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Capturing Peers', Teachers', and Parents' Joint Contributions to Students' Engagement: an Exploration of Models

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Capturing Peers', Teachers', and Parents' Joint Contributions to Students' Engagement:

An Exploration of Models

by

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Abstract

Building on research that has focused on understanding how peers contribute to students' engagement, this dissertation explores the extent to which peer group influences on students' engagement may add to and be contextualized by qualities of the relationships they maintain with their teachers and their parents. To focus on how each of these adult contexts work in concert with peer groups to jointly contribute to changes in students' engagement, the two studies used data on 366 sixth graders which were collected at two time points during their first year of middle school: Peer groups were identified using socio-cognitive mapping; students reported on teacher and parent involvement; and teachers reported on each student's engagement. In both studies, models of cumulative and contextualized joint effects were examined. Consistent with models of cumulative effects, peer group engagement, parent involvement, and teacher involvement each uniquely predicted changes in students' engagement. Consistent with contextualized models suggesting differential susceptibility, peer group engagement was a more pronounced predictor of changes in engagement for students who experienced relatively low involvement from teachers. Similarly, peer group influences on changes in students' engagement were stronger for students who experienced relatively low involvement from their parents. In both cases, these peer effects were positive or negative depending on the engagement versus disaffection of each student's peer group. Both studies also used person-centered analyses to reveal cumulative and contextualized effects. Most engaged were students who experienced support from

either both teachers and peers, or both parents and peers; the lowest levels of engagement were found among those students who affiliated with disaffected peers who also experienced either their teachers or parents as relatively uninvolved. Both high teacher and high parent involvement partially protected students from the motivational costs of affiliating with disaffected peers. Similarly, belonging to engaged peer groups partially buffered students' engagement from the ill effects of low teacher and parent involvement. These findings suggest that, although peer groups and teachers and parents are each important individually, a complete understanding of their contributions to students' engagement requires the examination of their joint effects.

Acknowledgements

I firmly hold to the Bronfenbrennerian view that an individual is more than just a singular, distinct being. An individual takes on a particular shape through the unthinkably large number of interactions had with every person, idea, and object in their environment—their ecological system—throughout the entirety of their life. By extension, an individual's accomplishments are not simply his or her own, but are shared with important others. I recognize that I am no different; and so, I would like to take this moment to formally thank a few particularly special individuals for helping me to become me and for making this accomplishment possible.

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Chapter 1

Introduction

For decades, multiple disciplines of research have focused on identifying predictive factors, other than demographics such as socioeconomic status, race, and ethnicity, that explain why some children underperform in the classroom and/or leave school prematurely. Much of this area of work has explored students' motivation as a primary predictor of academic success (Wentzel & Miele, 2016; Wigfield et al., 2015); however, an increasing number of researchers, who have more recently come to view students' engagement as an observable manifestation of the energy and persistence that emanates from their underlying motivation (Ryan & Deci, 2009; Skinner, Kindermann, Connell, & Wellborn, 2009; Wang & Degol, 2014), have begun to explore its role as a predictor of achievement.

Research exploring student engagement provides compelling evidence that the extent to which students are behaviorally and emotionally involved with learning activities in the classroom predicts their academic performance (Blondal & Abalbjarnardottir, 2012; Finn & Zimmer, 2012; Skinner et al., 2009; Ullah & Wilson, 2007). Engaged students, through their intrinsically motivated involvement with learning, are less likely to engage in delinquent behaviors, and are at lower at risk for low school achievement, and dropout (Appleton, Christenson, & Furlong, 2008; Fall & Roberts, 2012; Finn & Rock, 1997; Li & Lerner, 2011; Janosz, Archambault, Morizot, & Pagani, 2008; Wang & Fredricks, 2014; Wang & Peck, 2013). Disaffected students,

on the other hand, who may be detachment from, bored with, or apathetic toward learning activities, are at an elevated state of risk for sustained underachievement, dropout and involvement in delinquent behaviors (Blondal & Adalbjarnardottir, 2012; Finn, 1989; Li & Lerner, 2011; Morrison, Robertson, Laurie, & Kelly, 2002).

With accumulating evidence suggesting that students' engagement plays a central role in students' learning and academic success, the field has sharpened its focus on identifying antecedent factors that bolster children's engagement in the classroom. These factors include the structural qualities of the school and classroom (Anderman & Maehr, 1994; Qin, Johnson, & Johnson, 1995; Teven & McCroskey, 1997; Urdan & Schoenfelder, 2006) as well as the various, overlapping social environments experienced by the child (Skinner & Pitzer, 2012; Urdan & Schoenfelder, 2006). The two studies presented in this dissertation build on the later of these two lines of research, by examining how students' social environments work in concert, synergistically or antagonistically, to jointly influence students' motivated classroom engagement.

To date, research has focused on three major sources of social influence on the development of students' academic engagement and motivation: *parents*, *teachers*, and *peers* (Wang & Eccles, 2012). A majority of existing work in this area has concentrated on parents' and teachers' influence on students' academic engagement, generally finding that students who experience parents and teachers who are involved (Klem & Connell, 2004; Ryan & Shin, 2011; Skinner & Belmont, 1993) and supportive of their

motivational needs (Hamre & Pianta, 2001; Wentzel, 1994, 1997) are more engaged

during classroom tasks and learning activities than students whose parents and teachers

are coercively involved or uninvolved (Skinner et al., 2009). Less research has explored

how friends, classmates, and peer groups influence students' classroom engagement

(Altermantt & Pomerantz, 2005; Berndt, Hawkins, & Jiao, 1999; Hallinan & Williams,

1990; Kindermann, 1993, 2007; Ladd, 1990); however, interest in this area has surged

in recent years (Juvoven, Espinoza, & Knifsend, 2012; Lynch, Lerner, & Leventhal,

2013; Perdue, Manzeske & Estell, 2009; Wang & Eccles, 2012). Part of this research

has focused on *peer groups*, which are the small groups of peers with whom children

choose to spend their time, and has generally converged on the finding that their

contributions to students' school engagement and motivation are considerable

(Kindermann, 1993; Kindermann, 2007; Ryan, 2001).

　　While this small, but growing body of research has provided compelling

evidence that peer groups play a cruicial role shaping students' academic motivation

and engagement, there remain some limitations to these findings. Findings from most

research in this area are based on main effects models, and so are generalizable to only

to the "average" student. Much of this work involves regression-based analyses, where

differences between students are controlled for, rather than explored and explained. For

example, Kindermann (2007) controlled for variables such as teacher and parental

warmth and involvement, to explore the unique effect peers have on the development of

student engagement. While these studies identify the peer group as a significant source

of influence on students' motivation, over and above parental and teacher contributions, they do not explore the possibility that peer groups might be more important sources of socialization for some students than for others. It is possible, for example, that qualities of the relationships students have with other social partners (i.e., parents and teachers) may contribute to students' broader social ecologies in ways that render them more, or less, susceptible to peer group influences. Together, the papers presented as part of this dissertation expand upon the research base by providing a clearer picture of how peer group influences operate within a more complete social ecosystem. Both studies test the efficacy of two models of joint influence: cumulative models, and contextualized models.

The remainder of this document is organized as follows: Chapter 2 provides a brief review of the current literature. In this chapter, research on the construct of academic engagement, its antecedents and consequences, and models useful for explaining its contextually-seated development, are reviewed. Chapters 3 and 4 contain two free-standing manuscripts. The paper presented in Chapter 3 examines how peer groups and teachers contribute jointly to changes in 6th grade students' academic engagement across a single school year. In this study, models of joint influence were used to explore how peer groups and teachers work together, in concert, to support (or undermine) students' engagement. Guided by an ecological perspective and previous research on joint effects, support was expected for models suggesting that peer group and teacher influences are both cumulative and contextualized. The paper presented in

Chapter 4 explores the impact teachers have on moderating peer effects on the development of 6th graders' academic engagement. Following an approach similar to the study presented in Chapter 3, this study examines the efficacy of cumulative and contextualized models of peers' and parents' joint effects on students' engagement. Support for both models was expected. Both of these chapters discuss in more detail the relevant research questions and their rationale, as well as the research methods, measures, analyses used to address these questions.

Finally, Chapter 6 offers a summary of findings from both studies, discusses the strengths and limitations of the proposed studies, and attempts to integrate findings from the two studies in a discussion of implications for future research and practice.

Chapter 2

Literature Review

In the ongoing pursuit of a solution to a student achievement problem that, despite some progress, has persisted for decades, researchers focused on optimizing students' learning and achievement have focused much of their attention on students' engagement and motivation. Moving beyond a focus on status risk factors or predictors of low achievement (Pagani et al., 2008), research has turned to exploring how students' enjoyment of, and interested involvement in the learning process are necessary for sustained academic success (Jimerson, Campos, & Greif, 2003; Marks, 2000). Research on students' engagement has focused on explicating the self-system processes through which academic engagement leads to achievement (Skinner, Furrer, Marchand, & Kindermann, 2008), as well as on identifying how students' social contexts—which include parents, teachers, and peers—can either support or undermine the development of such engagement (Christenson, Reschly, & Wylie, 2012).

Students' Academic Engagement

Students' *academic engagement*, which has been broadly conceptualized as a students' active, energized, and ongoing involvement in learning activities (Skinner et al., 2009), is a dynamic, multidimensional construct that encompasses the cognitive, behavioral, and emotional components of students' motivated interactions with classroom activities (Appleton et al., 2008; Fredricks, Blumenfeld, & Paris, 2004;

Jimerson et al., 2003; Marks, 2000; Skinner, Kindermann, & Furrer, 2008; Wellborn,

1992). Conceptualizing engagement as an outward expression of the energy and

determination borne out of students' motivation to learn, some motivational theorists

suggest that students' engagement is a marker of a motivated state. Engaged students

demonstrate consistent and active participation in class activities and are drawn toward

challenging topics. When presented with academic challenges they appear happy,

curious, and interested, because they view such challenges as an opportunity to learn.

In contrast, disaffected students often struggle to stay on task, and appear disinterested,

bored, or apathetic when working on classroom learning tasks, and give up easily when

school work is hard.

Engagement and disaffection can be viewed as theoretically distinct and

separable motivational states, each comprised of emotional and behavioral components

Figure 2.1
Engagement and Dissaffection

Academic Engagement
Emotional: Appear Happy, Curious, and Interested in learning
Behavioral: Effortful, attentive, and involved Participate in class activities.

Academic Disaffection
Emotional: Appear Bored, Appathetic, and unenthusiastic about learning
Behavioral: Hard time staying on task, maintaining attention, and withdraw
participation during class activities

(Skinner et al., 2009; See figure 2.1). On the one hand, *Behavioral Engagement* captures students' *active* reactions to material and activities presented in the classroom. Behaviorally engaged students exert observable effort (e.g., hand-raising, staying on-task), attention (e.g., by listening intently), involvement and participation during classroom activities (e.g., by contributing to class discussion). In contrast, behaviorally disaffected students are frequently off-task, distract (or are easily distracted by) other students while their teachers offer instruction, and seldom participate during group or classroom activities. On the other hand, *Emotional Engagement* captures students' *affective* reactions to material and activities presented in the classroom. Emotionally engaged students may appear happy and enthusiastic about learning. They visibly "light up" in excitement when presented with the opportunity to learn something new. In contrast, emotionally disaffected students may seem disinterested in learning and may exude a spirit of boredom while in class.

Students' Engagement and Academic Achievement. Research findings suggest that students' academic engagement is a robust predictor of students' learning (Carini, Kuh, & Klein, 2006), retention (Kuh, Cruce, Shoup, Kinzie, & Gonyea, 2008), achievement, and attainment (Christenson et al., 2012; Finn & Rock, 1997; Finn & Zimmer, 2012; Janosz et al., 2008; Skinner, Wellborn, & Connel, 1990), at all levels of education (Hughes & Kwok, 2007; Shernoff, Csikszentmihalyi, Schneider, Shernoff, 2003; Skinner, et al., 2009; Ullah & Wilson, 2007). Engaged and motivated students learn more, and get better grades. Furthermore, engaged students are less likely to

dropout (Blondal & Adalbjarnardottir, 2012; Finn, 1989), become gang involved (Escribano, 2010), and engage in illicit substance use, or other forms of delinquency (Li et al., 2011).

While of much of the interest in students' engagement stems from its status as a robust predictor of important academic outcomes, it also draws interest because it captures the states that students are in while learning in the classroom. Unlike status predictors of achievement commonly explored in psychological and educational research, many of which are either fixed traits (e.g., race, gender, and to some extent personality) or are states not easily amenable to manipulation (e.g., SES), students' engagement is malleable and can be intervened on. The ultimate goal of research on student engagement is to inform practitioners and interventionists of the ecological factors that support the maintenance or restoration of high levels of academic engagement. Interventions may have the biggest impact on improving students' learning and achievement by working to create contexts that promote, support, and maintain students' engagement and motivation.

Although evidence suggests that bolstering students' engagement may be key to improving the quality of their learning and academic success, academic motivation and engagement show normative declines over the course of students' schooling (Bouffard, Marcoux, Vezeau, & Bordeleau, 2003; Otis, Gruzet, & Pelletier, 2005). In general, students show significant declines in their engagement and motivation to learn across grade levels (Anderman & Maehr, 1994; Eccles, Midgley, & Adler, 1984; Fredricks &

Eccles, 2002; Gottfried, Fleming, & Gottfried, 2001; Wigfield et al., 2006), with the

sharpest declines occurring at major school transitions (Ratelle, Guay, Larose, & Sené

cal, 2004). By the time they enter high school, too many students become accustomed

to doing just enough to get by, and attend class not because they enjoy learning, but

because it is compulsory. Most students navigate their way through and graduate from

high school, many despite their personal apathy toward and lack of interest in learning.

However, if not intervened upon, steadily eroding engagement and swelling disaffection

may lead some students, particularly those saddled with multiple risk factors who

generally enter school less engaged than their more advantaged peers, down a path

toward eventual school dropout (Finn, 1989; Spencer, 2006; Wigfield et al., 2006).

Driven by the serious implications that declines in engagement have for the

quality of student learning and achievement, research has focused on developing a

better understanding of the construct of student engagement (Appleton et al., 2008;

Fredricks et al., 2004), and the system of antecedents and consequences that maintain its

normative decline (Skinner & Belmont, 1993; Skinner, et al., 2009; Skinner & Pitzer,

2012). Much attention has focused on understanding how engagement is affected by the

contact students have with and the support they receive from a variety of social partners

including: parents, teachers and peers. The following sections discuss research that has

examined the effect parents, teachers, and peers have on students' engagement.

Parent Supports and Student Engagement.

It has been argued that the earliest social effects on students' engagement and

motivation to learn come from their caregivers. Long before children come into contact,

interact, and form influential interpersonal relationships with schoolmates or teachers,

parents have a marked effect on the ways their children will subsequently experience

school. Striking evidence suggests that the quality of toddlers' relationships with their

parents predicts their future motivation and persistence in the face of scholastic

challenges (Grolnick, Frodi, & Bridges, 1984). Parenting quality (e.g., parenting that is

hands-on, involved, and autonomy-supportive) as experienced by pre-K children has

also been linked to subsequent school readiness (Hess, Holloway, Dickson, & Price,

1984) and adjustment at the transition to school (Barth and Parke, 1993), both of which

predict positive student achievement trajectories.

Even once their children have entered a formalized school setting, parents

continue to play an important role in shaping their learning experience (Bempechat &

Shernoff, 2013; Grolnick, Friendly, Bellas, 2009). Through the extent to which they

remain involved and maintain quality relationships with their children, parents

contribute to their child's budding motivation and engagement (Furrer & Skinner, 2003;

Grolnick, Ryan, & Deci, 1991; Mo & Singh, 2008), as well as their performance and

achievement (Kurdek & Sinclair, 2000; Sirin & Rogers-Sirin, 2004). In a study on third

to sixth-grade students, Furrer and Skinner (2003) reported that students who

experienced a high sense of relatedness to their parents were more engaged in the

classroom (emotionally and behaviorally), controlling for the quality of students'

relationships with their teachers and peers. Furthermore, they found significant

associations between students' engagement and academic performance. Similarly, Sirin et al. (2004) found that quality of the relationships that middle-class, African American students had with their mothers had a direct positive relationship with their academic performance, controlling for their own academic aspirations, academic engagement, and self-esteem.

Recognizing the association between the relationships children have with their parents and their classroom motivation and performance, some researchers have focused their work on understanding *how* parent-child relationships impact students' motivation and performance. A variety of ways in which parents contribute to their children's scholastic motivation and achievement have been identified. Through their involvement, parents may contribute directly. There is compelling evidence that the extent to which parents are instrumentally involved in their children's school activities (e.g., homework) affects their motivation. Research findings suggest that the quality of parental involvement in children's school activities directly impacts students' study habits. For example, Xu & Corno (1998) found that students of parents who involved themselves in structuring effective studying environments for their children, were themselves subsequently more engaged in preparing and effective at organizing and monitoring their own work habits. By engaging in direct forms of involvement (e.g., asking about school, attending parent/teacher meetings, helping with homework) parents place high value on education by implicitly communicating its importance. Students may internalize these educational values and carry them into the classroom

where, if they are pro-learning, they may serve as motivational resources (Cheung &
Pomerantz, 2015). Parents' involvement may also contribute directly to students'
engagement and motivation by bolstering self-perceptions of academic competence and
nurturing a mastery orientation (Grolnick & Slowiaczek, 1994; Pomerantz, Ng, &
Wang, 2006).

