INSTRUCTION BASED ON PEER INTERACTIONS

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INTRODUCTION

Peers are of central importance to children throughout childhood and adolescence. They provide each other with companionship and entertainment, help in solving problems, personal validation, and emotional support. In turn, children who engage in positive activities with peers also tend to experience levels of emotional well-being, positive beliefs about the self, and values for prosocial forms of behavior and social interaction that are stronger and more adaptive than children who do not (Rubin, Bukowski, & Parker, 2006; Wentzel, Baker & Russell, 2014). In addition, children who enjoy positive interactions and relationships with their peers also tend to be engaged in and even excel at academic tasks more than those who experience problems with peers (Wentzel, 2013). For example, numerous studies have documented that children’s interactions and personal relationships with peers are associated with a range of academically related outcomes at school, including goals and values, skills related to self-regulation and problem-solving, and performance outcomes, such as grades and test scores (Wentzel, 2013, 2014).

This body of work suggests that learning is likely influenced by the social contexts within which children learn, and highlights the notion that intellectual development might be dependent on the characteristics of and opportunities provided by peers within school settings (Bronfenbrenner, 1989). In light of this evidence, a central question addressed in this chapter is how students’ involvement with peers might be related to academic motivation and accomplishments. Toward this end, peer-related activities are discussed in terms of children’s interactions and interpersonal relationships with classmates as they occur within the broader social structures of schooling. We first summarize the evidence that links involvement with peers at school to learning and intellectual outcomes. We discuss peer involvement within structured learning contexts and within informal day-to-day relationships. Next, we present theoretical and conceptual models that might explain these links. Finally, we suggest ways in which evidence and theory can be applied to classroom instruction and school-based practices, and suggest future directions for this field of work.
STUDENTS’ INTERACTIONS WITH PEERS AND SCHOOL-RELATED COMPETENCE

Researchers typically have studied children’s involvement with peers at school in two ways, within the context of relationships (e.g., degree of peer acceptance by the larger peer group, membership in specific peer groups, and dyadic friendships; Kindermann, in press; Wentzel, 2009), and within structured interactions related to instruction (e.g., cooperative and collaborative learning; Slavin, 2011; Wentzel & Watkins, 2011). In this section, we first review briefly findings relating interactions in structured learning contexts to learning outcomes. We then describe students’ informal interactions with peers and provide evidence of positive associations between these types of interactions and students’ motivation and academic outcomes. Theoretical perspectives that provide insights into why these associations exist are then considered.

Peer Interactions in Formal Learning Activities

Connections between peer involvement and learning have been studied most often within the context of structured learning activities that require collaborative and cooperative interactions. For the purposes of the following discussion, we consider these activities at two levels: those that require dyadic interactions and those that require interactions among members of a larger group. Dyadic learning activities typically involve the joint structuring of an activity with shared participation of two students in which outcomes for each individual are typically documented. In contrast, group activities typically involve four to six members; outcomes can be gauged by group-level as well as individual-level performance. While both of these approaches to peer learning appear to promote individual learning outcomes, they do so under different task and partner conditions. In the following sections, evidence linking participation in each of these formal peer learning activities to learning outcomes is described (see Chapter 18 in this volume for a more detailed review).

Dyadic Learning

Learning in dyads is a well-established educational practice. In general, reviews of research indicate that dyadic peer interactions contribute most (albeit modestly) to learning outcomes for minority, urban-dwelling, and young children, and when dyads are homogeneous with respect to gender (e.g., Rohrbeck, Ginsburg-Block, & Fantuzzo, 2003). However, experimental laboratory studies of peers working in dyads have documented that active discussion, problem solving, and elaborative feedback are associated with advances in a range of cognitive competencies, including problem solving skills, conceptual understanding, and metacognitive reasoning; samples range from preschool to high school students (Gauvain, in press; Rogoff et al., 2007). These benefits have been demonstrated in studies of mathematics (Ginsburg-Block & Fantuzzo, 1998) and science learning (Golbeck, 1998), especially when the quality of peer interactions is high (Webb, Nemer, & Zuniga, 2002).

Experimental evidence has also linked dyadic problem solving to high levels of intellectual engagement, use of advanced strategic thinking skills, and specific academic gains, and to greater task engagement and understanding than does problem solving done individually or within the context of traditional classroom instruction.
Instruction Based on Peer Interactions

These latter findings are qualified, however, by strong evidence that positive outcomes occur for less competent students when they have peer partners who are competent in the task, have good communication skills, provide ability-related positive feedback, and who clearly articulate problem-solving strategies (Azmitia, 1988; Fuchs et al., 1994; Tudge & Winterhoff, 1993).

In contrast to findings from more controlled experimental laboratory studies, results of classroom intervention studies on dyadic learning have been less conclusive. However, specific dyadic peer tutoring programs have yielded promising results (see Person & Graesser, 1999), and have been used effectively in teaching basic skills such as math, reading and spelling (Mastropieri, Scruggs, & Berkley, 2007). These programs have been particularly effective with students of varying cognitive and academic abilities (e.g., Greenwood, Carta, & Maheady, 1991); peer tutoring is particularly efficacious with students who have attention deficits because it involves active responding to academic material under conditions of frequent, immediate feedback using individualized academic content presented at the student’s level and pace (DuPaul, & Henningson, 1993).

**Group Learning**

The effects of peers working together in small groups on academic outcomes also appear to be generally positive (see Chapter 18 in this volume). Results of quasi-experimental and experimental studies suggest that the most successful group learning activities are those that require positive interdependence among group members, individual accountability, face-to-face interactions among students, and learning social skills necessary to work cooperatively. Effects on academic achievement and cognitive outcomes (e.g., creative problem solving, knowledge retention) are consistently positive when students work toward group goals while individual group members are simultaneously held accountable for progress (i.e., individual testing).

