66	1.31	-1.90	5.61
Peer nominated Social Impact	Integrated	580	0.31	1.47	1.73	4.46
	Isolated	83	-0.54	1.14	2.12	5.29

Wave 3						
Teacher-rated Externalizing	Integrated	630	5.52	1.54	-0.95	0.04
	Isolated	58	5.17	1.75	-0.48	-1.08
Teacher-rated Internalizing	Integrated	630	3.44	1.17	0.15	-0.25
	Isolated	58	3.58	1.32	0.59	0.30
School Belonging	Integrated	630	3.66	0.78	-0.54	-0.08
	Isolated	58	3.47	0.97	-0.91	0.27
Teacher-rated Friends	Integrated	640	4.91	1.37	-0.30	-0.43
	Isolated	64	3.98	1.52	0.03	-0.83
Peer nominated Social Preference	Integrated	640	0.23	1.47	-0.93	6.41
	Isolated	64	-0.77	1.31	-1.82	4.02
Peer nominated Social Impact	Integrated	640	0.26	1.41	1.72	4.42
	Isolated	64	-0.39	1.13	1.87	4.39

Table 2

Regression Analyses of School Functioning Controlling for Initial Functioning

	Externalizing Behavior		Internalizing Behavior		School Belonging	
	1	2	1	2	1	2
5 th Grade Score	.58**	.58**	.38**	.38**	.63**	.61**
Isolation Status	--	-.05	--	.04	--	-.08*
R2	.34	.34	.15	.15	.39	.40
F for Change in R2	271.55**	1.93	91.24**	1.15	331.98**	5.748*

Note. 1 = First regression model, 2 = Second regression model. Standardized Betas reported.
*p<.05, **p<.01

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