High quality parenting may also indirectly contribute students' academic
engagement and motivation be fostering secure attachment (Ainsworth, 1979). It has
been suggested that the qualities of the ways in which individuals relate to others within
a classroom context (i.e., peers and teachers) are affected by and originate in early
attachments individuals form with their primary caregiver (Furrer & Skinner, 2003).
From this perspective, the earliest relational experiences children have with their
caregivers are internalized and carried forward with them, into their classrooms, as
internal working models. These mental models may color children's views of others in
their classrooms (e.g., peers), and shape how they interact with them. Children who
experience warm and involved parents may be more prone to view others as caring,
compassionate, and worthy of trust, a worldview that better equips these students to
engage in productive and prosocial interactions with groups of peers who tend to be
more engaged.

In sum, it is clear that parents have an *early* and *lasting* impact on children's
experience of school, both *directly*, in terms of instrumental support given, and perhaps
indirectly, through the effect that their parenting has on fostering a sense of trust in

others that may subsequently color their child's perceptions of others. Although parents

make important, early and lasting contributions to children's academic motivation,

additional social partners eventually enter the picture, particularly once children's social

ecologies expand to include individuals in their school classrooms.

Teacher Supports and Student Engagement.

Children spend a significant amount of time in schools (Eccles & Roeser, 2011;

Rutter, Maughan, Mortimore, & Ouston, 1979). Within schools, teachers are uniquely

positioned to shape multiple domains of their students' development (National Research

Council, 2004; Wentzel, 2009a), including their academic engagement and motivation

to learn. Teachers lead the co-creation of a learning environment in which students'

enthusiasm for learning is either supported and promoted, or undermined. They support

engaged learning, in part, by establishing and maintaining healthy relationships with

their students. In fact, research suggests that the quality of teachers' interactions with

students, measured both objectively and as perceived by students, is a significant

predictor of students' engagement and motivation (Wentzel, 2009a). Students maintain

higher levels of motivation and engagement when their teachers provide support for

their motivation and engagement. Teacher motivational supports include interpersonal

warmth, pedagogical caring (Wentzel, 1997), closeness (Hamre & Pianta, 2001),

acceptance (Wentzel, 1994), help, direction (Ryan & Shin, 2011), involvement,

provision of structure, and autonomy support (Klem & Connell, 2004; Skinner &

Belmont, 1993). As suggested by Self-Determination Theory and theories of Stage

Environment Fit, high quality student-teacher relationships, characterized by involvement and affection, are a foundation upon which the development of motivation and engagement depend (Eccles & Roeser, 2009; Reeve, 2012; Wentzel, 2009a; Wigfield et al., 2015). Empirical research bears this out. For example, utilizing a sample of 144 third- to fifth-grade students, Skinner& Belmont (1993) found that students whose teachers provided clear expectations, contingent responses, and strategic help were found to be more likely to show more effortful and persistent engagement with learning tasks. They also found that students who experience their teachers as being warm, affectionate, and involved appear happier and more enthusiastic during class activities. Similarly, Wentzel (1994, 1997) found links between students' perceptions of positive relationships with their teachers and their pursuit of pro-social classroom goals. Through their involvement, teachers foster students' sense of belonging (Osterman, 2000, Goodenow, 1993), relatedness (Furrer & Skinner, 2003), or attachment to school (Libbey, 2004), and create environments in which students *want* to engage with class activities.

Although teachers represent a significant component of the social ecology of the classroom and have been found to have significant socializing effects on students' academic motivation and achievement, there are other important classroom social partners with whom children interact—children's peers.

Peer Group Influence on Student Engagement.

Interest in peer effects on children's development has grown exponentially over

the past few decades. Although much of the work looking at peer effects on children's development has focused on peers' influence on non-educational aspects of children's development, research examining peer effects on children's *academic* development has garnered increased interest in recent years (Kindermann, 1993; Kindermann, 2007; Ryan, 2001). Research in this area provides compelling evidence that the peers with whom children spend their time have a significant impact on their own motivational development (Berndt & Keefe, 1995; Epstein, 1983). In an early study, Cairns, Cairns, and Neckerman (1989) found that 7th grade students who subsequently dropped out of school between ninth and eleventh grade tended to affiliate with peers who also subsequently dropped out of school. Although third variables may have played a role in producing these results (e.g. similarity to peers in SES, or family attitudes toward education), it is possible that processes of peer influence led to an erosion of academic engagement and motivation that culminated in early school exit. In support of this, A.M. Ryan (2001) found that middle school students who affiliated with peers who disliked school showed the steepest declines in their own enjoyment of school. These results suggest that students' regular interaction with disaffected peers may promote academically disaffected behaviors and beliefs, which may in turn decrease motivation and interest in academics, and increase the likelihood of school dropout.

In the same vein, Kindermann (2007) found that the academic engagement profiles of students' peer affiliates significantly predicted changes in their own academic engagement over a school year, over and above the effects of adult (parent

and teacher) involvement. Results from these studies suggest that students who frequently spend time with highly engaged peers have less dramatic declines in their own academic engagement over a school year compared to students who affiliated with disaffected peers.

While these studies suggest that peers can, in some cases, contribute to declines in students' motivational development, the potential positive contributions peer relationships afford most youth should not be overlooked. It is important to acknowledge that peers play a crucial and positive role in child and adolescent development, and it may be argued that they more often contribute to each other's development in positive ways. Peers often provide valuable resources (e.g., help) and can offer emotional support during emotionally stressful times. Furthermore, regardless of the extent to which students' peers are themselves engaged students, simply having peer relationships in the school setting may foster a sense of school belonging or, at the very least, provide some students with the only reason to show up. Indeed, it seems that the only thing worse for youth development than affiliating with disaffected peers, is having no peer affiliations at all (Hall-Lande, Eisenberg, Christenson, & Neumark-Sztainer, 2007; Nesdale & Zimmer-Gembeck, 2003; Wentzel, McNamara-Barry, & Caldwell, 2004).

Challenges Faced When Examining the Peer Context.

The peer context has unique characteristics that make it particularly challenging to study. Therefore, any overview of research on peer groups influence on students'

engagement would be incomplete without a thorough discussion of some of the unique features of the peer context and the research challenges they pose. The following sections describe the challenges involved in identifying peer groups, capturing their key attributes, and modeling their influence on child development.

Defining and Identifying the peer context. Students' peer context consists of the small number of age mates with whom they maintain close relationships (i.e., friends) and/or choose to spend a significant amount of their time (i.e., peer groups). Students' peer contexts are unique in part because they may be defined in many ways, depending on the criteria used to define their members (e.g., peer definitions may be interactionally-based, or relationally-based). Unlike parent and teacher contexts, which may be more clearly defined and delineated, there is variability in how researchers conceptualize the peer context. While there are many ways to define the peer context, research has largely focused on two distinct forms of the peer context: friendships, and peer groups.

Peer groups and friendships are commonly conceptualized as being distinct (Bukowski, Metzow, & Meyer, 2009). *Friendship* relationships involve dyadic, reciprocal, and emotionally bonding relationships that form between two individuals. Friendship is based on mutual liking, trust, and respect. Friends feel free to share secrets with each other, and turn to each other for support during trying times. In contrast, *peer group* affiliations involve relationships among small groups of individuals that are formed primarily through *frequency of social interaction*. Although children select into

these groups, peer groups are often thought of as being less intimate in nature compared to friendships.

Although friendships and peer groups are often distinguished from each other (Kindermann & Gest, 2009), and are the focus of two somewhat distinct areas of research, there is evidence that they do somewhat overlap: many friends (though not all) are also peer group members, and many peer group members (though not all) are friends (Kindermann & Skinner, 2011). It is possible that the frequent interactions children have with peers in small groups may provide opportunities for more intimate relationships to form. For example, a group of children who organize around the activity of playing basketball during recess may end up spending more time together in other contexts (e.g., working together in class or studying after school), and over time develop a friendship. Research supports this, suggesting that friendships often develop within the context of peer groups (Cairns, Leung, Buchanan, & Cairns, 1995).

Further adding to its complexity, the peer context has amorphous qualities that makes it difficult to identify children's "peers" with accuracy. First, children affiliate with friends and peers in a variety of different contexts (e.g., the mall, school, non-school, club sports). This makes it difficult to accurately identify the entire set of peers with whom a child spends their time, and to collect information on their key attributes. For example, it may be difficult for a researcher studying school motivation to collect relevant data on peers who are found outside of classroom or school settings. Second, the boundaries of peer groups are not often clearly defined, and groups are overlapping.

Finally, peer groups and friendships change frequently over a relatively short period of time. Although students' relationships to other social partners, specifically teachers, show regular, predictable changes (e.g., most students' have a new teacher or set of teachers every year), peer relationships are highly dynamic, with existing relationships dissolving and new ones forming rapidly, sometimes on a week-to-week basis.

Considering the variety of distinct forms that the peer context takes, and the difficulties associated with identifying peers, it should not be surprising that over the past few decades a handful of different methods have been developed to overcome some of these challenges. Broadly speaking, research studying peers, peer groups, or friends tend to relay either on self-report methods, or peer-report methods.

Self-reports and identifying peer networks. Self-report methods remain the most commonly employed methods in peer network research, and have been utilized to examine peer influence and selection in a variety of different research areas including aggression (Espelage, Holt, & Henkel, 2003), spread of obesity (Christakis & Fowler, 2007), food and media preferences (Rozin, Riklis, & Margolis, 2004), and student engagement and achievement (Ryan, 2001; Wentzel & Caldwell, 1997). In research that utilizes self-report methods of identifying networks or groups, participants are asked to identify other individuals (e.g., peers, friends, co-workers) with whom they have some type of social or relational connection. For example, social network researchers who are interested in peer groups may ask their participants, "Who are the people with whom you spend time?" In response to this question, participants provide a list of people with

whom they interact frequently. Unfortunately, especially in late childhood and adolescence, participants sometimes provide inaccurate accounts of their peer networks by reporting that they hang out with peers with whom they *wish to* affiliate—peers who are popular or whom they admire. This can become a particularly common problem in research on child and adolescent peer group network, when a child falsely reports hanging out with high status peers as a form of impression management. This phenomenon, termed *self-enhancement bias* (Leung, 1996), can create problems; specifically, popular or admired students may be inaccurately "tied" to a number of peers who are not in their actual peer group.

To deal with this problem, most research that uses self-report methods only considers nominations that are reciprocated as relational ties. This strategy can, however, create another problem. By considering only reciprocated nominations as relational ties, many *actual* ties may be lost in cases where one individual fails to reciprocate. Non-reciprocated nominations could occur for a variety of reasons. A non-reciprocating peer may not have had parental consent to participate, may have been absent during the time of data collection, or may have fallen outside of the sample (e.g., an individual who goes to a different school). Ties based on unreciprocated self-report nominations are in most cases omitted under the assumptions that there is disagreement between two individuals about the status of their relationship (despite not actually having sufficient evidence to support this assumption) and that disagreement implies that there is no relationship. However, in some of these cases it is possible that barriers

to participation prevented an informant from providing information, or that he or she

simply forgot to indicate a connection. In either case, this problem may lead to *actual*

ties not being captured, which would result in inaccurate network depictions (e.g., an

individual may be represented as being isolated in a network model, despite actually

having many peer affiliates). To avoid possibly misrepresenting actual social networks,

researchers using self-report methods must obtain network information from all

individuals in the networks being studied. Of course, achieving a 100% sample rate is

very difficult and in some cases, particularly in research using children and adolescents

as participants (where parental consent is mandatory), is likely impossible.

Despite problems associated with using self-report nomination strategies to

identify children's peers, this method does have advantages. First, setting aside the

potential for bias, there is no person better positioned to report on who a child spends

time with than the child him- or herself. They have complete knowledge of the peers

with whom they spend time, in any setting. Second, identifying friends and peer groups

using self-report methods involves computations that are easy compared to the

statistical analyses used to identify from peer-reported data (which are explained

shortly). Finally, self-report methods are particularly useful for identifying relationships

between individuals that are difficult or impossible for others to observe accurately.

Specifically, self-report methods may be better suited for identifying friendships, where

the nature of the relationship is based on how two individuals *feel* about each other.

However, for peer relationships that are interactionally-based, namely peer groups,

methods not so reliant on children's own reports may be more fruitful.

     Peer-report Methods and Identifying Networks. Social Cognitive Mapping

(SCM; Cairns, Perrin, & Cairns, 1985) is a method in which participants serve as

"expert observers" of peer interactions. With this method of peer data collection,

students are asked to identify students whom they frequently observe hanging out

together. Specifically, students are asked, "Are there people who you see hanging out

with each other a lot?" Students typically respond by providing a list of individuals

whom they observe as being frequent interaction partners, and often choose to list

groups to which they themselves belong.

To identify valid peer groups, nominations are entered into a co-occurrence matrix. Peer

affiliations are identified using either correlation-based methods (Cairns & Cairns,

1994; Cairns, Gariepy & Kindermann, 1990) or conditional probability methods

(Kindermann, 1993; 1996; 2007). The correlational method is the most frequently used

method, and is implemented in the original SCM analysis program (Leung, 1998). With

this method, two individuals are assumed to have a tie if their network connection

patterns covary significantly, as indicated by a correlation coefficient above .40. If the

peers with whom two students affiliate (as well as the students with whom they do not)

are similar, then it is assumed that they belong to the same peer group.

     An alternative way of identifying peer group members is based on probability

assumptions (Kindermann, 1993, 1996). Using this method, the frequencies by which

students are co-nominated with all other members of the school network are entered

Table 2.1
Table 2.1. Subset of a coocurance matrix of girls in 6th grade (Kindermann, 2007)
Subset of a co-occurrence matrix of girls in 6th grade

	KER	RYB	DAL	COD	SUO	ROM	STQ	CHR	KAA	KAW	Total Nominations
KER	-	28	23	12	10	3	3	0	0	0	36
RYB	28	-	20	11	12	3	4	0	0	0	32
DAL	23	20	-	10	9	4	2	0	0	0	28
COD	12	11	10	-	19	8	13	0	0	0	29
SUO	10	12	9	19	-	9	10	0	0	0	29
ROM	3	3	4	8	9	-	4	0	0	0	11
STQ	3	4	2	13	10	4	-	0	0	0	17
CHR	0	0	0	0	0	0	0	-	10	10	14
KAA	0	0	0	0	0	0	0	10	-	13	16
KAW	0	0	0	0	0	0	0	10	13	-	17
No. of informants											260
Total Nominations											3,047
No. of Groups Generated											694

Table 2.2

Binomial Z-score formulas used to identify peer relationships.

Deriving binomial z-score using a χ^2 contingency table

	RYB	¬RYB	Total
KER	**28** (1.66)	**8** (34.34)	36
¬KER	**4** (30.34)	**654** (627.66)	658
Total	32	662	694

$$x^2 = \sum \frac{(\text{observed} - \text{expected})^2}{\text{expected}}$$

$$x^2 = 462$$

$$z = \sqrt{x^2}$$

$$z = \sqrt{462}$$

$$z = 21.49$$

Equation used to directly compute binomial z-scores (Sackett, 1987; Allison & Liker, 1982)

$$z = \frac{P(KER|RYB) - P(KER)}{\sqrt{\frac{P(KER)(1 - P(KER))(1 - P(RYB))}{n(P(RYB))}}}$$

$$z = \frac{.875 - .052}{\sqrt{\frac{.052(1 - .052)(1 - .046)}{32(.046)}}}$$

$$z = 21.49$$

Note. Values appearing in parentheses in the contingency table represent the expected values for those cells.

into a co-occurrence matrix. By considering the conditional probability of group

membership (that an individual is observed in a group, given that some other individual

is examined in that group), and the unconditional probabilities of group membership

(given all groups observed in the network, the probability that either individual is

observed in a group at all), binomial Z-scores can be calculated (See equation on in

Table 2.2; Sackett, 1987; Allison & Liker, 1982). These z-scores are then used to

indicate whether an individual is more likely to be nominated as being in a group with

another individual than should be expected by chance. Consider an example using two

students appearing in table 2.1, KER and RYB. Of the 32 times RYB was nominated as

belonging to a group, KER was nominated as belonging to the same group 28 times.

Furthermore, KER received 36 total group membership nominations herself out of 694

total group nominations network-wide. Using the conditional probability of observing

KER as a member of a group, given that RYB was a member of a group ($P_{KER|RYB}$:

$^{28}/_{32}$=.875), and the unconditional probabilities that RYB and KER belonged to any

group (P_{RYB}: $^{32}/_{694}$=.052; P_{KER}: $^{36}/_{694}$=.046) a binomial z-score is computed. Significance

of the resulting z-score ($Z = 21.49$, $p < .001$) is interpreted as an indication that those

two students are affiliates and belong to a peer group. Only network connections that

are significant at the .01 level are retained (see Kindermann, 2007).

Regardless of whether correlations or probabilities are used, SCM offers

solutions to some of the challenges facing network researchers who rely on self-report

methods. First, unlike with self-report methods, informants' self-enhancement biases

have less power to decrease the accuracy of network identification. Because SCM

methods rely on consensus to validate relational ties, the impact of a single child's false

reports is minimized. Second, with SCM methods, researchers do not have to obtain

network information from all members of a network. It has been suggested that accurate

depictions of naturally occurring networks can be obtained when only half of the

network is reporting on it, provided that the sample is fairly representative (e.g.,

matches a classroom's distribution of boys and girls; Cairns & Cairns, 1994;

Kindermann, 2007).