Positive increases in motivational outcomes in the form of intrinsic motivation, positive attitudes toward school, persistence, sense of efficacy, and self-esteem also have been documented, especially when group approaches are structured, cultivate informational interdependence (i.e., jigsaw arrangements; Aronson & Patnoe, 1997), and combine group goals and individual accountability (Buchs, Butera, Mugny, & Darrnon, 2004). Group learning tends to be largely unsuccessful in producing cognitive gains when group members differ as a function of ability, race, ethnicity, and SES (Cohen, 1986; McMaster & Fuchs, 2002). Moreover, direct pathways from dyadic and group forms of learning to cognitive gains rarely have been established when accounting for the complex social and motivational aspects of peer interactions.

**Informal Peer Interactions**

In addition to dyadic and group learning activities, students interact with each other within the context of social relationships on a daily basis. Relationships with peers are typically studied in terms of peer acceptance or sociometric status, peer groups and crowds, and friendships. Peer acceptance and sociometric status variables typically are based on unilateral assessments of a child’s relative standing or reputation within the peer group. Scores reflect either a continuum of social preference ranging from well-accepted to rejected (e.g., How much do you like this person?), or assignment to a
sociometric status group (i.e., popular, rejected, neglected, controversial, and average status; Asher & Dodge, 1986). As such, peer acceptance or social status of a student is determined by a diverse set of peers who are not necessarily friends with the student and with whom interactions might be infrequent.

Membership in peer crowds and groups is typically determined by identifying clusters of students who are friends with each other using statistical procedures (e.g., peer networks; Kindermann & Gest, 2009) or by asking students to identify groups characterized by activities (e.g., sports) or behavioral characteristics (e.g., substance use) or more simply, those who spend time together (e.g., who hangs out; Brown, 1989). Students’ membership in specific peer crowds and groups has been studied most frequently in adolescent samples (Brown, 1989; Brown & Dietz, 2009). Adolescent crowds often include “Populars” (students who engage in positive forms of academic as well as social behavior), “Jocks” (characterized by athletic accomplishments), “Druggies” (engaged in delinquent and other illicit activities), and “Normals” (fairly average students). Research on peer crowds has been mostly descriptive, identifying the central norms and values that uniquely characterize each crowd.

Finally, peer relationships are studied with respect to dyadic friendships. In this case, students are asked to nominate their best friends at school; often, nominations are then matched to determine reciprocity, or best friendships. The central distinction between friendships and involvement with the broader peer group is that friendships reflect relatively private, egalitarian relationships often formed on the basis of idiosyncratic criteria. In contrast, peer groups are defined by publicly acknowledged and therefore easily identified and predictable characteristics that are valued by the group. Larger peer groups often are comprised of students who have formed close dyadic friendships with each other. However, friendships are enduring aspects of children’s peer relationships at all ages, whereas peer groups and crowds emerge primarily in the middle school years, peak at the beginning of high school, and then diminish in prevalence as well as influence by the end of high school (Brown, 1989).

Research that establishes causal relations between informal peer interactions and academic outcomes is rare. However, a growing body of work indicates that the quality of these relationships (regardless of how they are studied) has implications for understanding students’ motivation and performance outcomes (Wentzel, 2005, 2013). We discuss each of these outcomes in turn.

**Motivation**

Multiple types of peer relationships have been associated with a broad range of motivation outcomes. Sociometric status and peer acceptance have been related positively to pursuit of goals to learn, interest in school, and perceived academic competence; moreover, these findings are robust at all ages (see Wentzel & Muenks, in press, for a review). During middle school, having friends has been related to positive aspects of social (e.g., goals to help, share, cooperate and follow rules) and academic (e.g., engagement in academic tasks) motivation (Kindermann & Skinner, 2012; Wentzel, 2005). Peer group membership has been associated with liking and enjoyment of school (Ryan, 2001), and with changes in motivation (e.g., intrinsic and extrinsic goals) over time (Kindermann & Gest, 2009; Kindermann & Skinner, 2012). Finally, peer acceptance and group membership have been related to a range of motivation outcomes (e.g., goals, efficacy, interest) during high school (King & Ganotice, 2014; Nichols & White, 2014; Robnett & Leaper, 2013).
Academic Achievement

Peer relationships have also been related to academic accomplishments. Social status and acceptance have been related positively to classroom grades, standardized test scores, and IQ in samples ranging from elementary school to high school (Cillessen & van den Berg, 2012; Wentzel & Muenks, in press); longitudinal studies have documented the stability of these relations over time (e.g., Gest, Demitrovich, & Welsh, 2005; Parker & Asher, 1993; Wentzel & Caldwell, 1997). Simply having friends also has been related positively to grades and test scores (Jones, Audley-Piotrowski, & Kiefer, 2012; Wentzel, Barry, & Caldwell, 2004; Wentzel & Caldwell, 1997). Students who make transitions with their friends, and those who make friends quickly, also tend to make better academic adjustments to new schools than those who do not (e.g., Ladd, 1990; Molloy, Gest, & Rulison, 2011; Wentzel et al., 2004).

Finally, adolescent peer groups differ in the degree to which they pressure members to become involved in academic activities, with “Jocks” and “Popular” groups providing significantly more pressure for academic involvement than other groups (Brown & Dietz, 2009). Researchers who identify friendship-based peer groups using statistical procedures also have found relations between group membership and academic performance (Kindermann & Gest, 2009; Kindermann & Skinner, 2012). For example, elementary-aged students tend to self-select into groups of peers that have motivational orientations to school similar to their own. Over the course of the school year, these orientations became stronger and more similar within groups (Kindermann, 1993; Ryan, 2001). Friendship-based groups in middle school also have been related to changes in academic performance over time (Wentzel & Caldwell, 1997).

Summary

The literature on peer relationships and interactions provides strong and convincing evidence that peer interactions within informal relationships and more structured learning activities are related positively to a wide range of motivational and academic competencies at school. However, although findings often are robust across samples and age groups, this evidence is based almost entirely on correlational studies lacking strong bases for drawing causal inferences. Similarly, experimental work on dyadic and group learning often has not included important controls. Therefore, it is not clear whether the positive outcomes reported in these studies are the direct result of interactions with peers, or the result of other outcomes associated with peer interactions such as behavioral styles and social skills that are conducive to classroom learning, or the motivational benefits of having positive peer relationships that also support learning.

Despite these methodological drawbacks, it is reasonable to assume that for many children, peers have the power to influence the development and demonstrations of academic competencies in positive ways. Theoretical perspectives on why and how such positive influence might take place are discussed in the following section.

THEORETICAL PERSPECTIVES ON PEER INTERACTION AND ACADEMIC COMPETENCE

How and why might students’ relationships with peers be related to positive school-related accomplishments? Traditionally, theoretical explanations have focused on the broad notion that positive interactions with peers contribute directly to cognitive
development and functioning. These explanations focus primarily on interactions that take place in formal learning contexts (e.g., Piaget, 1965; Vygotsky, 1978). Additional approaches are based on models of peer socialization that consider how students’ positive relationships with each other in informal learning contexts provide important opportunities for motivating and facilitating academic accomplishments (Wentzel, 2005, 2015). A final explanation for positive associations between peer interactions and academic outcomes is that influence might not be direct but rather, that functioning in social and academic domains might be linked to each other by way of factors that contribute to positive outcomes in each. In the following sections, each of these perspectives will be described.

**Peer Interactions and Cognitive Gains**

Theories of cognitive development have a longstanding tradition of relying on social interaction to explain cognitive growth and learning. Piaget and Vygotsky both proposed that children are active participants in their own development and that they acquire knowledge about their world through activity and social interactions. For example, Piaget (e.g., 1965) proposed that mutual discussion, perspective taking, and conflict resolution with peers can motivate the accommodation of new and more sophisticated approaches to intellectual problem solving. This conflict facilitates an awareness of differences in perspectives and fosters the evaluation and development of each partner’s own beliefs. For Piaget, development was contingent on the relatively symmetrical nature of same-aged peer interactions that allowed conflict resolution within the context of mutual reciprocity.

Piaget’s notion of symmetrical interaction among peers is found most often in collaborative learning contexts. The nature of these collaborative problem-solving contexts orients children toward discovery and reflection rather than practice and implementation (Phelps & Damo, 1989). Collaborative learning is unique, in that by definition, it encourages discovery learning by incorporating co-construction of knowledge from the original learning situation and always involves retaining each partner’s perspective to some degree. Therefore, the resulting cognitive representation involves an integration of multiple perspectives. In support of this notion is evidence that problem solving tasks that demand the acquisition of basic reasoning skills have been found to occur best in peer collaborative contexts rather than other forms of peer learning contexts such as tutoring (Sharan, 1984; Slavin, 1980). Cognitive gains attributed to participation in cooperative learning activities also have been explained with respect to mechanisms associated with symmetrical peer interactions (also see Chapter 18 of this volume).

The social activity on which Vygotsky (1978) placed primary importance involves small groups, often pairs of individuals, who engage in social exchanges. However, Vygotsky suggested that within these peer groupings, social interactions can contribute directly to the development of academic and social skills when competent students teach specific strategies and standards for performance to peers who are less skilled. Therefore, in contrast to Piaget, Vygotsky proposed that asymmetrical interactions contribute to competence development through the process of scaffolding. Vygotsky was clear in his suggestion that not only is a difference in the level of expertise between partners necessary, but also an understanding by the more advanced partner of the abilities of the less advanced child so that information can be presented at a developmentally appropriate level (Tudge & Rogoff, 1989). Therefore, the challenge for the
advanced partner is to find a technique that will facilitate as well as motivate positive
social interactions and communication with the less advanced partner. This process of
scaffolding extends the range of the less advanced child by bridging the gap between
current skill and desired skill, thereby allowing him or her to accomplish a task not
otherwise possible. From an instructional perspective, scaffolding requires deliberate
decision making and choice of peer partners in order to create the optimal learning
environment for students.

Peer Interactions and Socialization Models

What do positive relationships and interactions with peers in informal settings provide
to students that enable or facilitate positive academic outcomes? Most researchers agree
that at the core of positive peer relationships and interactions are the benefits they pro-
vide in the form of social supports (Bukowski, Motzoi, & Meyer, 2009; Parker & Asher,
1993). These supports serve a range of functions, including maintenance of the peer
group by promoting socially valued goals and social cohesion, as well as facilitating
the development of individual outcomes such as social skills and psychological well-
being. Supports that promote allegiance to the broader group and to engagement in
group-valued activities take the form of expectations for the pursuit and achievement
of specific outcomes, help to achieve these outcomes, a safe environment, and emo-
tional nurturance (see Wentzel, 2004 for a review). These outcomes reflect essential
components of social support in that if present: a) information is provided concern-
ing what is expected and valued by the group; b) attempts to achieve these valued
outcomes are met with help and instruction; c) attempts to achieve outcomes can be
made in a safe, non-threatening environment; and d) individuals are made to feel like
a valued member of the group.