Finally, SCM and other peer-report methods may be less stressful for some

participants than self-report methods. Being asked to produce a list of their friends may

be distressing or embarrassing for students who have few social ties. For some

participants, this self-reflective exercise may raise into awareness the fact that they have

few close relationships. In order to alleviate their emotional discomfort, or to avoid

humiliation, students who have few social connections to peers in their school may

report having relationships that do not exist (self-enhancement bias). Peer-report

methods may avoid these problems by asking essentially the same question in a manner

that is not self-oriented. Reporting on the relationships or interactions that occur

between others may be less distressing or embarrassing for participants who have few

social connections.

Despite the many benefits to using SCM, it is not without limitation. Most

notably, the method may be somewhat limited in the types of networks it can identify.

Since networks are constructed using participants as expert *observers*, only networks in which the relational ties represent an observable phenomenon can be identified. For example, relying on peer-reports to identify friendships may be problematic because children may have difficulty accurately observing the emotional content of a friendship that exists between two other children. However, for research where the focus is on frequent interactions that occur between individuals, utilizing peer-reports may be the best methodological option available. After all, who is better suited to report on peer group membership than the individuals who are positioned to observe them every day?

Capturing network characteristics. Regardless of the method used for identification, once peer groups have been defined a new problem arises: how to accurately capture key characteristics of the peer network. The most commonly used method to estimate peer group characteristics involves the aggregation (arithmetic average) of an individual's peer affiliate scores (Kindermann, 1993; Kurdek & Sinclair, 2000). Using this method, group characteristics are relatively easy to compute. Unfortunately, it has been noted that this method is not without its flaws (Kindermann, 1996; Kindermann, 2007). By estimating group characteristics through aggregation, the researcher assumes that the individuals who make up the group are equal in how they exert influence. In reality, group members are likely not uniformly influential (Kindermann, 1996), with some peers being more, and others less, influential in a group. By aggregating group member scores, the potential for examining differential influence is averaged away. Furthermore, group size has a direct relationship to how

much "sway" an individual has in determining a group average. That is, one group

member in a group of three is more powerful (statistically) in determining the group

average than one group member in a group of twelve. For these reasons, a simple

aggregation of group member scores may be problematic.

Despite its potential limitations, this method has been widely used to estimate

peer group characteristics along a variety of different dimensions including school

engagement (Kindermann, 1996; 2007; Ryan, 2001), academic achievement (Kurdek &

Sinclair, 2000; Ryan, 2001), and aggression (Espelage et al., 2003).

Modeling Peer Influence. With peer groups identified and their key attributes

defined, a third challenge arises: How to isolate the effects of peer *socialization* from

peer *selection*. This challenge exists because children and adolescents create and

maintain their own peer contexts, by choosing to spend time (or choosing to stop

spending time) with specific age mates. In contrast, parents are either biologically or

socially assigned (i.e., children cannot adopt their parents). Similarly, in most cases

children do not select their specific teachers. In most cases, children are assigned, often

non-randomly (e.g., tracking), to the schools they will attend and the instructors they

will be taught by. Therefore, any direct effect parent and teacher contexts have on

children's development can be more safely assumed to reflect parents' *influence* on their

children or teachers' *influence* on their students.

On the other hand, children are able to select the peers with whom they spend

their time (from within the natural boundaries of their schools, neighborhoods, and

communities), and their choice is based largely upon similarity, or *homophily*. That is, children choose to spend their time among peers with whom they are alike. Peer selection may be based on demographic similarities (e.g., age, sex, or race) as well as according to shared interests and behavioral similarities (Hartup, 1983). This process has been referred to as "assortative pairing" or "assortiveness" (Kandel, 1978; Kindermann, 2007). Because children and adolescents are relatively free to choose the peers with whom they spend time, it is often difficult to separate out peer effects due to *selection* (assortiveness) from effects due to *socialization* (influence). To accurately capture the process of peer influence, a researcher needs to (1) obtain an accurate measurement of key attributes of the group (which is discussed earlier in this section), and (2) sufficiently disentangle selection effects from influence effects in explaining individual/group similarities.

Capturing peer influence while controlling for peer selection. *Social influence* is commonly viewed as being the extent to which an individual becomes *similar* in some way (e.g., similarly engaged in class) to individuals who make up his or her group. For example, researchers exploring the phenomenon of peer pressure and conformity have examined the extent to which students are or become similar to their peers in their alcohol or tobacco use (Urberg, Degirmencioglu, & Pilgrim, 1997), and other delinquent behaviors (Espelage et al., 2003).

While peer influence may result in individual/group similarities, similarity by itself is not sufficient to imply influence (Kandel, 1978). Peer groups do not form at

random. On the contrary, it has been noted that students often choose the peers with

whom they spend time based largely upon existing similarities across a broad spectrum

of characteristics, including academic orientation (Kindermann, 2007, 2008). Therefore,

observed similarity between an individual and the peers with whom he or she affiliates

may result either from peer selection, peer influence, or other variables. For example,

individuals may be similar to members of their peer group in their marijuana use partly

because they choose to spend time with peers who have similar drug use habits

("assortative pairing"; Kandel, 1978) and partly because they were, over time,

influenced by their peers, presumably through one or more of a collection of

socialization processes (e.g., modeling, or reinforcement). Likewise, individuals may be

similarly engaged in school compared to those they hang out with partly because they

selected those peers for this quality, and partly because their peers *influenced* their

engagement (or for some other spuriously related reason; e.g., SES as a neighborhood

effect).

Some researchers have attempted to demonstrate peer influence in their work

using cross-sectional designs. Cross-sectional research on peer influence is inherently

flawed because by using concurrent measures of individual/group similarity, researchers

are not able to tease apart the distinct contributions that selection and influence make

toward producing the similarity that can develop between friends and individuals who

spend time together. Because influence is a process, models that account for how an

individual's thoughts, beliefs, feelings, preferences or behavior *change over time* in the

Figure 2.2
Statistical model useful for separating effects of selection from effects of influence.
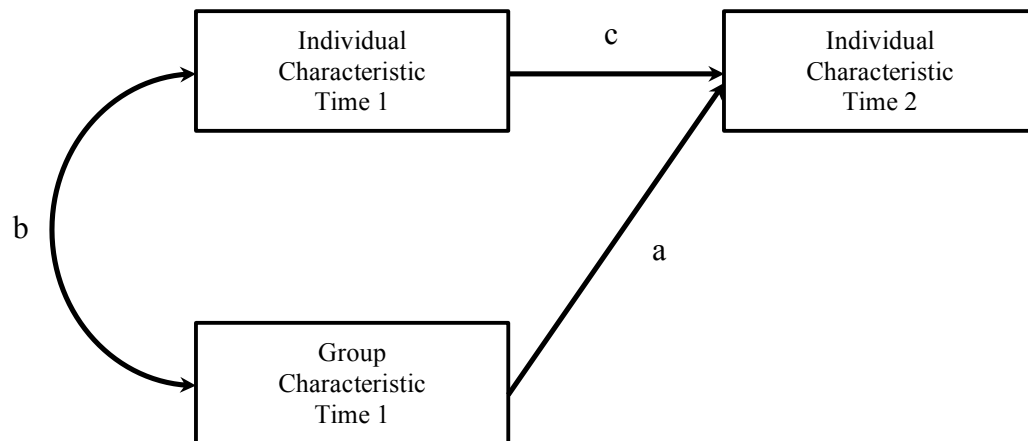
Note. Parameters of this auto-regressive model are interpreted as representing (a) influence, (b) selection, and (c) stability.

presence of peers are needed. Furthermore, to isolate the effect of peer socialization, these models must also account for processes of peer selection that are based largely upon initial similarity.

A methodological model that examines the degree to which peer group characteristics predict change in an individual's characteristic has been used in a variety of areas of research that explore peer influence (Kindermann, 1996; Christakis & Fowler, 2007). With this regression-based model (see Figure 2.2), data on students' key characteristics (e.g., academic engagement) are obtained at two time points and peer groups' characteristics are captured or created (e.g., via group aggregate) for the initial time point. Students' scores at the later time point are regressed on their peer groups' initial scores, controlling for their own initial scores. By controlling for students' prior

scores as well as prior student/peer similarities (captured by the concurrent correlation between students' and peers' initial characteristics), this effect may be interpreted as representing peer groups' *influence* on *changes* in students' characteristics. To further isolate peer influence effects, any number of additional control variables may be added to the base model.

Joint Influence of Teachers, Parents, and Peers on Students' Engagement and Motivation

Although research has thoroughly examined the extent to which peers influence students' engagement, research aimed at developing a more complete understanding of the contexts in which peer influences on students' engagement and motivation are stronger (or weaker) has drawn increased attention. Research on teachers', parents', and peers' joint contributions to students' motivation and engagement represents one branch of this emerging line of work, and has generally examined two models of joint social influence.

Cumulative models of joint effects have been used to explore how peers contribute to students' motivation in ways that parents and teachers cannot. These models suggest that peer, parent and teacher influences are each uniquely important, and that they are additive in their joint effect. From this perspective, the highest levels of student engagement and motivation can be achieved only when all three social contexts are providing optimal levels of support. That is, if a student affiliates with disaffected peers, no amount of parent or teacher supports can make up for it.

Contextualized models of joint effects, on the other hand, have been used to examine how the magnitude of peers' influence on students' engagement is amplified or reduced depending on qualities of the relationships that students maintain with their teachers or parents. Models of contextualized effects may be used to identify factors in students' social ecological system that explain their differential susceptibility to peer influence (Brechwald & Prinstein, 2011). They may also be used to demonstrate how parent and teacher contexts can buffer students from the potentially negative effects of hanging out with groups of disaffected peers, particularly when they provide the right amount of motivational supports.

In the following sections, studies that have found support for these models of joint influences on students' engagement and motivation are examined (see table 2.3 for summaries). First, research that has examined how teachers and peers work together in classrooms to contribute jointly students' engagement and motivation is reviewed. This is followed by a brief review of the few studies focused on parents' and peers' joint contributions to students' engagement and motivation.

Peer and Teacher Joint Influences on Engagement and Motivation. As previously noted, teachers play an important role in shaping the development of students' engagement. Although much of this work has focused on how teachers directly and uniquely impact student motivation and engagement, the focus of this research has more recently expanded to include explorations of how they work together, jointly, with the peer context.

Table 2.3
Summary of Studies Examining Models of Joint Influences on Students' Engagement

Study	Contexts of Joint Influence	Model of Joint Influence	Summary
Chen (2005)	Teacher, Parent & Peers	Cumulative	Examined how perceived support from peers Parents, and teachers shapes student academic achievement indirectly through its effect on student academic motivation. Parents teachers, and peers were found to have unique effects on students' academic engagement. Peer, parent, and teacher effects on student achievement were mediated by students' engagement. The relationship between perceived peer support and academic achievement was fully mediated by academic engagement. Interactions were not examined.
Danielsen, Wiium, Wilhelmsen, & Wold (2010)	Teachers & Peers	Cumulative	Found evidence suggesting that perceptions of support from teachers (i.e., friendliness and fairness) and peers (i.e., classmates' acceptance, kindness and helpfulness, and sense of togetherness) each uniquely predicted students' self-reported academic initiative at the individual level. Interactions were not examined.

Table 2.3 (Continued)
Summary of Studies Examining Models of Joint Influences on Students' Engagement

Study	Contexts of Joint Influence	Model of Joint Influence	Summary
Davidson , Gest, & Welsh (2010)	Teachers & Peers	Contextualized	Examined differences in school adjustment between students with different patterns of relatedness to teachers and peers. They distinguished three groups: (1) high relatedness to both; (2) low relatedness both; and (3) peer-oriented (moderate teacher relatedness and high peer relatedness). Adjustment was lowest for students who reported low relatedness to both peers and teachers. Both high relatedness and peer-oriented students evinced positive academic adjustment, suggesting that positive relationships with peers might be sufficient to support adjustment, even if students did not have highly supportive relationships with teachers.
De Laet et al. (2015)	Teachers & Peers	Cumulative	Investigated whether qualities of students' relationships with teachers and peers jointly predicted changes in students' behavioral engagement from grades 4 to 6. A cumulative model fit the data best, indicating that high and increasing levels of teacher support and high levels of peer acceptance contributed uniquely to buffer students from normative declines in behavioral engagement. Moderation and mediation were tested, but none were found.

Table 2.3 (Continued)
Summary of Studies Examining Models of Joint Influences on Students' Engagement

Study	Contexts of Joint Influence	Model of Joint Influence	Summary
Furrer & Skinner (2003)	Teacher, Parent & Peers	Contextualized	Examined third through sixth grade students' reports of their relatedness to teachers, parents, and peers as predictors of self- and teacher-reported behavioral and emotional engagement. Profiles of students with high relatedness to none, one, two, or all three of these social partners were identified. Group comparisons revealed that high relatedness to teachers and parents could compensate for low relatedness to peers, but high relatedness to peers could not compensate for low relatedness to teachers and parents.
Marion et al. (2014)	Parents & Peers	Contextualized	Examined the extent to which friend influence on student engagement depended on maternal affection. Within friendship dyads, students who scored higher on school burnout than their friend were identified. Actor-Partner Interaction Models examined whether high burnout students' engagement in fall predicted changes in the engagement of their (less burnt out) friend across the school year. Results from a multiple group model suggested that friend influence was strongest for students who reported low maternal affection; Friends' influence was non-significant among students who reported high maternal affection.

Table 2.3 (Continued)
Summary of Studies Examining Models of Joint Influences on Students' Engagement

Study	Contexts of Joint Influence	Model of Joint Influence	Summary
Li, Lerner, & Lerner (2010)	Parents & Peers	Cumulative	Using a longitudinal design and a large, nationally representative sample, this study found that both parent and peer influence on academic competence were mediated by the unique effect each had on students' behavioral and emotional academic engagement. No moderations were tested.
Raufelder, Jagenow, Drury, & Hoferichter (2013)	Teachers & Peers	Contextualized	Identified profiles of students who viewed their own academic motivation as being (1) more dependent on peers, (2) more dependent on teachers, (3) equally dependent on both, or (4) dependent on neither. The largest group of students consisted of those who saw their academic motivation as primarily dependent on peers, followed by students who saw their motivation as simultaneously peer- and teacher-dependent. Degree of membership in all four clusters was associated with several markers of motivation, including academic drive, learning goals, striving for academic success, and avoidance of academic failure.

Table 2.3 (Continued)
Summary of Studies Examining Models of Joint Influences on Students' Engagement

Study	Contexts of Joint Influence	Model of Joint Influence	Summary
Ricard & Pelletier (2016)	Teachers & Peers	Cumulative	Examined whether parent and teacher needs supports, and having at least one reciprocal friendship predicted students' concurrent academic motivation in Grade 10, and the likelihood of dropping out by Grade 12. Results suggested that having one reciprocal friendship predicted both motivation and academic persistence, above the significant effects of experiencing high parent and teacher support for autonomy, relatedness, and competence. Parent supports appeared to be the most significant predictor of academic motivation and dropping out; however, a lack of reciprocal friendships predicted both lower academic motivation and higher likelihood of dropping out. No interactions were tested.

Table 2.3 (Continued)
Summary of Studies Examining Models of Joint Influences on Students' Engagement

Study	Contexts of Joint Influence	Model of Joint Influence	Summary
Wang & Eccles (2012)	Teachers, Parents, & Peers	Cumulative	Examined growth curves of behavioral, emotional, and cognitive engagement from grades 7 to 11. Students' reports of peer support predicted less steep declines in motivation, over and above the effects of support from teachers and parents. No two-way interactions with support from teachers (or parents) qualified the protective contributions of peer support. However, protective effects of peer support on behavioral engagement were found only for students who reported more pro-social friends. For students reporting more anti-social friends, higher levels of peer support exacerbated declines in engagement.
Wentzel, Battle, Russell, & Looney (2010)	Teachers & Peers	Cumulative	Examined the extent to which middle school students' perceptions of four kinds of supports from their teachers and peers (expectations for academic engagement and positive social behavior, provisions of help, safety, and emotional nurturing) were related to school motivation. Multiple regressions revealed that all four of the teacher supports predicted student self-reported academic motivation; when peer supports were entered in the last step, both peer expectations and help were also unique predictors. No interactions were significant.

Teachers may indirectly effect students' academic outcomes through the effects their classroom management has on peer social processes (Farmer, Lines, & Hamm, 2011; Kindermann, 2011). For example, van den Berg, Segers, & Cillessen (2012) found that peer perception of students' sociometric status (i.e., likeability) was improved through teachers' purposeful manipulation of seating arrangements in the classroom. That is, when two students who reported not getting along with each other were intentionally seated nearer to each other by their teacher, the quality of their relationship improved. Furthermore, presumably through increases in likeability, students' experiences of peer victimization were also reduced by the manipulation of seating. Taken together with findings from research liking students' sociometric status and academic performance (Engels et al., 2015; Ollendick, Weist, Borden, & Greene, 1992), this study illustrates how teachers may contribute to student outcomes indirectly, through intervening on peer processes in the classroom.

Teachers' influence may also be intertwined with the peer context in subtler ways. Specifically, the extent to students are open to peer influences may in part depend on how much they perceive their teachers as being present and involved. Students who perceive a lack of direct involvement from their teachers may, over time, rely less on their guidance and turn more to their friends and peer groups for support and direction. By isolating themselves from sources of adult influence, students may become more susceptible to peer influences which, particularly when peers are disaffected, may not be not entirely positive.