Applied specifically to peer activities as they occur in classroom and school settings,
this perspective suggests that students will engage in the pursuit of academic goals in
part when their peers communicate positive expectations and standards for achieving
academic goals; provide direct assistance and help in achieving them; and create a
climate of emotional support that facilitates positive engagement in valued classroom
activities, including protection from physical threats and harm (Ford, 1992; Wentzel,
2004). In the following sections, we describe specific mechanisms whereby peer sup-
ports can have influence on motivational and academic outcomes. We group these
mechanisms with respect to informational supports (providing goals, expectations,
and assistance) and motivational supports (emotional caring, rewards and reinforce-
ments, and peer pressure).

Informational Supports

It is clear that teachers play a central role in academic instruction and modeling strat-
egies to learn. However, students also communicate important information, teach
valuable skills, and provide instrumental help to each other. Although these supports
can occur during the course of academic instruction, they are a large part of informal
peer interactions at school. As suggested by social cognitive theory, direct instruction
and modeling are powerful mechanisms whereby students learn from peers what is
expected of them along with skills that enable them to go about meeting those expect-
tations (Bandura, 1986). These processes can occur within dyadic or small group
interactions. The larger peer group also can be a source of behavioral standards, with
direct instruction and modeling serving as a means to monitor and enforce group standards and expectations (Brown, Bakken, Ameringer, & Mahon, 2008; Kindermann, 2007).

Direct Instruction

During the course of interactions with peers, students receive input concerning socially valued goals and expectations for academic performance and social behavior (i.e., What am I supposed to do? Is this important and enjoyable to do?), and standards against which judgments of personal efficacy can be made (i.e., Can I do this?). From a social-cognitive perspective, peers who convey expectations that academic engagement and positive social interactions are important and enjoyable are likely to lead others to form similar values and goals (Bandura, 1986).

Empirical evidence that peers communicate expectations and opinions concerning appropriate behavior and academic outcomes is scant. However, it is clear that these communications do occur, functioning to define, clarify, maintain, and enforce peer norms (Brown et al., 2008). Middle-school students report that their classmates hold expectations for them regarding social behavior and academic performance (Wentzel, 1994; Wentzel, Baker, & Russell, 2012). In turn, peer expectations are related to students’ own goals and values: Students who perceive relatively high expectations for academic learning and engagement from their peers also report that they pursue goals to learn (Wentzel, 2004; Wentzel, Battle, Russell, & Looney, 2010; Wentzel et al., 2012), and perceived expectations from peers for behaving prosocially are significant predictors of internalized values for and displays of prosocial behavior (Wentzel et al., 2014). Influence of group norms on motivation is also suggested in findings relating peer group membership to academic outcomes, from elementary school through high school (e.g., Kindermann, 1993; Kiuru, Aunola, Vuori, & Nurmi, 2007; Sage & Kindermann, 1999). Finally, advice and feedback from peers following success or failure can lead to adjustments in perceived competence and expectations for future success (Altermatt et al., 2002; Gauvain & Perez, 2007).

Modeling

Modeling is also a powerful process by which information is communicated. As with direct instruction, peer modeling can influence students’ adoption of goals and values for behavior and academic performance (Bandura, 1986). Of interest for the current chapter is that modeling effects are especially likely to occur when students are friends (Crockett, Losoff, & Petersen, 1984; Ricciardelli & Mellor, 2012). Findings relating characteristics of friends to changes (positive and negative) in social behavior and engagement throughout middle school (Barry & Wentzel, 2006; Berndt, Hawkins, & Jiao, 1999; Wentzel et al., 2004) and high school (Prinstein, Brechwald, & Cohen, 2011) provide indirect evidence for modeling effects. Similarly, changes in younger children’s competence perceptions from fall to spring have been associated with the competence perceptions of their very best friends (Altermatt & Pomerantz, 2005; Molloy et al., 2011). Adolescents’ perceptions of their friends’ academic behavior, engagement, and performance also have predicted students’ own achievement-related choices, goal pursuit, engagement, and academic performance (e.g., Jones et al., 2012; Marion et al., 2014; Nelson & Debacker, 2008).
Motivational Supports

Students also exert influence on each other by expressing degrees of emotional caring, dispensing rewards and reinforcements, and engaging in peer pressure. These types of influence are found in instances of social acceptance and rejection, intrinsic and extrinsic reinforcements, and group contagion.

Social Acceptance and Rejection

Students experience varying levels of social belongingness and acceptance as a function of their relationships with specific peers and to the extent that peer groups are inclusive or exclusive (Bennett, 2014). Models of peer influence posit that students who are rejected by their peers suffer from a lack of opportunities and supports afforded to children accepted by peers, including positive and effective role models, direct instruction concerning normative behavior and skill development, and sources of positive reinforcements for social and academic behavior (Parker & Asher, 1987; Patterson & Bank, 1989).

Social acceptance and rejection can also have a powerful impact on students' motivation and emotional well-being. For example, theoretical perspectives suggest that strong affective bonds and perceived support from others serve as buffers from stress and anxiety and contribute to a positive sense of emotional well-being (Sarason, Sarason, & Pierce, 1990). In turn, feelings of emotional security and being socially connected are believed to facilitate the adoption of goals and interests valued by others, including goals to contribute in positive ways to the overall functioning of the social group (e.g., Ryan & Deci, 2000). In support of this notion is an extensive literature indicating that experiencing supportive and caring peers is related positively to interest and engagement in classroom life, whereas viewing relationships with peers as negative is related to motivational and academic problems (e.g., Wentzel, 2005, 2014).