In the past decade, research on teachers' and peers' joint influence on students'

engagement and motivation has accumulated. Most of this research has found evidence

of cumulative effects (Danielsen et al., 2010; De Laet et al., 2015; Wang & Eccles,

2012; Wentzel Battle, Russell, and Looney, 2010), which suggests that teachers and

peers both provide essential supports that the other does not. However, evidence from

an emerging body of work also supports contextualized models of joint teacher and peer

effects, suggesting that the strength of their influences are interdependent (Davidson,

Gest, & Welsh 2010; Furrer & Skinner, 1993; Raufelder, Jagenow, Drury, &

Hoferichter, 2013). Findings from this work suggests that involved teachers can buffer

against the worst effects of affiliating with disaffected peers. For example, Furrer and

Skinner (1993) examined how profiles of students' relatedness to teachers, parents, and

peers predicted self- and teacher-reported behavioral and emotional engagement.

Profiles of students with high relatedness to none, one, two, or all three of these social

partners were identified. Group comparisons revealed that high relatedness to teachers

could compensate for low relatedness to peers. Similarly, evidence suggests that

positive relationships with peers might be sufficient to support students' academic

adjustment, even if their teachers provide low levels of support.

In a separate study, Davidson, Gest, and Welsh (2010) used profile analysis to

examine differences in school adjustment between students with different patterns of

relatedness to teachers and peers. Three profiles of students were identified: (1) high

relatedness to teachers and peers; (2) low relatedness teachers and peers; and (3)

moderate teacher relatedness and high peer relatedness (peer-oriented). Adjustment was

lowest for students who reported low relatedness to both peers and teachers, and

positive academic adjustment was found among students who experienced both social

contexts as supportive. Surprisingly, peer-oriented students evinced positive academic

adjustment on par with students who experienced both teacher and peer contexts as

supportive, suggesting that positive relationships with peers might be sufficient to

support health levels of academic adjustment, even if students did not experience highly

supportive teachers.

   Peer and Parent Joint Influences on Engagement and Motivation. Few studies

have investigated how parent and peer effects work together. Of the handful of studies

that have, most have found evidence supporting only cumulative models of their joint

contributions, which suggest that both peers and parents make significant but largely

separate contributions to students' engagement. First, in a longitudinal study of 960

students from 57 schools across 13 U.S. states, Li, Lerner, and Lerner (2010) found that

both parent and peer influence on academic competence were mediated by the unique

effect each had on students' behavioral and emotional academic engagement. In a

second study, Chen (2005) tested a similar mediation model. They found that peer and

parent supports each indirectly contributed to the academic achievement of 270 students

in a secondary school in Hong Kong, through their unique effects on students' academic

motivation. In a third study, Ricard and Pelletier (2016) examined whether tenth-grade

students' perceptions of parent (and teacher) supports, and peer relationships (i.e.,

having at least one reciprocal school-based friendship) predicted their concurrent academic motivation and whether or not they dropped out before the end of twelfth grade. Results suggested that parent supports were the most significant predictor of academic motivation and dropping out; however, presence of peer relationships also predicted both higher academic motivation and lower likelihood of dropping out, above the effects of experiencing optimal parent and teacher supports. Finally, Wang and Eccles (2012) examined growth curves of behavioral, emotional, and cognitive engagement from grades 7 to 11. On average, all three dimensions of engagement showed normative declines that are typically observed across these grade levels. However, having motivationally supportive peers predicted less steep declines, over and above the effects of experiencing parents (and teachers) as motivationally supportive. The effects peer support had on buffering against normative declines in behavioral engagement were found only among students who affiliated with pro-social peers. For students affiliated with anti-social peers, peer support actually exacerbated declines in engagement.

Although these studies only found support for cumulative models of the joint contributions made by parents and peers, it should be noted that only one of the four studies (Wang & Eccles, 2012) used analyses capable of testing for contextualized effects. Because the other three studies used analyses that examined only the main effects of parent and peer supports, it is unknown whether or not they would have also found support for a contextualized model of their joint influence. That said, only two

studies have found evidence supporting contextualized models of joint parent and peer

effects (Furrer & Skinner, 1993[1]; Marion et al., 2014). Marion et al. (2014) examined

the extent to which friend influence on schoolwork engagement of 320 Finnish

adolescents varied as a function of school burnout and maternal affection. Within same-

sex friendship dyads, students who scored relatively higher on school burnout compared

to their friend were identified. Actor-Partner Interaction Model (APIM) analysis was

used to examine whether the engagement of high burnout students in fall predicted

changes in the engagement of their (less burnt out) friend across the school year. The

extent to which maternal affection buffered students against their friend's influence was

tested using a multiple group comparison. Results suggested that effects of having a

relatively disaffected friend were stronger for students who reported the lowest levels of

maternal affection. In fact, the effect of having a disaffected friend was non-significant

among students who reported the highest levels of maternal affection.

The Current Studies. Taken together, the eleven studies that have explored

joint teacher/peer and parent/peer influence provide evidence for two complementary

perspectives on how peers work together, both with teachers and parents, to jointly

shape students' engagement. On the one hand, it is clear that peers contribute to

students' engagement in ways that are separate from and compliment teacher and parent

effects. On the other hand, of the few studies that examined interactions between

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[1] In their study, Furrer & Skinner (1993) also examined the roll teachers play, jointly
influencing students' engagement.

contexts, evidence that the effects of peer influences may also depend on students'

experiences of support from teachers and parents was also found. These findings may

suggest that students are differentially susceptible to peer influences. In support of this

interpretation, Raufelder et al. (2013) used latent class analysis to identify profiles of

students who showed different patterns of their motivation being dependent on teachers

and peers. Interestingly, the largest group of students consisted of those who saw their

academic motivation as primarily dependent on peers; however, a significant number of

students were identified who did not see their motivation as primarily dependent on

peers. They instead saw their motivation as either more dependent on teachers, equally

peer- and teacher-dependent, or independent of both. This study suggests that students

range from being particularly impressed upon by their peers, to not at all, and

underscores the concept of differential susceptibility as one possible explanation of the

findings from studies examining contextualized models of joint effects.

The two studies presented in Chapters 3 and 4 aim to further explore both

cumulative and contextualized models of joint teacher/peer and parent/peer effects.

Work in both these studies was grounded in an ecological systems perspective of human

development (Bronfenbrenner & Morris, 2006), and guided by both Self-Determination

Theory (SDT; Connell & Wellborn, 1991; Deci & Ryan, 1985) and theories of Stage-

Environment Fit (SEF; Eccles et al. 1993; Roeser, 2005). The following section first

provides a brief description of the ecological systems perspective, then briefly describes

SDT and theories of SEF.

Framework and Theory Underlying Models of Joint Effects

     Ecological Systems Perspective. According to the Ecological Systems model (Bronfenbrenner & Morris, 2006), human development occurs through increasingly complex processes of reciprocal interaction that occur between an active, evolving individual and the persons, objects, and symbols in their environment. From this perspective, individuals' environments are viewed as complex sets of "nested structures, each inside the other like a set of Russian dolls" (Bronfenbrenner, 1979, p. 3). The inner most "doll", or level, of individuals' environmental system is called the microsystem, and represents the many environments (physical or social) in which individuals engage directly in interaction, or proximal processes, with people, symbols, or objects. For example, students reside at home some of the time and at their school at other times; and, within each of these settings, they frequently interact with significant others who reside in those environments (i.e., parents and siblings at home; teachers and peers at school). Students' home environments may represent one microsystem; likewise, in school, students' peer group may represent a microsystem, and the classroom, led by the teacher, may represent another.

     The second level of individuals' ecological system is the *mesosystem*, and represents the system of interactions or linkages between two or more microsystems. For example, students' peers and parents may be thought of as being linked; in that, parents may play a role in placing limits on who their children spend time with, and peers, likewise, may shape how children come to view their parents' attempts to guide

their social development. In this and other possible ways, parents and peers (who

represent significant others who comprise distinct microsystems) are inextricably

linked.

Beyond microsystems and mesosystems, are the third and fourth levels of

individuals' ecological systems, the exosystem and macrosystem. The *exosystem*

captures the contexts in which individuals themselves do not directly interact. For

example, middle school students may not routinely interact with their parents'

coworkers and boss, but the interactions that parents have with these social partners

may, nonetheless, indirectly impact students' development (e.g. a parent's pressure to

perform at work may disrupt how involved they are with their child). The *macrosystem*,

captures the broadest, most distant level of the system. It represents the socio-economic,

cultural and political systems that govern the values, beliefs and ideas that determine

qualities of the interactions that individuals have. For example, in western cultures

mothers, on average, maintain higher levels of involvement with their children's

schooling than fathers (Grolnick & Slowiaczek, 1994), in part based on cultural beliefs

of what it means to be a "good mother" and a "good father."

Finally, the *chronosystem* applies to all levels of the ecological system the

dimension of time. This allows for the demonstration of both change and constancy in

the child's environment, at all levels of the system. For example, family structure and

dynamics (*micro-* and *meso-systems*), parent's employment status and tenure

(*exosystem*), or societal views on parenting (such as fathers' roles as involved parents;

Cabrera et al., 2000; *macrosystem*) can all change with time, and thus impact students' development differentialy over time.

Both studies presented in this dissertation focus on micro- and meso- system level effects. Specifically, the unique role peers, teachers, and parents play, as distinct microsystems, shaping students' engagement are examined. In addition, linkages between these microsystems, or mesosystems, are examined—specifically links between peer and teacher contexts, and links between peer and parent contexts.

Self-Determination Theory. Deci and Ryan's Self-Determination Theory (1985) postulates that individuals' motivation can be either supported or undermined depending on the extent to their basic psychological needs are met. Underlying this theory is the assumption that humans are naturally oriented toward positive growth (i.e., that all humans are innately motivated), and that healthy motivational development is predicated upon individuals' receiving quality supports from their environment for their basic psychological needs. Just like a flower needs water, sunlight, and nutrient soil to grow, SDT argues that a developing person has needs for autonomy, relatedness, and competence. When support for these motivational needs is provided by an individual's environment, the individual maintains positive motivational growth. When some or all of these needs are not met, motivational development is undermined and decreases.

Autonomy refers to the extent to which individuals feel agentic, free to make personally relevant decisions. Students who feel highly autonomous feel free to engage in tasks and pursue goals which they are intrinsically interested in, rather than feeling

forced to perform a task that they are uninterested in. Students' autonomy may be supported by their parents, teachers, and peers through the extent to which these social partners are perceived as being supportive of their agency. *Competence* refers to a person need to feel effective through his or her intentional actions. An individual who feels competent feels as though he or she possesses the requisite knowledge or skills needed to produce change in or control the environment. Individuals feel competent when presented with developmentally appropriate goals and challenges that are well-structured and provided by supportive environments.

Perhaps most relevant to the studies in this dissertation, *Relatedness* refers to a person's belief that he or she belongs and is generally cared for and accepted by others. An individual who feels highly related to those around him or her feels a sense of belonging, and an enhanced sense of wellbeing and worthiness. Individuals who feel connected to others in a setting are more likely engage in the enterprise of that setting.

Stage-Environment Fit. Theories of Stage-Environment Fit posit that declines in students' academic motivation become sharpest at school transitions (particularly the elementary to middle school transition) due to a mismatch that emerges between students' developing needs and their school environment's ability to support them. Having transitioned into middle school, students suddenly find themselves in multiple classrooms throughout the day. In each of their classrooms, they are surrounded by different sets of students and are taught by different teachers. In their new school environment, middle school students experience an increased focus on performance in

compulsory areas of study like science and mathematics, and an increased sense that they "have to learn what they have to learn" (not necessarily what they are interested in learning). This transition occurs at a developmental moment when students increasingly need the support for their relatedness and autonomy.

Combined with SDT, Stage-Environment Fit theory suggests that during school transitions, the transition to middle-school in particular, the quality of students' relationships with adults may decline in quality. Declines in parental involvement may follow changes in their perceptions of their children as being in need of their involvement (e.g., "They're older, and don't want me around"), and of their ability to continue to be of help (e.g., "I can't help them with their calculus homework"). At the same time, declines in teachers' involvement, particularly in middle and high school, are likely structurally-based—having many more students, across multiple classes, with whom to be involved. Regardless of the underlying reasons, declines in both forms of adult involvement may leave students with inadequately supported needs for relatedness. To meet this need, they may turn to their peers, leaving them more vulnerable to processes of peer influence which, in some cases, may not be pro-learning.

The remaining portions of this dissertation are organized as follows. Chapter 3 presents research that builds on, bridges, and extends work which has explored teachers' and peers' joint contributions to students' engagement. Similarly, the study presented in Chapter 4 builds on a newly emerging body of work by examining models of parents'

and peers' joint influence on students' engagement. Following leads from previous

research, both of these papers examine cumulative and contextualized models of joint

effects, each of which tests one of two basic ideas: that (1) peer groups play an

important role maintaining (or eroding) students' motivation, that is unique from and

adds to significant teacher and parent contributions; and, that (2) the magnitude of

peers' unique contributions to students' engagement is dependent on the relationships

that students maintain with the adults—namely teachers and parents—within their

larger social ecologies. Finally, Chapter 5 includes an integrative discussion, connecting

the present studies with existing literatures and making recommendations for future

research.

Chapter 3

An Examination of the Joint Effects of Peer Group and Teacher Influences on Students' Engagement[2]

The construct of academic engagement has sparked considerable enthusiasm in both research and educational communities in recent decades for three reasons. First, engagement is a robust predictor of academic success, showing links to students' learning (Blondal & Adalbjarnardottir, 2012), retention and graduation (Finn, 1989), and educational achievement and attainment (Finn & Zimmer, 2012), across all educational grade levels (Hughes & Kwok, 2007; Shernoff, Csikszentmihalyi, Schneider, & Shernoff, 2003; Skinner, Kindermann, Connell, & Wellborn, 2009; Ullah & Wilson, 2007). Second, engagement seems to offer some protection from developmentally risky behaviors, such as drop-out and delinquency (Fall & Roberts, 2012; Li & Lerner, 2011; Wang & Fredricks, 2014; Wang & Peck, 2013), especially during early and middle adolescence, when these behaviors are otherwise normatively on the rise. And third, studies indicate that engagement is malleable and so open to intervention efforts (e.g., Anderson, Christianson, Sinclair, & Lehr, 2004).

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[2] The document of record is published in the Journal of Educational Psychology.
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In recent years, a fourth source of enthusiasm about the construct of engagement has emerged, as motivational researchers have begun to explore the overlap between engagement, a construct grounded in educational, psychological, and sociological traditions targeting antidotes to student drop-out (Finn, 1989; Newmann, 1992; Rumberger & Rotermund, 2012), and research on achievement motivation, an area of study grounded in the older and broader field of motivation (Deci, 1992; Weiner, 1990). Leaders in the field have recently suggested that student engagement may be considered an outcome of motivation and, as a result, research on engagement is now included in definitive reviews of motivational research (e.g., Wentzel & Miele, 2016; Wigfield et al., 2015). Some motivational theorists even argue that classroom engagement, defined as students' ongoing, active, and energized participation in academic tasks, is a potential marker of a motivated state, and so can be considered an observable manifestation of the energy and persistence generated by underlying motivation (Ryan & Deci, 2009; Skinner et al., 2009; Wang & Degol, 2014). Viewing engagement from a motivational perspective opens up the possibility that many of the factors already established as important predictors of motivational development may also serve to support students' classroom engagement (Reeve, 2012; Skinner, 2016; Wang & Eccles, 2012).

In fact, much of the research examining the ways in which students' engagement can be shaped by their interpersonal relationships in school has relied on motivational accounts of the influences of teachers and peers (Martin & Dowson, 2009; Wentzel, 2009a, 2009b). To date, studies have largely concentrated on the role of teachers (Quin,

in press; Roeser, Eccles, & Sameroff, 2000; Wentzel, 1997), but in recent years, research has begun to expand to include friends, classmates, and peer groups (Wentzel & Ramani, 2016). Up until now, however, few studies have looped back to examine the role of peer groups in combination with students' relationships with teachers, despite previous work that documents the centrality of teachers to student motivation and engagement (Quin, in press; Wentzel, 2009a). Guided by ecological models of schools as complex social systems, (Bronfenbrenner & Morris, 2006), the purpose of the current study was to provide a more contextualized view of peer group contributions to academic engagement, by considering how their impact could be shaped by students' relationships with teachers, specifically, students' experiences of their teachers' involvement.

A Social-Ecological Model of the Impact of Teachers and Peers on Student Engagement

The present study was framed by an ecological perspective. This framework suggests that complex social ecologies, like schools, can be conceptualized as multifaceted systems that contain multiple subsystems, and these subsystems work together to shape student development. If peer groups represent one such subsystem and teacher-student relationships represent a second, then an ecological perspective suggests that it may be important to examine them jointly, and posits two primary ways in which they can work together. First, teachers and peer groups may exert "cumulative" or additive influences, in which the contributions of social partners accrue in their effects

and in which, despite some overlap, each may provide essential supports that the other

cannot. Second, the influences of teachers and peer groups may be "contextualized" or

interactive, in that the impact of one set of social partners may depend on the nature of

the other. Many kinds of contextualized interactions among subsystems can be

imagined, such as *compensatory* effects, in which support from one social partner

protects students from the negative impact of the other, or *amplifying* effects, in which

the positive or negative attributes of one social partner magnify the corresponding

positive or negative effects of the other. Such a perspective suggests that the effects of

peer groups may be both cumulative and contextualized—peers not only provide unique

supports to academic engagement, but their effects also depend on the quality of

students' relationships with teachers. Although an ecological perspective highlights the

possibility of joint effects of teachers and peers, it does not specify *how* and *why* teacher

involvement might temper the influence of peer groups. For guidance on these more

specific questions, we turned to Self-Determination Theory (SDT; Connell & Wellborn,

1991; Deci & Ryan, 1985) and theories of Stage-Environment Fit (SEF; Eccles et al.,

1993; Eccles & Roeser, 2009).

      Teacher involvement and student engagement. SDT posits that all people,

including students in classrooms, have fundamental psychological needs for relatedness,

competence, and autonomy. When those needs are fulfilled by participation in an

enterprise, like school, individuals will more constructively take part in the activities of

that enterprise, for example, students will engage more fully with learning activities in

classrooms and cooperate more willingly with school rules (Ryan & Deci, 2009).

Consistent with this theory, decades of research have shown that students evince greater

engagement when teachers provide higher levels of support for students' motivational

needs, including warmth, pedagogical caring (Wentzel, 1997), closeness (Hamre &

Pianta, 2001), acceptance (Wentzel, 1994), help, direction (Ryan & Shin, 2011),

involvement, provision of structure, and autonomy support (Klem & Connell, 2004;

Skinner & Belmont, 1993; *see Quin, in press, for a review*). A primary pathway through

which teacher motivational support shapes engagement is by helping students feel more

efficacious, autonomous, welcome, and safe, and to better internalize educational values

(Connell & Wellborn, 1991; Deci & Ryan, 1985; Reeve, 2012; Skinner & Belmont,

1993; Wentzel, 1999, 2009a; Wigfield et al., 2015).

Although studies have identified a wide band of teacher behaviors that promote

student motivation and engagement, research suggests that central among them is

teacher provision of pedagogical caring (Wentzel, 1997) or involvement (Skinner &

Belmont, 1993), which focuses on a constellation of teacher behaviors, including

warmth, affection, and enjoyment, that mark a close and caring teacher-student

relationship. One pathway through which teacher involvement seems to support student

motivation and engagement is by fostering students' sense of belonging (Osterman,

2000; Goodenow, 1993), relatedness (Furrer & Skinner, 2003), or attachment to school

(Libbey, 2004). According to SDT, relatedness to teachers (and other social partners)

acts like "psychological glue" that connects students to school and promotes their

engagement. From this perspective, high quality student-teacher relationships, characterized by involvement and affection, are a foundation upon which the development of motivation and engagement depend (Eccles & Roeser, 2009; Reeve, 2012; Wentzel, 2009a; Wigfield et al., 2015).

At the same time, SEF alerts researchers to the importance of early adolescence and the transition to middle school as a time when students' needs for relatedness may become increasingly strained. Just when young adolescents are testing their fledgling independence from parents by reaching out for closer connections to peers and adults outside the home, like teachers, the quality of students' relationships with teachers begins to decline (according to reports from both students and teachers; Wigfield et al, 2015). These declines may be due at least in part to organizational changes in which students shift from having few to many teachers per day, making it more difficult to build close connections (Eccles & Roeser, 2009). SEF highlights this stage-environment mismatch, and suggests that declines in the quality of teacher-student relationships, which parallel declines in student engagement, may be a major contributor to losses in engagement and motivation over the transition to middle school (Eccles & Roeser, 2009; Wigfield et al., 2015). Because of its centrality in promoting student motivation and its well documented decline at the middle school transition, the current study focused on the role of teacher involvement, specifically, students' experiences of their teachers as involved (affectionate, caring, and dependable) as a potential predictor of students' engagement in the classroom.

Challenges to examining teachers' involvement. While studies converge on the importance of teacher involvement to student engagement and motivation, researchers who aim to assess teachers' influence during middle school still face distinct challenges (Wentzel, 2009a). Although the identification of students' teachers may be straightforward, identifying those teachers who are best positioned to influence students' engagement is not. This is a particularly thorny issue for research in middle schools, where students interact with multiple teachers throughout the day. To overcome this problem, many researchers use measures that assess students' experiences of their teachers in general (e.g., Wang & Eccles, 2012), thereby allowing students themselves to aggregate the most salient influences. In support of this practice, researchers have used questionnaires tapping students' perceptions of teacher involvement that include the stem "My teacher…" in longitudinal studies from elementary school through middle school (e.g., De Laet, et al., 2015; Skinner & Belmont, 1993). Evidence of the functioning of these scores over time indicates that, at least under these conditions, such measures maintain their key psychometric and validity characteristics (Skinner, Kindermann, & Furrer, 2008; Skinner, Zimmer-Gembeck & Connell, 1998).

Peer groups and student engagement. Multiple strands of research have converged on the conclusion that classmates and friends also play a significant role in student motivation and engagement in school (Wentzel, 2009b). Although much of this research has focused on close, reciprocated friendships as sources of enjoyment and correlates of success in school (Altermatt & Pomerantz, 2005; Berndt, Hawkins, & Jiao,

1999; Hallinan & Williams, 1990; Ladd, 1990), a growing number of studies have examined the role of naturally-occurring peer groups. This work explores the proposition that one way peers influence student engagement, motivation, and achievement is through proximal processes that occur in frequent social interactions within self-selected groups of peers (Kindermann, 2007; Ryan, 2000, 2001). A key idea is that participation in groups of peers who are engaged or disaffected from school has the potential, in addition to the contributions of friendship relationships and dyadic interactions with peers, to impact students' own emotional and behavioral engagement in the classroom (Kindermann & Skinner, 2012). Theories of peer group influence have suggested that their effects may be conveyed through multiple channels. They may be transmitted directly, through mechanisms of socialization, including modeling, reinforcement, encouragement, or pressure to conform to group norms (Altermatt & Pomerantz, 2005; Harris, 1995; Kindermann, 2003; Lynch, Lerner, & Leventhal, 2013), as well as indirectly, for example, by fulfilling needs for relatedness (Anderman & Anderman, 1999; Nelson & DeBacker, 2008; Furrer & Skinner, 2003) or providing academic help and support (Lempers & Clark-Lempers, 1992; Wentzel & Watkins, 2011).

Peer groups, which can be viewed as largely self-selected social contexts, provide opportunities for dyadic interactions and the formation of friendship relationships with similar peers (Kindermann & Skinner, 2012). Because peer groups tend to be selected based on similarity (i.e., homophily), such groups can create a more

concentrated or intensified local context, that, in the case of engagement and disaffection, may surround students who are already engaged with a higher concentration of engaged peers, and expose students who are already somewhat disaffected to a higher concentration of disaffected peers, thus potentially amplifying individuals' initial motivational states over time. For example, studies have shown that peer groups' average engagement levels at the beginning of the school year are small but robust predictors of changes in students' teacher-reported engagement over the year, during both elementary and middle school (Kindermann, 1993, 2007). In the same vein, Ryan (2001) found that middle school students who affiliated with peers who disliked school showed the steepest declines in their own enjoyment of school. Because of their potential importance to the development of students' engagement, the current study focused on the role of peer groups, specifically, the extent to which the members of an individual student's peer group were engaged versus disaffected with academic activities in the classroom.

Challenges to the study of peer groups. While a growing number of studies have pointed to the important role peer groups play in the development of student engagement and motivation, they have also highlighted two key challenges to investigating their effects. First, it can be difficult to reliably identify children's peer groups in naturalistic contexts, like schools. Natural peer groups consist of the agemates with whom children regularly interact. Such groups are hard to define because they are self-organized, evolve rapidly, and are often overlapping. To address this challenge, the

current study used Socio-Cognitive Mapping (SCM; Cairns, Perrin, & Cairns, 1985), which employs students themselves as expert observers of group interactions. Because students have the opportunity to witness schoolmates' public exchanges every day, such "insider" observations afford the most complete access to information about naturally occurring peer groups. Another advantage of relying on multiple observers is that it allows for an assessment of the level of agreement between reporters. Furthermore, unlike self-reports, which require near complete participation (otherwise each non-participating child is also missing as a potential peer group member of participating children), the accuracy of SCM is less affected by participation rates, because other reporters typically include missing group members. In fact, Cairns and Cairns (1994) estimated a criterion such that, when the sample of reporters is relatively representative, reports from slightly more than half the student body are sufficient to yield reliable networks.

Once the members of each student's peer groups have been identified, a second challenge is to figure out how to capture meaningful characteristics of groups. One method, used in the present study, is to create peer profile scores for each child, by identifying the members of a target child's peer group, and then combining measures of key characteristics obtained for each member (Kindermann, 1993; 1996; Kurdek & Sinclair, 2000; Ryan, 2001). Peer profiles of engagement can be calculated for a given student by averaging the engagement scores of each member of his or her peer group. In the current study, SCM was used to identify the members of each child's peer groups,

and peer profiles of engagement versus disaffection were used to capture the

motivational composition of each child's local peer context, with the expectation that

these profiles might predict changes in individual student's engagement over the school

year.

Studies of Joint Effects of Teachers and Peers

As research on peer group influences has begun to accumulate, findings seem to

converge on their potential importance to student motivation and engagement (Wentzel

& Muenks, 2016). However, few of these studies have tried to incorporate the impact of

the other major social partner in the classroom, namely, teachers. To date, only seven

studies have examined the joint effects of teachers and peers on student academic

engagement, motivation, or success. To guide our own examination of the interplay

between teachers and peers, we built on the few studies that have begun to incorporate

the effects of both social partners, looking carefully at the attributes they targeted and

how they analyzed different configurations of these relationships.

Evidence for cumulative effects. Of the seven studies of joint effects, four

found evidence for only cumulative effects, in which peers contributed uniquely to

student engagement over and above the effect of teachers. In a large sample of 13-year-

old students in Norway, Danielsen, Wiium, Wilhelmsen, and Wold (2010) found that

perceptions of support from teachers (i.e., friendliness and fairness) and peers (i.e.,

classmates' acceptance, kindness and helpfulness, and sense of togetherness) each

uniquely predicted students' self-reported academic initiative (tapped using items such

as "I challenge myself when I am doing schoolwork") at the individual level;

interactions were not examined. In a second study, Wentzel, Battle, Russell, and Looney

(2010) analyzed the extent to which middle schoolers' perceptions of four kinds of

supports from teachers and peers (expectations for academic engagement and positive

social behavior, provisions of help, safety, and emotional nurturing) were related to

school motivation. Multiple regressions, controlling for sex, grade level, and teacher,

revealed that all four of the teacher supports uniquely predicted student self-reported

academic motivation. When peer supports were entered in the last step, both peer

expectations and help were also unique predictors, although none of the interactions

between corresponding teacher and peer supports were significant.

In a third study, De Laet and colleagues (2015) investigated whether relationship

qualities of teachers (including global support and conflict) and peers (including

popularity and acceptance) jointly predicted the development of children's behavioral

engagement from grades 4 to 6. An additive model showed the best fit to the data,

indicating that high and increasing levels of teacher support and high levels of peer

acceptance (but not teacher conflict or peer popularity) contributed independently to

counteract the normative declines in children's behavioral engagement. Analyses of

moderation and mediation were conducted but none were found. In a fourth study,

Wang and Eccles (2012) examined growth curves of behavioral, emotional, and

cognitive engagement from grades 7 to 11, which they assessed using student-reports of

school compliance, identification with school, and subjective value of learning,

respectively. Although, in general, all three dimensions of engagement showed the normative declines typical for these ages/grades, students' reports of peer support predicted more favorable trajectories, that is, less steep declines, over and above the effects of support from teachers (and parents). No two-way interactions with support from teachers (or parents) qualified the protective contributions of peer support, but these effects were more pronounced for the trajectories of emotional and cognitive engagement of African-American students. Moreover, protective effects of peer support on behavioral engagement were found only for students who reported having more pro-social friends. For students reporting more anti-social friends, higher levels of peer support actually exacerbated declines in engagement.

Evidence for contextualized effects. Three additional studies found evidence for both cumulative and contextualized effects. All three used either pattern-oriented or person-centered analyses to examine groups of students who differed in their profiles of relationships with peers and teachers. In an early study, Furrer and Skinner (2003) examined third through sixth grade students' reports of their relatedness to teachers and peers (as well as parents) as predictors of self- and teacher-reported behavioral and emotional engagement. Using median splits, they created groups of students with high relatedness to none, one, two, or all three of these social partners. Group comparisons revealed that high relatedness to teachers could compensate for low relatedness to peers, but high relatedness to peers could not compensate for low relatedness to teachers. In a second study, Davidson and colleagues (2010) focused on school adjustment as the

target outcome (assessed as an aggregate of academic skills and self-concept, school bonding, loneliness, and self-worth), and used latent profile analysis to identify students with different patterns of relatedness to teachers and peers (based on teacher-reported teacher-student closeness, peer-nominated peer social preference, and self-reports of perceived peer competence). Three groups were distinguished: (1) high relatedness (high on all three indicators); (2) low relatedness (low on all three indicators); and (3) peer-oriented (medium teacher-student closeness combined with high peer social preference and perceived peer competence). Although adjustment was lowest for students who reported low relatedness to both peers and teachers at the beginning of the sixth grade, students from both high relatedness and peer-oriented groups evinced positive academic adjustment, suggesting that positive relationships with peers might be sufficient to support adjustment, even without highly supportive relationships with teachers. Finally, Raufelder, Jagenow, Drury, and Hoferichter (2013) used latent class analysis to identify four groups of students, namely, those who reported that their academic motivation was more dependent on teachers, more dependent on peers, dependent on both, or dependent on neither. Interestingly, the largest group of students consisted of those who saw their academic motivation as primarily dependent on peers, followed by students who saw their motivation as simultaneously peer- and teacher-dependent. Degree of membership in all four clusters was associated with several markers of motivation, including academic drive, learning goals, striving for academic success, and avoidance of academic failure.

Critique of current studies of joint effects of peers and teachers. Taken together, these studies provide evidence for two complementary perspectives on how teachers and peers work together to shape students' academic engagement, motivation, and adjustment. On the one hand, all seven found evidence of cumulative effects of peers and teachers, whether studies used variable-centered (Danielsen et al., 2010; De Laet et al., 2015; Wang & Eccles, 2012; Wentzel et al., 2010) or person-centered analyses (Davidson et al., 2010; Furrer & Skinner, 2003; Raufelder et al., 2013), suggesting that peers play an important role in their own right, a role not completely filled by teachers, no matter how much support they provide. However, studies did not converge on whether joint effects are also contextualized, that is, whether peer group effects are qualified to some extent by students' relationships with their teachers. In fact, three studies explicitly tested for interactions, but did not find them (De Laet et al., 2015; Wang & Eccles, 2012; Wentzel et al., 2010). In trying to explain these differences, it may be significant that, in two of these three studies (Wang & Eccles, 2012; Wentzel et al., 2010), researchers relied on student-report measures to tap all three of the key constructs, namely, teacher support, peer support, and motivational outcomes. It is possible that common-method variance makes it more difficult to disentangle the differential effects of the three parties involved. In the current study, information about each player was provided by separate sources. Such separation may facilitate the detection of these more complex interactive effects. Consistent with this notion, other studies that employed multiple independent reporters also uncovered interactive

effects (e.g., Davidson et al., 2010).

A second factor contributing to differing patterns of results in previous studies could be the specific characteristics of teachers and peers that researchers targeted for investigation. Studies were relatively consistent in their selection of teacher factors. All seven studies focused on the social-emotional qualities of student-teacher relationships that have been shown to predict student motivation and engagement (such as involvement, closeness, friendliness, fairness, positive expectations, and provision of help, safety, and emotional nurturing; Sabol & Pianta, 2012; Wentzel, 2009a). However, studies varied widely in the peer attributes they targeted. Some included student ratings of general support from peers and teachers (Wang & Eccles, 2012) or feelings of relatedness to both partners (Furrer & Skinner, 2003). Some examined specific qualities of peer relationships that were strictly parallel to those examined in teachers (e.g., Wentzel et al, 2010). Other studies selected peer characteristics that were not exactly the same as those of teachers, but were also in the general domain of social-emotional relationship qualities (i.e., classmates' acceptance, kindness, helpfulness, and togetherness; Danielsen et al., 2010). Finally, some researchers focused on key markers of overall positive functioning in the peer domain, such as peer-nominated popularity, acceptance, or social preference (De Laet et al., 2015; Davidson et al., 2010).

In the current study, consistent with other researchers of joint effects, we examined the social emotional quality of students' relationships with teachers as predictors of their engagement. However, we differed from all previous studies in the

peer characteristics we decided to target. Instead of examining peer relatedness or peer support, which have been the focus of previous studies, we targeted the engagement profiles of students' naturally-occurring peer groups. We reasoned that, unlike teachers, peers do not typically have the goal of promoting a student's motivation, so their efficacy may not reside in the quality of their relationships or the support they provide. Instead, peers may shape engagement through the power of joint activity, that is, students' own engagement may be buoyed by participating as an active member of a group of enthusiastically engaged age-mates who enjoy and work hard at learning activities. In contrast, trying to complete learning activities within local contexts of disaffected peers who may be passive, bored, frustrated, or discouraged can exert a downward pressure on students' own engagement, and so eventually reinforce or intensify their own disaffection.

The Interplay of Teacher and Peer Group Influences in School

The current study attempted to build on previous studies of joint effects, integrating them using an ecological framework focused on motivational theories, and strengthening them by employing key strategies to meet the methodological challenges of studying peer groups and teacher involvement. As the target outcome, we focused on changes in sixth-graders' engagement over the school year, since middle school marks a time when peer relationships normatively increase in importance and the quality of teacher-student relationships typically declines (Wigfield et al., 2015).