Theorists also have argued that desires to sustain positive group identity and cohesion can result in exclusionary practices within and between groups (e.g., Abrams & Rutland, 2008; Bennett, 2014), including the formation of stereotypes and discrimination (e.g., Dovidio et al., 2005; Tajfel & Turner, 1979). As with social acceptance and rejection, these group-level processes can have a profound effect on students’ emotional well-being (Brown et al., 2008), their access to opportunities and supports (Haslam, Reicher, & Levine, 2012), and motivational beliefs, including a sense of group efficacy (Bandura, 1986).

Intrinsic and Extrinsic Reinforcement

Peers can also exert influence by way of reinforcements and rewards. Intrinsic rewards are positive outcomes for the self that are associated with the act of engaging in a task or activity; students might engage in behavior valued by peers because they experience the behavior as enjoyable and of personal value (Boggiano, Klinger, & Main, 1986; Ojanon, Stratman, Card, & Little, 2013). Extrinsic rewards are outcomes associated with a task that are externally imposed or viewed as an end-point, such that the task is viewed as a means to an end. In this case, engaging in positive social interactions and conforming to social expectations is a way to achieve other goals, such as social acceptance or a better grade (Wentzel, 2002).
Peer influence has also been studied with respect to negative reinforcements and reward systems. In this literature, the primary focus has been peer use of intimidation, power assertion, negative reinforcement, and punishment. These practices have been used to explain the process of peer pressure and how peer groups function to establish normative standards and power hierarchies (e.g., Cairns, Neckerman, & Cairns, 1989). To illustrate, popular children often exert power over others by using social acceptance and status as a reward for compliance and conformity (Cillessen & Rose, 2005; Sandstrom, 2011). An extensive literature has also demonstrated how negative reinforcement through the use of physical and relational aggression can result in a broad range of negative outcomes related to motivation, emotional functioning, and social behavior, for perpetrators as well as victims (e.g., Crick, Murray-Close, Marks, & Mohajer-Nelson, 2009). Evidence also suggests that students can experience punishments for doing well academically through labeling and stigmatization (Boehnke, 2008; Fordham & Ogbu, 1986).

**Group Contagion**

Group contagion is a process of influence that has been studied as a unique aspect of peer group functioning. As defined by Dishion and Piehler (2009), peer contagion “describes a mutual influence process that is not intentional, purposeful, or planned, but is initiated and maintained by social dynamics” (p. 589). In essence, it is influence that occurs as a function of being a member of a peer group or social network, and of patterns of reinforcement that occur as a product of group functioning (Dishion, 2013). Peer contagion is associated most often with children’s and adolescents’ disinhibition of behavior and the disruption of normative behavior (e.g., Boxer et al., 2005; Ehrenreich et al., 2014), and with mood regulation and depressive symptoms (Dishion & Connell, 2006). However, peer group dynamics have also been associated with positive aspects of student motivation, such as pursuit of intrinsic goals (Duriez et al., 2013) and emotional well-being (Prinstein, 2007; van Workum et al., 2013).

**Links Between Formal and Informal Peer Settings**

Thus far, we have argued that students have the potential to influence each other’s cognitive development and academic accomplishments by way of interactions in formal and informal contexts. Formal peer contexts such as dyadic and group learning activities are believed to foster intellectual development by way of interactive problem solving. Such development is based on the assumption that cognitive gains are made when peers collaborate while engaging in fairly structured tasks. These perspectives describe cognitive gains in fairly narrow terms, that is, as the development of specific cognitive structures and intellectual skills. Informal contexts as defined by various types of peer relationships are believed to influence student motivation and academic accomplishments through informational and motivational supports.

Although discussion of ways in which these two perspectives on peer learning might be synergistic is rare, it is useful to think about ways in which peer interactions in one type of context might influence interactions in the other. For example, the same supports that are afforded by informal peer contexts also are likely to facilitate the types of positive interactions that are related to cognitive gains within more structured peer learning contexts (Wentzel & Watkins, 2002). The fact that collaborating on academic tasks with friends tends to yield more predictable cognitive advances than
does collaboration with non-friends (e.g., Fonzi, Schneider, Tani, & Tomada, 1997) provides support for this notion. Therefore, it is reasonable to assume that the specific supports provided within the context of informal peer relationships can partly explain successful learning in formal peer learning activities, especially if the students know each other well.

Similarly, students’ affective functioning is an important outcome of peer interactions in informal settings that has implications for academic outcomes (e.g., Juvonen, Nishina, & Graham, 2000). For example, evidence documents significant relations between psychological distress and depression and a range of achievement-related outcomes, including interest in school (Wentzel, Weinberger, Ford, & Feldman, 1990), negative attitudes toward academic achievement, actual levels of performance (Dubow & Tisak, 1989; Wentzel et al., 1990), school avoidance and low levels of classroom participation (Buhs & Ladd, 2001), and ineffective cognitive functioning (Jacobsen, Edelstein, & Hoffmann, 1994). In the same vein, it is likely that successful peer collaborations can enhance the quality of peer relationships by providing opportunities for students to strengthen interpersonal ties and, therefore, the likelihood that positive peer supports will become available during other forms of classroom instruction.