Consistent with previous research, we expected to find joint effects that were

both cumulative and contextualized. We focused on one specific pattern of contextualized effects, referred to as *differential susceptibility*, in which student receptiveness to peer group influences is more or less pronounced, depending on the quality of their involvement with teachers. Following SDT and SEF, we reasoned that, if after the transition to middle school, students are not able to establish warm and supportive relationships with teachers, they might become less adult-oriented and more open to peer group influences (Davidson, Gest, & Welsh, 2010), thus amplifying the impact of peers. If so, then low teacher involvement during this developmental period could render students more susceptible to the impact of their peer groups, which would be especially problematic for students who hang out with disaffected peers. In contrast, high teacher involvement might be able to protect students from some of the motivational costs of belonging to disaffected peer groups.

To conduct this investigation, we relied on a data set that contained all of the elements needed to examine joint effects, that is, a data set that incorporated different sources of information about each of the key constructs, in this case, information about peer groups derived from multiple peer-observers, ratings of student engagement from teachers, and students' ratings of their experiences of the involvement provided by their teacher (Kindermann, 2007). Although peer group contributions to student engagement, through processes of selection and socialization, have been documented in this data set, no previous attempts have been made to determine whether the magnitude of these effects differs for students who experience differing levels of teacher involvement. In

some ways, the current study may be seen as encouragement to researchers who have previously examined the contributions of peers or teachers separately, to revisit their data sets to see if information about the other social partner is available, and so would allow a more ecologically-oriented examination of their joint effects on student engagement, motivation, or adjustment.

   We investigated patterns of joint influence in three steps. First, we examined the possibility of cumulative effects, in which teachers and peer groups make largely separate and additive contributions to students' developing academic engagement. To test this model, we first replicated the general finding that teacher involvement and peer group profiles of engagement each positively predicts changes in student engagement individually, and then examined whether they make additive contributions. We expected that peer groups would make a unique contribution, over and above the contribution of teacher involvement. Second, we investigated the possibility of contextualized effects. Consistent with the notion of differential susceptibility, we expected that peer groups would play a more prominent role in predicting changes in students' engagement when teachers were less involved. Based on research suggesting that peer groups can socialize towards engagement or towards disaffection (Kindermann, 2007; Ryan, 2001; Wang & Eccles, 2012), we expected that these more pronounced peer group contributions would be positive or negative depending on the profile of engagement versus disaffection characterizing each child's peer group, with students who affiliated with engaged peers groups showing increases in engagement and those affiliating with disaffected groups

showing declines over the school year.

Third, we explored patterns that included both cumulative and contextualized effects, using latent profile analysis to identify groups of students who showed different combinations of teacher involvement and peer group engagement. We then examined whether these clusters of students showed different patterns of change in their academic engagement over the year. We expected to see two specific patterns. First, we predicted cumulative effects: It was expected that neither having an involved teacher alone nor affiliating with engaged peers alone would be sufficient to foster optimal levels of student engagement. To optimize engagement, students would likely require *both* involved teachers *and* engaged peer groups. If so, then students with the highest levels of engagement over the year would be those who both affiliated with engaged peers and experienced high levels of teacher involvement, whereas the steepest declines would be found among students who not only affiliated with disaffected peers, but also experienced their teachers as uninvolved. Second, we also expected contextualized effects, such that high teacher involvement would protect children from some of the motivational costs of affiliating with disaffected peer groups (Sabol & Pianta, 2012), and by the same token, connections with engaged peers would buffer students from the motivational costs of experiencing uninvolved teachers.

Method

For this study, Kindermann's (2007) dataset was reanalyzed. Of 366 sixth-grade students (age 11-13) enrolled at the sole middle school (grades 6 through 8) in a small

rural/suburban town in the U.S., 340 (93%) participated; all of them had been participants in a longitudinal study since 3rd grade. Most students identified themselves as Caucasian, with less than 5% identifying themselves as non-white, and were predominately from working to middle class families (87% of the adult population had at least a high school degree). The number of male and female participants was roughly equivalent (48% female).

The middle school these sixth graders attended was organized around homeroom classes: Students were assigned to these structured 20-minute first-period classes for the whole year. This arrangement was explicitly designed to provide homeroom teachers with the opportunity to get to know their students by checking in and interacting with them every day. Although homeroom teachers taught varying subjects (and so saw most of their students again in content classes), they were expected to serve as supports for their homeroom students and as designated liaisons to other teachers if students experienced academic or behavioral problems. All 13 of the sixth-grade homeroom teachers participated in the current study. They provided information about the students in their homeroom classes, and indicated that they knew their students very well and were familiar with their academic problems and progress. Questionnaires were administered to students in class by trained interviewers; items were read aloud by one interviewer, while a second interviewer monitored the classroom to answer individual students' questions. Teachers were not present in the classroom, and typically completed their questionnaires during this time.

Students' Academic Engagement

Students' academic engagement was assessed using a 14-item Likert-type scale measuring teachers' perceptions of students' engagement in academic activities (Wellborn, 1992). These measures are not intended to measure engagement in a single classroom, but in classrooms in general. The scale assesses students' behavioral engagement (e.g., "This student works as hard as he/she can") and emotional engagement (e.g., "In my class, this student appears happy"). Prior studies on fourth through seventh graders have shown moderate to strong intercorrelations between the components ($r = .72$, $n = 1,018$; Skinner et al., 2008) and indicated that they form an internally consistent indicator of engagement ($\alpha = .90$, $n = 1,018$). Teacher reports of engagement have been found to be stable over time ($r = .73$, $p < .001$, $n = 144$, Wellborn, 1992; $r = .78$, $p < .001$, $n = 1,018$, Skinner et al., 2008) and moderately correlated with academic achievement in the expected direction ($r = .40$ with math achievement, $r = .58$ with reading achievement, Skinner & Belmont, 1993; Skinner et al., 1990).

Teacher perceptions of student engagement were obtained at two time points during the school year, first in October and then again in May. At the first time point, homeroom teachers reported on 318 students (93% of the consenting students; 87% of the population). At the second time point, homeroom teachers reported on 322 students. Missing data and differences in sample size at the two measurement points are due to a combination of student attrition and new students entering the school. Three hundred

students had teacher reports at both time points.

Naturally Occurring Peer Groups

In October, students reported on naturally occurring peer groups using Social Cognitive Mapping (SCM; Cairns et al., 1985). In SCM, participants serve as "expert observers," reporting on whom they frequently see "hanging around" together while at or away from school. Students were provided with a form containing space for observations of up to twenty groups, each group having space for up to twenty members. Of the 280 participating students (77% of the sample; 56% female), none exhausted the space provided. Students were encouraged to consider all students in their entire school, regardless of grade level, as well as peers from outside the school. They were asked to list as many groups as they could from free recall, and were instructed to include dyadic groups as well as their own groups. Students could be nominated as being members of many separate groups at the same time so that multiple and overlapping groups were retained.

Peer groups were identified by first arranging students' reports of groups in a co-occurrence matrix, indicating the frequency with which each student was observed in interactions with each other student. Binomial z-scores were calculated for each co-occurrence in the matrix, and a 1% significance level was used to determine whether a student was more likely to be nominated as being in a group with each other student than could be expected by chance (for details, see Kindermann, 2007). In order to guard against self-enhancement biases, significant connections that were based on one single

observation were not accepted, as in almost all cases these were children's own self-nominations. Not counting errors of omission (e.g., that most girls do not report most boys' peer groups), there was high consensus about group connections (*kappa* = .88).

Three key indices of the characteristics of peer group networks were calculated. The number of members, excluding the focal student, who were identified in each student's peer group was used as a measure of group size. The percentage of peers maintained as group members from fall to spring was taken as an indicator of peer group stability. Finally, peer group profiles of engagement were calculated by averaging the teacher-rated engagement scores across the members of each child's group connections.

Teacher Involvement

In October, students themselves reported on the amount of involvement experienced from their teachers by responding to 11 items (Skinner & Belmont, 1993; all items were on a 4-point scale). The scale captures three facets of teacher involvement: the extent to which students' teachers showed *affection* (three items; e.g., "My teacher really cares about me"), the extent of *availability* (three items; e.g., "My teacher is always there for me"), and the extent of *dependability* (five items; e.g., "I can rely on my teacher to be there when I need him/her"). Because the students had been involved in the longitudinal study from third grade onwards, teacher involvement items were worded so that they referred to a single teacher. Thus, the items are used as a proxy for students' experiences of general teacher involvement. Previous work has

found that these measures have high internal consistency (α = .79, n = 144, Skinner &

Belmont, 1993) and that their key psychometric and validity characteristics are

maintained from elementary to middle school (Skinner, et al., 2008; Skinner, et al.,

1998).

Results

Descriptive statistics and correlations can be found in Table 1. In all analyses, a

Full Information Maximum Likelihood method was used to estimate missing data.

Overall, students showed moderate levels of engagement in both fall (m = 3.07, SD =

.57) and spring (m = 3.07, SD = .61), with relatively high stability between time points

(r = .75, p < .001). On average, members of students' peer groups were moderately

engaged in fall (m = 3.09, SD = .34), with larger groups showing a tendency toward

higher engagement (r = .25, p < .001). Peer groups were modest in size (m = 4.81, SD =

3.99), and relatively stable across the school year, with just about half of students'

affiliations in fall continuing into spring (m = .46, SD = .33). Finally, while students, on

average, rated their teachers as being fairly involved (m = 3.01, SD = .52), students who

experienced their teachers as more involved were more engaged themselves both in fall

(r = .34, p < .001) and in spring (r = .40, p < .001), and tended to be affiliated with peers

who were more engaged in fall (r = .20, p < .001).

Cumulative Effects: Do Peer Groups Contribute to Engagement Over and Above the Effects of Teachers?

Cumulative effects of teachers and peers were examined in two steps. First, in

Table 3.1
Construct Means, Standard Deviations, and Correlations (Study 1).

	1	2	3	4	5	6	7	*m*	*SD*
1. Student Eng. Fall	-							3.07	.57
2. Student Eng. Spring	.75***	-						3.07	.61
3. Peer Eng. Fall	.42***	.39***	-					3.09	.34
4. Teacher Involve.	.34***	.40***	.20***	-				3.01	.52
5. Sex	.16**	.21***	.19***	.29***	-			1.47	.50
6. Group Stability	.17*	.17*	.03	.10†	.20***	-		0.46	.33
7. Group Size	.19***	.08	.25***	.10†	.27***	.13*	-	4.81	3.99

Note. N = 366. *** *p* < .001 ** *p* < .01 * *p* < .05 † *p* < .07.

analyses of each potential contributor separately, peer group engagement scores in fall were found to predict changes in students' engagement from fall to spring, β = .11, *p* < .05; χ^2(36) = 60.250, *p* = .007; CMIN/DF = 1.674, CFI = .988, RMSEA = .043, as did teacher involvement, β = *.15, p < .01;* χ^2(39)= 51.333, *p* = .089; CMIN/DF = 1.316, CFI = .993, RMSEA = .029. Both models controlled for sex, peer group stability, and peer group size. In a second set of analyses, the contributions of peer group engagement and teacher involvement were modeled simultaneously, again controlling for peer group size and stability, and sex. This model fit the data well, χ^2(66) = 101.358, *p* = .003, CMIN/DF = 1.536, CFI = .986, RMSEA = .038, and indicated that peer group engagement in fall predicted changes in students' engagement across the school year (β = .10, *p* < .05), over and above the contribution of teacher involvement (β = .15, *p* < .01).

Contextualized Effects: Do the Effects of Peers Differ for Students with Different

Levels of Teacher Involvement?

In order to investigate differential susceptibility, in which students' experiences

of teacher involvement can magnify or reduce the impact of their peer groups on

academic engagement, data were analyzed using two complementary modeling

strategies. First, a latent moderated model was used to examine whether peer group

effects on changes in students' engagement depended on teacher involvement. Then, to

aid the interpretation of the interaction, a multiple-group model examined whether peer

group effects on students' academic engagement were significantly different between

students who experienced highly involved teachers and students who experienced less

involved teachers. Both modeling strategies used AMOS 19 (Arbuckle, 2010).

The moderated model (see Figure 1), which was tested using the orthoganilizing

procedure described by Little, Bovaird, and Widaman (2006), showed good fit to the

data, $\chi^2(203) = 188.302$, $p = .763$; CMIN/DF = .928, CFI = 1.000, RMSEA = .000 C.I.=

.000 to .017. As indicated by the model, the interaction between peer group engagement

and teacher involvement was a significant predictor of changes in students' engagement

from fall to spring ($\beta = -.15$, $p < .01$), suggesting that peer group contributions to

changes in students' academic engagement were dependent on students' experiences of

involvement from their teachers. The negative interaction parameter indicates that lower

teacher involvement was associated with increased peer effects.

Multiple-group SEM analyses further explored whether differences in the extent

to which peer groups contributed to students' engagement could be found between students who experienced highly involved teachers versus students who experienced their teachers as less involved. Using a tertile split, two groups of nearly equivalent size were identified: students who perceived their teachers as most involved (n =129, m involvement = 3.54), and students who perceived their teachers as least involved (n =127, m involvement = 2.47; 100 students in the middle range were omitted). Compared to students who experienced teachers as least involved, students of highly involved teachers were more engaged both in fall and spring, and affiliated with more engaged peers (see Table 2).

To test for differences in peer group effects between these groups, a 3-step model invariance procedure was used (Kline, 2011; Tabachnick & Fidell, 2007). First, a configural model (Figure 2) was fit to the data, freely and simultaneously estimating model parameters for both groups. This model showed good fit to the data, χ^2 (72) = 96.454, p = .029; $CMIN/DF$ = 1.340; CFI = .982; $RMSEA$ = .038; 90% C.I. = .013 to .057. Despite similarity between the two groups in terms of stability of individual engagement, peer group contributions to changes in student engagement were greater for students who perceived their teachers as less involved ($ß$ = .30, p < .001). By comparison, results indicated that no significant peer group effects were found among students who perceived their teachers as most involved ($ß$ = -.05, p > .05). To test the significance of this difference, cross-group equality constraints were imposed on the model, beginning with the factor loadings. Constraining the

Figure 3.1

The Interplay Between Peer and Teacher Influences on the Development of Students' Engagement.
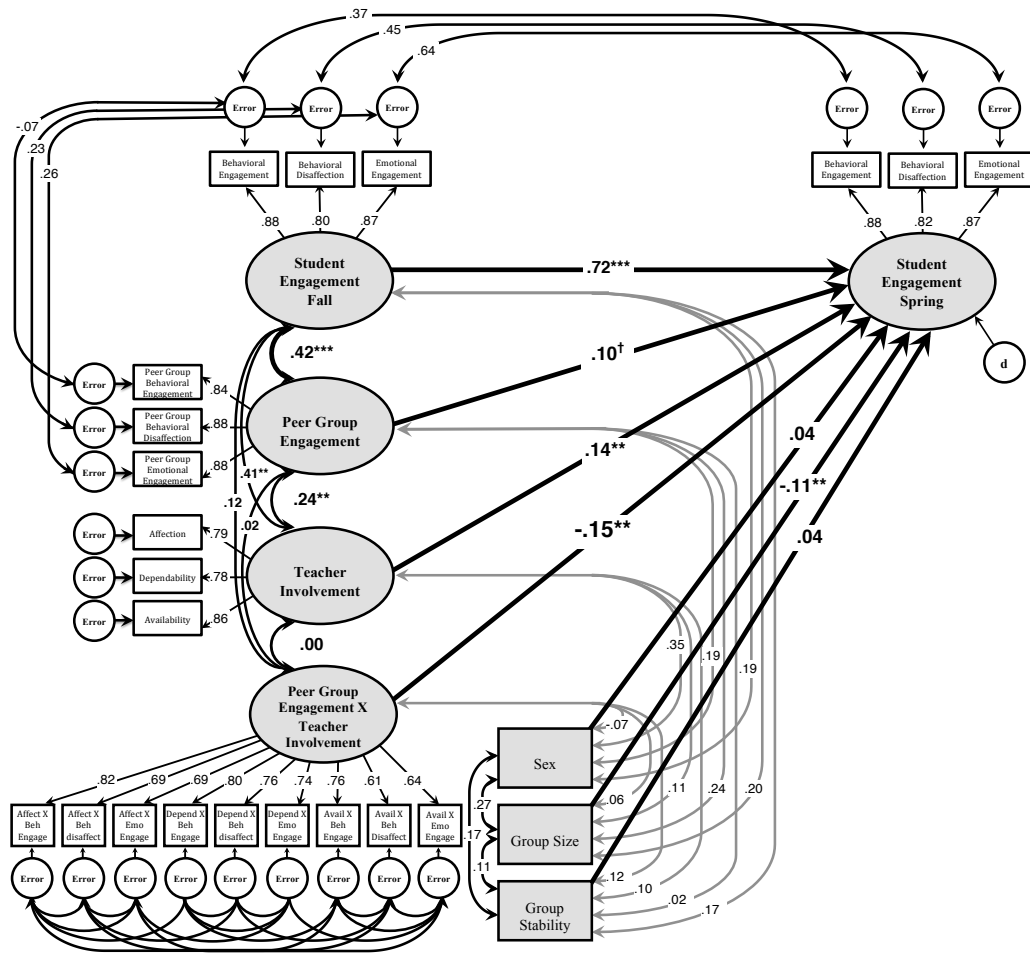
Note. χ^2 (203) = 188.302, *p* = .763; CMIN/DF = .928; CFI = 1.000; RMSEA = .000; 90% confidence interval = .000 to .017. *** *p* < .001, ** *p* < .01, * *p* < .05 † *p* < .07.