An additional way to think about connections between students’ interactions in informal and formal peer contexts is to consider basic underlying skills that might facilitate competent functioning in both types of settings. Specifically, behaving in socially competent ways can contribute to the development of positive relationships with peers (Fabes, Martin & Hanish, 2009), which in turn provide students with a range of positive supports. Socially competent behavior also can provide a foundation for the types of positive peer interactions in formal settings that are necessary for cognitive gains to occur (e.g., Ladd et al., 2014). In support of the notion that social skills and behavior are competencies important for developing successful peer relationships as well as for positive interactions in structured learning settings is empirical work documenting associations between peer relationships and social behavioral outcomes (Rubin et al., 2006) and between positive forms of social behavior and successful peer collaborations (Wentzel & Watkins, 2002).

In short, numerous studies provide evidence in support of strong associations between peer relationships and social-emotional functioning. Work on peer collaborative learning also has documented the important role of social skills and group cohesion in facilitating the positive effects of peer interactions on cognitive gains. From a theoretical perspective, examining the extent to which behavioral styles, social skills, and affective functioning account for positive associations between peer relationships, collaborative interactions, and academic outcomes is a critical next step in understanding the role of peers in facilitating intellectual growth and academic accomplishments.

From a practical perspective, it is important to understand the role that adults can play in promoting positive peer relationships and interactions at school, as well as supporting positive displays of behavior. Indeed, teachers and administrators are the primary architects of the classroom and school contexts where students interact with each other. In the following section, we describe the potential impact that teachers and the broader school context can have on students’ ability to provide positive resources and supports to each other, to interact with each other in positive ways within structured learning activities, and to encourage the peer group to be socially accepting, cooperative, and welcoming, particularly to students who demonstrate peer problems that interfere with their academic progress. Exploring teacher influences on children’s peer relationships has the potential to expand the way in which we conceptualize peer
problems and to improve interventions for improving behaviors by building the social skills linked to friendship and academic success (Mikami, Lerner & Lun, 2010).

**LINKING EVIDENCE AND THEORY TO PRACTICE**

Given the potentially powerful and positive role that peers can have on student learning and achievement, it becomes important to understand the role of teachers and the broader school context in promoting successful interactions and personal relationships among peers. There is evidence that teachers’ beliefs and behaviors; classroom organization and instructional practices; and school-wide structure, composition, and climate affect students’ ability to interact successfully in peer learning activities, students’ peer choice and general propensity to make friends, and levels of peer acceptance and friendship networks in classrooms. In the following sections, relevant research on teachers and classroom contexts, and then on school-level influences, is described.

*Teachers and Formal Peer Learning Activities*

Teachers play a critical role in the success of formal peer-learning activities in that the implementation of these activities, and particularly of peer tutoring techniques, requires that students have partners who can benefit from the interactions as well as contribute to the learning of their peer partners. Therefore, when implementing peer-assisted learning structures, teachers cannot just place students together and hope for the best. These activities require explicit planning and training that will prepare peer partners in academic as well as social skills. Indeed, the Vygotskian model presumes that a measure of assistance and feedback will typically be provided by the more competent partner in collaborative learning contexts and that peers will interact with each other in socially competent ways.

In support of this notion, research on peer learning has confirmed that children do not necessarily develop the constructive interaction patterns or the ability to scaffold that are required for productive engagement to occur without explicit preparation. As Person and Graesser (1999) note, tutoring behaviors tend to be primitive and are often characterized by questioning that is limited in frequency and level of cognitive demand, coupled with infrequent correction of errors, and the giving of positive feedback at inappropriate times. Moreover, students do not necessarily have the ability to engage in positive social interactions that are necessary for successful collaborations with one another (Peterson, Wilkerson, Spinelli, & Swing, 1984). However, the positive effects of training students to work with peers also have been demonstrated. Higher achieving partners who have been trained to offer positive constructive feedback and guided direction can enhance the quality of social interactions and cognitive functioning of lower achieving students (e.g., Fuchs et al., 1996; Tudge, 1992; Webb, 1983).

Of particular importance to teachers in inclusive educational settings is the use of peer contexts as vehicles for increasing learning or for ameliorating academic problems for diverse groups of students. Training peer partners to work with these students is especially important for obtaining positive results (e.g., DuPaul et al., 1998; Pfiffner & Barkley, 1998). A case in point is found with children diagnosed with Attention Deficit Hyperactivity Disorder (ADHD) who are being educated in regular classroom settings. These students tend to display behaviors known to impair peer relationships (e.g., noncompliance, complaining, whining, teasing, and inattention) and that peer
Instruction Based on Peer Interactions

Partners frequently complain about when working with students with ADHD (Hinshaw, 1992; Mrug et al., 2007; Normand et al., 2011). Repeated findings that children with peer problems are at elevated risks for subsequent disengagement and failure in academic settings (Buhs, Ladd, & Herald, 2006) underscores the importance of interventions that improve the peer relationships of these students in regular classroom settings.

Given the success of collaborative interaction training studies, however, it is reasonable to assume that preparing higher-achieving partners to engage and encourage peers with ADHD to participate in the problem solving process might improve the quality of their social interactions, and ultimately foster an opportunity for them to profit from collaborative peer learning. To illustrate, in a study by Watkins and Wentzel (2008), high-achieving females were trained in specific social interaction and communication skills such as: a) reflective listening (i.e., clarifying and summarizing their partner’s ideas by paraphrasing the suggestion or restating his/her feelings); b) providing positive feedback (i.e., giving constructive, positive ability-related statements); c) avoiding criticism; d) providing advance organizers (i.e., describe a proposed method of solving the task through thoughtful planning); e) providing strategies by thinking aloud (i.e., convey to partner the reasons underlying one’s decisions by allowing partner to share in the thinking process); f) giving elaborate explanations (i.e., step-by-step explanations and answers); and g) reciprocal questioning (i.e., elicit explanatory replies and engage partner in verbal participation). Observations of interactions between the trained high-achieving female partners and their male partners with ADHD documented that a positive significant increase in the use of these skills over the course of a session was associated with significant increases in joint participation and advanced strategic problem solving and significant decreases in inappropriate behavior and immature social interaction patterns for the male partners. This work suggests that collaborative settings can benefit children with ADHD when their peer partners are trained to display and reinforce positive social interaction skills.