Table 3.2
Mean Level Differences Between Students with High or Low Teacher Involvement.

| | High Teacher Involvement | | Low Teacher Involvement | | | | |
	M	*SD*	*M*	*SD*	M_{diff}	*t*	*p*
Student Eng. Fall	**3.29**	.53	**2.85**	.58	-.44	-6.32	.001
Student Eng. Spring	**3.32**	.55	**2.76**	.61	-.55	7.62	.001
Peer Engagement Fall	**3.18**	.33	**3.02**	.35	-.16	3.83	.001
Peer Group Size	5.57	.99	4.94	.20	-.64	1.24	.05
Peer Stability	.50	.34	.44	.33	-.06	1.42	.05

Note. n =129 for the high teacher involvement group. *n* = 127 for the low teacher involvement group.

measurement portion of the model did not lead to significant reductions in model fit, $\Delta\chi^2(6) = 5.548$, $p > .05$, indicating measurement equivalence between the two groups. The model fit the data well, χ^2 (78) = 96.180, $p = .080$; *CMIN/DF* = 1.233; *CFI* = .987; *RMSEA* = .030; 90% C.I. = .000 to .049. In a final step, the two-group model was estimated with an additional cross-group equality constraint imposed on the model parameter representing peer group effects on changes in students' engagement. Model fit remained good, χ^2 (79) = 102.337, $p = .040$; *CMIN/DF* = 1.295; *CFI* = .984; *RMSEA* = .034; 90% C.I. = .008 to .052; however, the imposition of this constraint lead to a significant reduction in model fit, $\Delta\chi^2(1) = 6.157$, $p < .05$, confirming the expectation that this parameter of the model should differ between groups. These results complement findings from the latent moderated model and support a contextualized view of peer influence on student engagement, suggesting that peer group contributions to students' engagement were greater among students who experienced their

Figure 3.2

Comparison of Peer Effects Between Students Who Perceive Teachers as Highly Involved and Students Who Perceive Teachers as Least Involved.
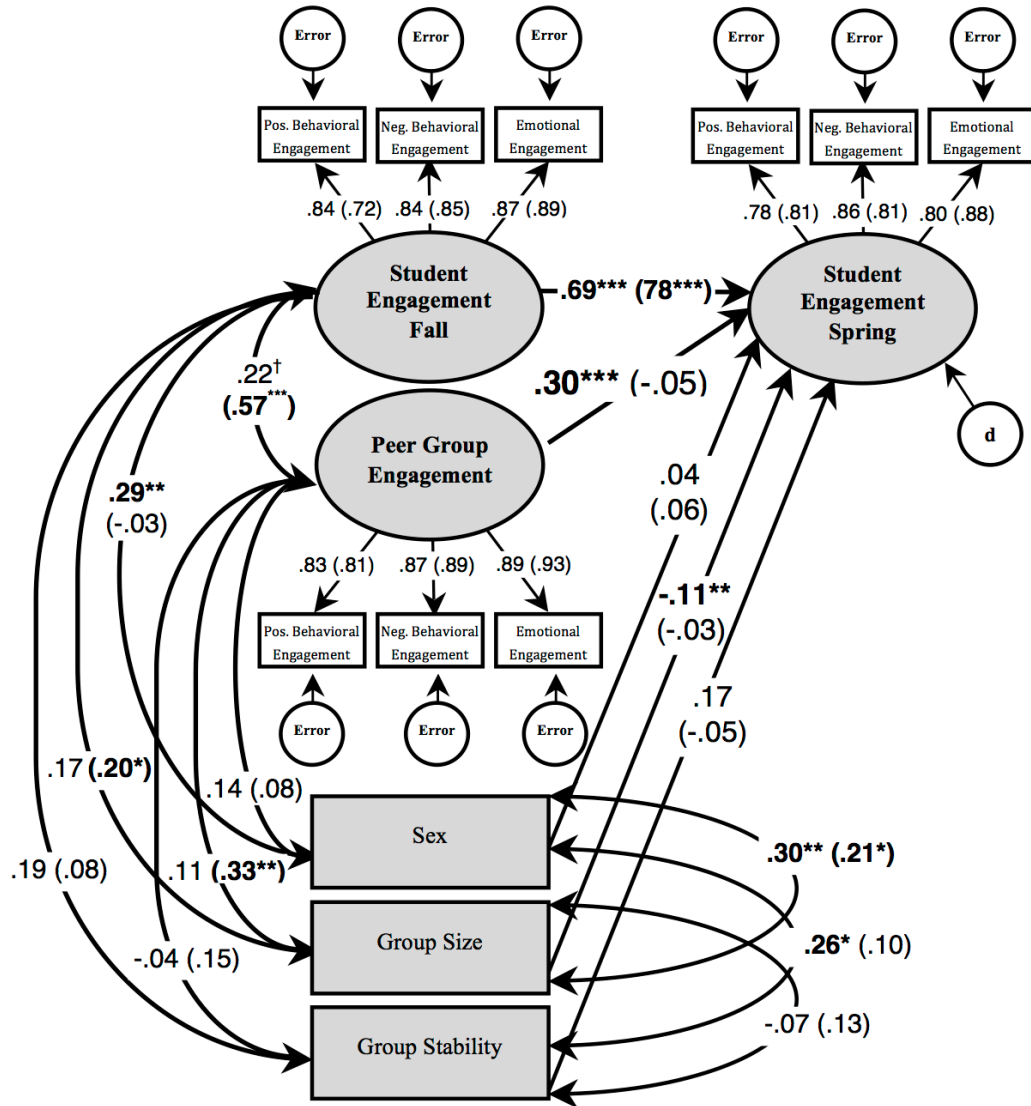
Note. χ^2 (72) = 90.632, *p* = .068; CMIN/DF = 1.259; CFI = .987; RMSEA = .032; 90% C.I. = .000 to .051. The model parameters for students who experienced their teacher as highly involved appear in parentheses. Error correlations have been omitted from the figure for clarity. *** *p* < .001, ** *p* < .01, * *p* < .05, † < .07.

teachers as less involved.

Cumulative and Contextualized Effects: Do Students with Different Configurations of Peer Group and Teacher Support Show Differential Change in Engagement?

To explore cumulative and contextualized effects, that is, to examine whether the joint effects of teachers and peer groups can be additive and compensatory, data were analyzed using a person-centered approach. Specifically, groups of students were identified who had different combinations of peer and teacher contexts, and these groups were compared to see whether they differed in the way their engagement changed across the school year. For these analyses, types of students were identified from the entire sample using latent profile analysis (LPA) modeling using MPLUS version 7.2 (Muthén & Muthén, 2012). Four separate LPA models were tested, with 2, 3, 4, or 5 profiles specified. All LPA model solutions were stopped at 60,000 iterations, and relative fit was assessed by comparing the Akaike Information Criterion (AIC), Bayesian Information Criterion (BIC), and the Sample Size-Adjusted Bayesian Information Criterion (Adj. BIC) for each model (see Table 3). With each of these assessments of fit, lower values indicate better model fit (Nylund, Asparouhov, & Muthén, 2007). In addition to assessing relative model fit, model preference was also based on the presence of adequately-sized profile groupings, and whether groups fit well with theoretical expectations. While the 5-profile model showed the best fit (as assessed by AIC and Adj. BIC), one of the profile groupings identified was inadequately

sized (n < 10), and substantively indistinguishable from another profile grouping; thus,

profiles identified using this model were not used. Profiles based on the 4-profile model

were chosen for use in subsequent analyses, as this model showed the best fit (in

comparison to all models but the 5-profile model), produced adequately-sized profile

groupings, and aligned well with theoretical expectations for the variety of

configurations represented. This model identified the following types of students:

members of engaged peer groups ($m = 3.35$, $SD = .25$) who experienced high teacher

involvement ($m = 3.52$, $SD = .30$; $n = 132$), members of engaged peer groups ($m = 3.28$,

$SD = .24$) who experienced low teacher involvement ($m = 2.56$, $SD = .32$; $n = 107$),

members of disaffected peer groups ($m = 2.74$, $SD = .20$) who experienced high teacher

involvement ($m = 3.08$, $SD = .33$; $n = 94$), and members of disaffected peer groups ($m =$

2.50, $SD = .31$) who experienced low teacher involvement ($m = 2.21$, $SD = .41$; $n = 33$).

Changes in engagement across the school year are shown in Figure 3 for each of

the four different types of students identified by LPA. An ANCOVA showed mean-

Table 3.3
Latent Profile Analysis Model Fit Results (Study 1).

	Statistical Criteria		
	AIC	BIC	Adj. BIC
2-profile Model	1102.421	1129.739	1107.531
3-profile Model	1053.001	1095.93	1061.032
4-profile Model	**1029.088**	**1087.627**	**1040.038**
5-profile Model[*]	1024.618	1098.768	1038.489

Note. AIC = Akaike Information Criteria, BIC = Bayesian Information Criteria, Adj. BIC = sample-size adjusted Bayesian Information Criteria (n*=(n+2)/24). Lower AIC, BIC, and Adj. BIC values indicate better fit. Values greater than or equal to the lowest values are shown in bold. [*]The 5-profile model was removed from consideration because it identified profiles of inadequate size (n < 10).

level-differences in student engagement between the four types of students in both fall, $F(3,359) = 15.66$, $p < .001$, and spring, $F(3,359) = 21.94$, $p < .001$, accounting for the covariates of sex, peer group size, and group stability. The strength of the relationship between cluster membership and student engagement in both fall ($\omega^2 = .10$) and spring ($\omega^2 = .14$) was moderate, accounting for the covariates. Post-hoc comparisons examined pairwise differences between the groups. As expected, the most engaged students were those who both affiliated with highly engaged peers and also experienced teachers as highly involved; these students showed the highest levels of engagement in both fall ($m = 3.32$, $SD = .51$) and spring ($m = 3.34$, $SD = .55$). They were more engaged than students who experienced only favorable teacher contexts (m difference = .33, $p < .001$, in fall; m difference = .27, $p < .001$, in spring), as well as students who experienced only favorable peer contexts (m difference = .31, $p < .001$, in fall; m difference = .33, $p < .001$, in spring). Conversely, the most disaffected students were those who both affiliated with disaffected peers and experienced teachers as least involved; these students showed the lowest levels of engagement in both fall ($m = 2.62$, $SD = .62$) and spring ($m = 2.41$, $SD = .63$). They were less engaged than students who experienced only favorable teacher contexts (m difference = -.32, $p < .01$, in fall; m difference = -.61, $p < .001$, in spring), as well as students who experienced only favorable peer contexts (m difference = -.34, $p < .01$, in fall; m difference = -.54, $p < .001$, in spring). Together these results support an additive model of the joint contributions of peer groups and teachers to students' engagement: Although it was

Figure 3.3

Differential Growth of Students' Academic Engagement Based on Students' Combined Experiences of Teacher Involvement and Peer Group Engagement.
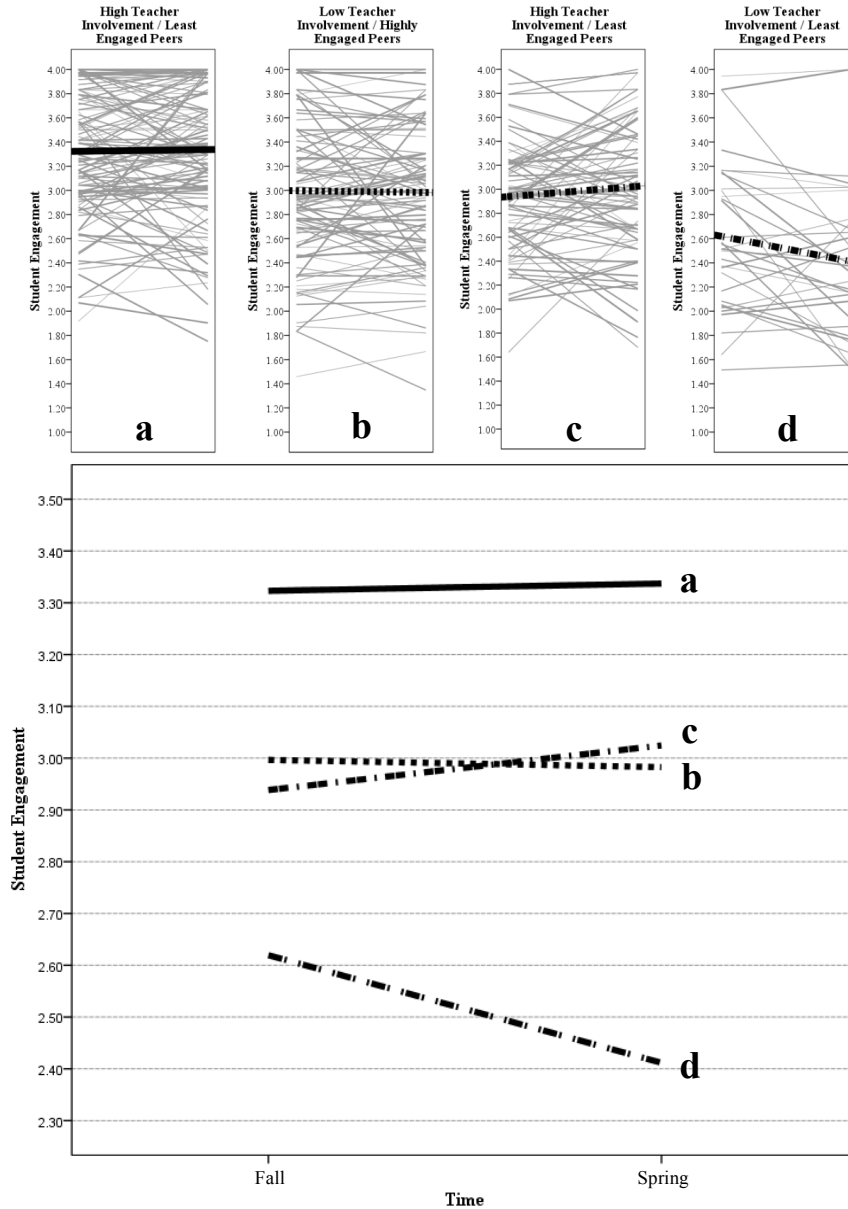
Note. Non-significant engagement changes in academic engagement are shown for students who (a) affiliate with highly engaged peer and experience high teacher involvement ($n = 132$), and who (b) affiliate with highly engaged peers and experience low teacher involvement ($n = 107$). Gains in engagement shown for students who (c) affiliate with least engaged peers and experience high teacher involvement ($n = 94$; average increase marginally significant at $p < .06$). Significant decreases in engagement shown for students who (d) affiliate with least engaged peers and experience low teacher involvement ($n = 33$; average decreases significant at $p < .05$).

better to have either an engaged peer group or an involved teacher than having neither,

for students to have the highest levels of engagement, support from *both* peers and

teachers was needed.

Results from a repeated-measures ANCOVA also showed significant differences

between the LPA-identified groups in how their engagement changed across the school

year, $F(3, 359) = 3.93$, $p < .01$. As predicted, students who experienced teacher and peer

group contexts that were both favorable (i.e., having involved teachers and affiliating

with engaged peer groups) fared best over time, showing high and stable engagement

across the year ($\Delta m = .01$), $t(131) = .40$, $p > .05$. In contrast, students with the least

favorable contexts (i.e., who experienced the least involvement from their teachers and

also affiliated with the most disaffected peers) demonstrated the steepest declines in

engagement across the academic year ($\Delta m = -.21$), $t(40) = -2.35$ $p < .05$. At the same

time, evidence for partially compensatory effects was also found. Students who

affiliated with disaffected peers, but who viewed their teachers as more involved

evinced moderate levels of academic engagement (showing higher levels than the most

disaffected group but lower levels than the most engaged group) that increased

marginally ($\Delta m = .09$) from fall to spring, $t(93) = 1.91$, $p < .06$. This suggests that an

involved teacher can offset some of the motivational costs of affiliating with disengaged

peers. Similarly, students who viewed their teachers as less involved, but nevertheless

affiliated with engaged peers also showed moderate levels of academic engagement that

remained stable over the year ($\Delta m = -.01$), $t(106) = -.38$, *ns*, suggesting that

academically enthusiastic peer group members can protect against some of the motivational costs of experiencing teachers as unsupportive.

Discussion

In 1976, Urie Bronfenbrenner wrote "…the ecology of education is not and cannot be confined solely to conditions and events occurring within a single setting, such as home, school, peer group, workplace, etc.; equal emphasis must be given to relations obtaining between settings" (p. 12). If the notion of "contextualization" can be applied not only to settings, but also to interactions with social partners, this suggests that the nature of the interactions between two people in a given setting may be best understood in the context of the other interactions those two people have experienced in that setting. In that spirit, this study sought to contribute to an emerging body of work focused on the joint effects of teachers and peers by examining how these subsystems of the school social ecology work together, both independently and interdependently, to shape students' motivation to engage in learning activities.

More specifically, we tested whether models of cumulative (additive) and contextualized (interactive) joint effects could explain changes in students' engagement from fall to spring of their first year in middle school, when peer influences are on the rise and the quality of students' relationships with their teachers typically declines. Evidence was found for both kinds of effects. Consistent with prior studies (Kindermann, 2007; Ryan, 2001; Klem & Connell, 2004; Wentzel, 1997), results from SEM models testing peer and teacher effects separately indicated that both peer group

engagement and teacher involvement individually predict changes in student

engagement over the school year. When tested simultaneously, peer groups were found

to make a unique contribution to changes in students' engagement, over and above the

substantial contribution of teacher involvement, suggesting that peers and teachers

contribute uniquely to students' engagement, and that their effects may be cumulative.