Teachers and Informal Peer Relationships

Although the nature of causal connections between teacher-student interactions and peer relationships is unclear, it is reasonable to assume that students’ positive relationships with peers might be due in large part to teachers’ communications of specific expectations for behavior and achievement, and to systematic regulation of student behavior through instruction-related activities. To illustrate, teachers’ expectations concerning students’ aptitude and performance have been related to levels of peer acceptance and rejection (e.g., Donohue, Perry, & Weinstein, 2003; Farmer, Lines & Hamm, 2011; Mikami, Griggs, Reuland, & Gregory, 2012). Teachers’ verbal and nonverbal behavior toward certain children, especially when critical, also has been related to how these children are treated by their peers (Harper & McCluskey, 2003).

Teachers’ verbal and nonverbal behavior toward certain children also has been related to how these children relate to their peers. Teacher praise directed at specific groups of elementary school-aged students has been associated with increased peer preference for those students (e.g., Flanders & Havumaki, 1960). In addition, teachers’ positive feedback in response to appropriate behavior has been related to students’ positive evaluations of and peer preference for students exhibiting that behavior, whereas negative and critical feedback for disruptive and off-task behavior has been related to negative evaluations of and peer disliking of students exhibiting such behavior.
(White & Kistner, 1992). Finally, teachers vary in the behaviors they consider to be appropriate and inappropriate when children are interacting with each other, especially with regard to aggression; in turn, teachers’ perspectives on the appropriateness of behaviors tend to be adopted by their students (Craig, Henderson & Murphy, 2000; Smith, 2007).

The instructional approach that a teacher adopts also appears to have an impact on students’ relationships with peers (Farmer et al., 2011). For example, students enjoy more positive relationships with classmates when teachers use learner-centered practices (e.g., involving students in decision making) as opposed to teacher-centered practices (e.g., focusing on rote learning, norm-referenced evaluation; Donohue et al., 2003) or competitive practices (Mikami et al., 2012). The way in which teachers group students also has been associated with the quality of peer relations (Gest & Rodkin, 2011), and interactions (Luckner & Pianta, 2011). Finally, middle and high school students in classrooms where students are encouraged to talk to each other about class assignments, to work in small groups, and to move about while working on activities also are less likely to be socially isolated or rejected, enjoy greater numbers of friends, and experience more diversity and stability in their friendships (e.g., Gest & Rodkin, 2011).

Finally, recent work on peer relationships points to ways in which teacher characteristics and instructional factors can have an influence on the peer ecologies of students with ADHD (e.g., Chang, 2004; Donohue et al., 2003). As with the other work cited in this section, this systems approach proposes that teachers’ interpersonal interactions with students and instructional practices should relate to the ways in which students interact with each other (Jones, Brown, & Aber, 2008). To illustrate, teachers’ public, positive attention to students with ADHD has been related to changes in negative impressions held by peers (Mikami et al., 2010). Moreover, decreases in peer rejection for students with externalizing behavior problems has been shown in classrooms where teachers established positive relationships with their students and utilized learner-centered instructional practices (e.g., warm teacher-child interactions, responsiveness to the student’s needs, respect for the student’s point of view, and classroom organization) that explicitly accentuate the capability of learning for all students (Hamre & Pianta, 2005). In contrast, the relation between externalizing behavior and decreasing social preference is actually strengthened for students with ADHD when teachers promote academic hierarchies and demonstrate preference for the most academically talented students (Mikami, Griggs, Reuland, & Gregory, 2012).

Collectively, this work demonstrates that the quality of teacher-student interpersonal relationships and learner-centered instructional practices have the potential to contribute to positive peer interactions, reputations, academic achievement, and motivation for students with peer problems (Mikami et al., 2012; Pianta & Allen, 2008). In turn, this work suggests the need for teacher-training interventions through professional development. The value of teacher professional development interventions is particularly important at the secondary school level where teachers are found to perceive their function as imparting academic content rather than facilitating social relationships with peers (Lynch & Cicchetti, 1997). One such intervention, My Teaching Partner-Secondary (MTP-S), is designed to increase teachers’ positive interactions with students and promote sensitive instructional practices. MTP-S has demonstrated most improvement in positive peer interactions of students high in disruptive behavior (Mikami et al., 2011). While direct instruction of social skills has been useful for younger students with peer problems, the MTP-S model suggests a more effective way
to improve peer relationships for adolescent students with diverse learning and behavioral needs.

**School-Level and Structural Influences**

Evidence of ways in which school structures and school-level characteristics can influence peer interactions and relationships has been less forthcoming. However, variations in the social, academic, ethnic and gender composition of classrooms are known to influence friendship dynamics. Specifically, homogenous classroom composition can be deleterious to the formation and maintenance of positive, high quality, peer relationships over time (Barth et al., 2004). The gender composition of a classroom can influence the relationships students form with each other (Barton & Cohen, 2004; Capella & Neal, 2012). Similarly, African-American students in classrooms that are ethnically diverse tend to report having more high quality friendships than those in less diverse classrooms (Jackson, Barth, Powell, & Lochman, 2006). Finally, the degree to which middle schools and high schools are ethnically diverse, as opposed to having clear majority and minority groupings, also can influence the nature and stability of students’ friendships, with greater diversity resulting in students who have more friends and more extensive social networks than those in less diverse schools (Jackson et al., 2006; Urberg, Degirmencioglu, Tolson, & Halliday-Scher, 1995).

Schoolwide policies and programs that accentuate the importance of students’ prosocial development can also facilitate the development of positive peer relationships (Durlak et al., 2011; Gresham, Van, & Cook, 2006). For example, social skills training programs can increase the prevalence of prosocial behaviors (e.g., sharing, cooperating) displayed by students in the classroom by teaching them how to recognize emotions more effectively, negotiate conflict resolutions, and control impulsive behaviors (Gresham et al., 2006). These programs also facilitate a reduction in maladaptive social skills, thus enabling the formation of more functional peer relationships (Wilson & Lipsey, 2007).

Other structured efforts to enhance prosocial behavior and corresponding peer interactions are exemplified by the Child Development Project (CDP; Developmental Studies Center, n.d.). The CDP curriculum provides cooperative learning activities and class meetings designed to communicate and reinforce positive behavioral and social norms of the classroom, foster cognitive and social problem-solving, and to build classroom unity and a sense of community. Formal evaluations (Developmental Studies Center, n.d.) have documented that CDP schools out-perform comparison schools on a multitude of factors, including increased levels of positive behavioral outcomes, lower levels of negative behaviors, and academic outcomes. Similarly, the Fast Track Program (see Bierman et al., 1999), a school-based intervention designed in part to promote friendship building skills and social problem solving strategies, has documented improvements in the quality of elementary-aged students’ peer relationships and social interactions (Lavallee, Bierman, & Nix, 2005), as well as prosocial and aggressive behavior (Conduct Problems Prevention Research Group, 2010).

From a developmental perspective, improving the quality of peer relationships should be of special concern for teachers and administrators who work with students during transitions to new schools. For example, many young adolescents enter new middle school structures that necessitate interacting with larger numbers of peers on a daily basis. In contrast to the greater predictability of self-contained classroom environments in elementary school, the relative uncertainty and ambiguity of multiple
classroom environments, new instructional styles, and more complex class schedules often result in middle school students turning to each other for information, social support, and ways to cope. Students who have access to positive peer supports are likely to adapt to the demands of middle school transition more quickly and in more positive ways than those without such supports (Wentzel et al., 2004).

Finally, although the literature implies that peers might be the primary source of threats to students’ physical safety and well-being, of central importance to understanding this process is that teachers and school administrators can play a central role in creating schools that are free of peer harassment and in alleviating the negative effects of harassment once it has occurred (e.g., Espelage & Colbert, in press; Olweus & Limber, 2009). Interventions designed to offset the often negative influence of peer groups and gangs on behavior and school attendance are especially successful if students have access to adults who provide them with warmth and strong guidance (e.g., Chaskin, 2010). Schools that stress intergenerational bonding also support the development of positive teacher-student relationships that can act as buffers against the potentially negative effects of aggressive peers on behavior (Crosnoe & Needhan, 2004).

CONCLUSION AND FUTURE DIRECTIONS

In this chapter, we addressed the question of how and why students’ social interactions and relationships with peers might be related to learning and intellectual development. Toward this end, we provided evidence that links involvement with peers at school to learning and intellectual outcomes, defining peer involvement with respect to interactions in structured learning contexts and as it plays out in interpersonal relationships on a daily basis. Theoretical and conceptual models that might explain these links also were described, and we presented ways in which evidence and theory can be applied to classroom instruction and school-based practices.

In general, theory and research provide a strong foundation for concluding that students’ involvement with their peers provides multiple opportunities and resources for the development of intellectual competencies and positive motivational orientations toward learning. Structured learning contexts such as collaborative or cooperative learning activities can provide a context where basic skills necessary for later achievement in content areas can be learned and practiced. These types of peer learning structures also provide students with an equal opportunity to participate in ways that eliminate the possibility that students will become passive learners. Formal as well as informal peer interactions also foster working relationships that emphasize mutual assistance and relatedness, shared goals, emotional support and safety, interdependence and group cohesion. All of these elements of peer involvement have the potential to make learning with peers highly motivating, to promote personal responsibility for learning, to utilize intellectual and interpersonal strengths, and to challenge the development of more sophisticated approaches to learning.

As the field moves forward, well-controlled experimental studies will be needed to understand the true causal impact of peer involvement on learning. At the same time, more sophisticated models that include mediating and moderating pathways are needed to understand specific processes that enhance (or detract from) the positive impact of peers on learning. For example, to what extent does the development of motivational processes such as goal setting, efficacy, and self-determination explain positive associations between peer interactions and academic outcomes? The moderating effects of
gender, race/ethnicity, and age in relations between peer interactions and achievement also deserve further study.

Similarly, models that identify ways in which classroom settings and instructional practices might modify the influence of peers on learning need further development (Farmer et al., 2011). In this regard, explanatory models must be developed with specific types of social configurations in mind (e.g., learning in dyads versus groups; learning with friends versus acquaintances), and perhaps modified depending on whether the target student is in elementary, middle, or high school, or has special needs. Integration of research on classroom reward structures, school culture and climate (Zusho, Dardino, & Garvia, in press), and person-environment fit (Simpkins, Fredericks, & Eccles, 2015) into models of peer learning also can inform our understanding of how the social institutions and contexts within which learning takes place can facilitate the positive impact of peer involvement in learning. We look forward to these advances in the field.

REFERENCES