At the same time, findings suggested that the effects of peer groups are also

contextualized. Interactions between peer groups' engagement and teachers'

involvement were significant as predictors of changes in students' own engagement,

indicating that the motivational contribution of peer groups was magnified or reduced

depending on students' experiences of involvement from their teachers. Consistent with

the notion of differential susceptibility, tests of multi-group models showed that peer

groups were significantly stronger as predictors of changes in engagement among

students who perceived their teachers as less involved, with these more pronounced

peer group effects associated with positive or negative consequences for engagement

depending on the motivational composition of each child's peer group.

Person-centered analyses likewise revealed support for both cumulative and

contextualized models. On the one hand, joint effects of peer groups and teachers were

clearly cumulative. Neither teacher involvement nor peer group engagement alone were

sufficient to foster the highest levels of student engagement; and declines in

engagement were steepest for students who both affiliated with disaffected peers and

reported lower levels of teacher involvement. On the other hand, results also suggested

that teacher involvement could partially buffer students from the motivational costs of belonging to disaffected peer groups: Students who affiliated with disengaged peers, but still experienced teachers as involved, showed moderate levels of engagement and made marginally significant gains in engagement across the school year. Perhaps surprisingly, these configural analyses also suggested that peer groups can dampen the effects of low involvement from teachers: Students who experienced their teachers as less involved, but who nevertheless affiliated with more engaged peers, also showed moderate levels of engagement and were able to maintain their engagement over the school year. Perhaps positive connections with peers have the potential, at least in the short run of a school year, to buffer some of the motivational costs otherwise associated with perceived lack of teacher support.

Limitations and Future Directions

It is important to consider the shortcomings of the current study, in terms of design and measurement, when interpreting its findings and making suggestions for further investigation of joint effects. In terms of design, the study is limited in that it focused on changes in engagement across only two time points within a single year. This made it impossible to follow the joint effects of teachers and peers across subsequent school years, as students encountered new teachers and joined new peer groups. Longer time frames with more measurement points would be useful if future studies aim to examine cumulative long-term effects or to explore meditational models, reciprocal effects, or growth curves. Previous studies of joint effects suggest that all of

these processes are important targets (e.g., Wang & Eccles, 2012).

In terms of measurement, the strategies used in the current study to assess student engagement and teacher involvement were limited in their ability to map the complex social world of teachers and peers during middle school. The use of multiple, independent reporters can be viewed as a strength of the study, but the decision to ask students about the involvement of "my teacher" as a proxy for the involvement of teachers in general may not fully capture the range of teacher interactions that students experience in middle school settings, where they typically encounter many teachers over the day. Although this strategy is common among researchers who assume that it is students' perceptions of experiences that are key to their engagement (e.g., DeLaet, et al., 2015; Furrer & Skinner, 2003; Skinner & Belmont, 1993), it is an empirical question whether findings from the current study will replicate in research utilizing aggregate indicators that, for example, are based on average involvement scores from every teacher with whom a student interacts. By the same token, reliance on homeroom teachers as the sole reporters of students' engagement, even teachers who indicated that they knew students well, may fall short of capturing the range of engagement that students exhibit from class to class over the day. Although teacher-reports of student engagement likely have advantages over self-reports (which were used in the majority of studies targeting joint teacher-peer effects), it is an empirical question whether the pattern of results found in the current study will replicate in research focused on other measures of engagement, such as classroom observations or aggregates that combine

engagement ratings from multiple teachers.

Finally, the current study is limited in that it did not supplement longitudinal correlational findings by explicitly incorporating markers of potential mechanisms of joint influence. As previously discussed, a variety of mechanisms have been documented through which teachers influence student engagement and motivation (Sabol & Pianta, 2012; Wentzel, 2009a) and studies are increasingly identifying pathways of peer influence, which seem to be both cognitive (for a review, see Brechwald & Prinstein, 2011) and behavioral (Kandel, 1985; Sage & Kindermann, 1999). Such evidence bolsters the current correlational findings, but causal interpretations would be strengthened by future studies that include measures of possible mechanisms to explain joint teacher-peer effects, and then test their viability using meditational analyses. Combined with experimental studies, such findings would help rule out alternative third variable explanations that are otherwise plausible. For example, students' behavioral problems may underlie both declines in their academic motivation and in the quality of their relationships with teachers (e.g., Wang & Fredricks, 2014) and peers (Davidson et al., 2010). Future studies that directly examine potential mechanisms would begin to identify the (perhaps multiple) pathways through which peers and teachers jointly influence students' academic engagement.

Implications for Future Research

The current study is consistent with previous research examining the joint effects of peer and teacher relationships on the development of students' academic

functioning, but also makes several key contributions to this growing area of study.

First, findings suggest that, in addition to the features of peers already identified in other

studies of joint teacher-peer effects, it would be useful to add peer groups, or more

specifically, the motivational composition of peer groups, as another peer attribute that

plays a role in students' engagement over and above that of teachers, and whose effects

seem to be contextualized by teacher involvement. Second, findings from the current

investigation corroborate the notion that using distinct sources of information about the

three players in processes of joint effects (namely, peers, teachers, and student

engagement) may make it easier to discern certain forms of contextualized effects.

Third, it underscores some of the methodological strategies, like SCM, that may be

useful in capturing the active ingredients in peer groups, and encourages researchers to

consider re-analyzing their data sets, if they contain all the elements needed to

meaningfully test for cumulative and contextualized joint effects.

Finally, the current study highlights the value of using an ecological perspective,

as well as motivational and developmental theories like SDT and SEF, to frame

expectations about joint influences. Ecological perspectives provide a larger framework

within which to consider the influences of peer and teacher subsystems, and suggest

conceptual terms, like cumulative and contextualized effects, to supplement researchers'

reliance on statistical terms like additive and interactive. They open up a range of other

kinds of contextualized effects and point to other subsystems, such as friendship

networks, or family and neighborhood subsystems, to which these ideas could usefully

be extended. More specific theories, like SDT, suggest that future work examining

potential mechanisms should include students' sense of relatedness to peers and

teachers, and examine whether they mediate the effects of peer group engagement and

teacher involvement on changes in student engagement. SEF also suggests that

particular kinds of contextualized effects, in which low teacher involvement contributes

to differential susceptibility to peer groups, may represent an emergent developmental

phenomenon, that only appears after the transition to middle school, when

environmental shifts make it more difficult for students to connect with teachers (Eccles

& Roeser, 2009). Such conceptual considerations may be helpful to future studies in

guiding the selection of peer characteristics and in making predictions about how and

why their effects might (or might not) be contextualized by students' relationships with

their teachers.

Models of joint teacher-peer effects. Future research on joint effects may also

benefit from greater discussion of the different ways in which influences from peers and

teachers can work together. The notion of differential susceptibility provides one

hypothesis, in which the lack of close relationships with teachers renders students more

open to peer group influences (Sabol & Pianta, 2012), but alternative models that posit

other kinds of contextualized effects, like compensatory or synergistic effects, could

also be fruitful. It is important to note that these alternative models are not necessarily

mutually exclusive; some are complementary. For example, in the present study, we

found evidence that joint effects are both cumulative (i.e., additive) and contextualized

(in this case, amplifying and dampening susceptibility). In other words, both teachers and peers are clearly important, in that support from one partner cannot fully substitute for poor relationships with the other, but each partner can still buffer or protect students from the worst motivational consequences of low levels of support from the other.

Of course, some models of contextualized effects are incompatible with cumulative models. For example, fully compensatory models, in which high levels of support from either partner are sufficient to produce the best outcomes, indicate that effects are not additive, instead they are substitutive—either one is a sufficient condition for the outcome. Other kinds of contextualized models also rule out additive effects, such as multiplicative threshold models in which some minimal level of support from one partner is required if the other partner is to have an impact. For example, if relationships with teachers are bad enough, it may be that no amount of peer encouragement can reignite students' engagement. Or, if a student's peer group is sufficiently disaffected, he or she may no longer respond to a teacher's involvement, support, or reassurance. These models suggest completely contextualized effects, where if one relationship is unfavorable enough, it can actually cancel the impact of the other social partner.

One strategy for discerning contextualized effects, employed in the current study as well as several previous ones (Davidson et al., 2010; Furrer & Skinner, 2003; Raufelder et al., 2013), is the use of pattern-oriented or person-centered approaches that identify subgroups of students who inhabit qualitatively different peer-teacher niches,

and comparing them on target outcomes, such as changes in motivational or academic functioning. The more that research on joint effects moves away from statistical models of interactive effects and toward conceptual models of contextualized effects, the wider the array of methodological strategies that can be brought to bear. In this regard, researchers may wish to take advantage of conceptual models and statistical techniques applied in work on developmental psychopathology (Luthar, Cicchetti, & Becker, 2000) and environmental reactivity (e.g., Moore & Depue, 2016), where researchers have considered hypotheses that include protective or buffering effects, immunization, thresholds, cumulative risk, diathesis-stress, and other forms of differential vulnerability or susceptibility to the environment (e.g., Ellis et al., 2011).

Reciprocal effects of student engagement on teachers and peers. As research increasingly focuses on social dynamics among multiple partners in the classroom, studies may also be expanded to include a consideration of reciprocal effects, in which students' own engagement feeds back to shape the supports they receive from teachers and peers. And, just as feedforward effects have been found to be contextualized, it is possible that reciprocal processes involving both social partners may also interact with each other. Engagement versus disaffection may turn out to be markers for whether students receive a double dose of motivational support or discouragement. That is, students who are highly engaged not only receive more involvement (as well as other forms of support) from teachers, but they also have access to more engaged groups of peers, whereas more disaffected students typically experience their teachers as

withdrawing their support and becoming more controlling over time, while at the same time their peer connections are largely confined to other disaffected students (Kiuru et al., 2015; Nurmi & Kiuru, 2015; Skinner & Belmont, 1993). Future studies that examine joint effects over longer periods of time could explore whether such reciprocal feedback processes amplify the feedforward effects suggested by findings from the current study, potentially contributing to virtuous and vicious cycles that shape the development of student engagement and motivation over multiple school years.

Implications for Practice

Although the research base is too thin at the current time to allow for any definitive recommendations, findings from studies of joint effects suggest three possibilities for educators and researchers to consider in their efforts to refine practices and strengthen interventions designed to promote students' engagement and motivational development. First, it seems likely that interventions targeting either teachers or peers many exert their effects through two pathways. Cumulative and contextualized joint effects, such as the ones found in the current study, imply that improvements in connections with either partner (e.g., increasing connections with teachers or with engaged peers) should not only exert positive effects on engagement directly, but should also exert positive effects *indirectly*, by mitigating the worst impacts of problems with the other partner (e.g., low quality relationships with teachers or connections to disaffected peers). At the same time, however, studies of joint effects also suggest that interventions targeting only one social partner will not be sufficient to

optimize student engagement over the long term. Results from this and other studies indicating contextualized effects imply that interventions focusing on a single classroom partner will only produce optimal engagement for a subset of students, namely, those who already have positive connections with the other partner. The students most in need of support, namely, highly disaffected students, will likely improve only in response to interventions that help them establish improved relationships with both involved teachers and engaged groups of peers.

Second, if the effects of peers are indeed contextualized, then interventions designed to improve student-teacher relationships may not only take on an added urgency, they may also benefit from an expanded focus. The sense of urgency follows from findings suggesting that low quality teacher relationships may pose a double risk for student motivation: once because of the direct impact of unsupportive teachers, and once because poor student-teacher relationships may leave students at the mercy of peer group influences, which are unlikely to be uniformly positive. According to studies of joint effects, it would be especially important for teachers to reach out to children and youth who affiliate with disaffected peers. If teachers can intentionally provide higher levels of involvement, such students may be protected from the worst effects of these connections. In the long run, teachers may develop strategies that are effective in bringing whole groups of disaffected peers back toward engagement, which would then allow all students access to groups of more engaged peers (Furrer, Skinner, & Pitzer, 2014). Interventions to support teachers in these challenging tasks may be able to

bolster their resolve by highlighting findings from studies such as the current one that make more explicit the "invisible hand of the teacher" in peer relationships (Kindermann, 2011).

Finally, findings from the current study may lead researchers, interventionists, and educators to a renewed appreciation of engagement, not only as a malleable motivational state that protects students from risky behaviors and contributes to their academic success, but also as an energetic resource that students themselves can offer their classmates. Adding to the list of peer attributes that predict motivational development, such as peer relatedness, kindness, emotional support, and instrumental help, the current study highlights the potential impact of joint activity with peers who are behaviorally and emotionally engaged (Wentzel et al., 2010). Such interactions may help to sustain or rekindle students' own enthusiastic participation in learning activities. The more that theories and research can succeed in capturing the interplay among interaction partners in the complex social ecology of the school, the more helpful they will be to educators and interventionists dedicated to the hard work of optimizing students' engagement, motivation, and academic development.

Chapter 4

An Examination of the Joint Effects of Peer Group and Parental Influences on Students' Engagement

The construct of academic engagement, which captures students' ongoing, active, and energized involvement with academic tasks, has received increased attention in recent decades because it predicts higher quality learning (Blondal & Adalbjarnardottir, 2012; Carini et al., 2006), and improved educational achievement and attainment (Finn & Rock, 1997; Finn & Zimmer, 2012; Janosz et al., 2008; Skinner et al., 1990), as well as decreases in students' risk of dropping out of school (Finn, 1989), and participating in delinquent activities (Fall & Roberts, 2012; Li & Lerner, 2011; Wang & Fredricks, 2013; Wang & Peck, 2013) which, particularly during early and middle adolescence, is otherwise normatively on the rise. The focus on student engagement may also stem from its status as a fluid motivational state, identifiable by classroom practitioners, that may be guided toward its optimal form when intervened upon. Unlike common status predictors, most of which are inherently fixed, academic engagement represents a promising target of evidence-based interventions that seek to improve student outcomes (e.g., Lehr et al., 2004; Anderson et al., 2004).

Contributing to the evidence base upon which intervention efforts are built, work on student engagement has focused on illuminating ways in which students' engagement is shaped by the individuals with whom they have interpersonal relationships, in and outside of school. A large proportion of this work has focused on

parent contributions (Grolnick et al., 2009; Steinberg, Lamborn, Dornbusch, & Darling, 1992), but, more recently, the roles played by friends, classmates, and peer groups have also drawn attention (Wentzel & Ramani, 2016). Evidence that both parents and peer groups each uniquely contribute to students' engagement has been found; however, much of the research on student engagement has followed two lines of inquiry that, up until recently, have been singularly focused, examining the role played by one type of social partner with whom students interact socially (e.g., research focused primarily on peers), with little or no attention given to the role played by students' other social partners (e.g., parents). While research examining how students' classroom partners (namely, peers and teachers) contribute jointly to their engagement and motivation has begun to accumulate in recent years (Davidson, Gest, & Welsh, 2015; Raufelder et al., 2013; Vollet, Kindermann, & Skinner, 2017, Skinner & Belmont, 1993), far less attention has been given to how peer group influence on students' engagement works in concert with social partners who reside outside the classroom—e.g., their parents at home.

To this point, while a general convergence of findings suggests that peer groups, which are the naturally-occurring, self-selected groups of peers with whom students frequently interact, play an important role in promoting, or, in some cases, undermining student motivation, few studies have followed up by reexamining the role these peers play in combination with students' relationship with their parents, despite a voluminous body of research that has documented the central role parents play in fostering students'

motivation and engagement in school (Hill & Tyson, 2009). The current study aimed to provide a more contextualized view of peer group influences on students' engagement, by considering how their effects may vary depending on students' experiences of parental involvement.

A Social-Ecological Model of the Impact of Parents and Peers on Student Engagement

The present study was framed by an ecological perspective, in which students' social ecosystems are viewed as parts of a complex, multifaceted system (Bronfenbrenner & Morris, 2006). Principal among these subsystems are students' home and school environments, within which students spend much of their time interacting with their parents and members of their peer groups, respectively. This framework suggests that students' academic engagement can be shaped within each of these environments, through frequent interaction with parents (with whom they interact primarily at home) and peer groups (with whom they interact primarily at school). However, this framework also suggests that the influences of parents and peers reach beyond the boundaries of the local ecosystems they primarily occupy to work in concert with the influences of students' other social partners. This perspective underscores the importance of examining parent and peer effects jointly, and suggests two primary ways in which their influences can work together. First, parents and peer groups may exert "cumulative" influences, in that each social partner adds necessary supports that the other cannot. Second, parental and peer group influences may be "contextualized" or

interactive, wherein the impact of one set of social partners may be dependent on qualities of the other. Many kinds of contextualized effects among subsystems may be imagined; however, two were examined in the present study: *compensatory* effects, in which support from one social partner protects students from the negative impacts of the other, and *amplifying* effects, whereby the positive or negative attributes of one social partner magnify the corresponding positive or negative effects of the other. Thus, from an ecological perspective, the joint effects of parents and peer groups may be both cumulative and contextualized; that is, peers may not only provide supports to academic engagement that are unique from those offered by parents, but the magnitude of their influence may also depend on the quality of students' relationships with parents, and, more specifically, on their experience of parent involvement.

Parent Involvement and Student Engagement. Research has shown that middle school-aged students are more fully engaged learners and show higher levels of achievement when their parents are involved (Jeynes, 2005; Jeynes, 2007; Raftery, Grolnick, & Flamm, 2013). While healthy parent-child relationships, in general, have been found to support students' school engagement and motivation (Sirin & Rogers-Sirin, 2004), parental involvement, particularly forms through which parents communicate the utility and value of education, emphasize educational expectations, and engage with their child regularly in open conversation about their goals and plans, has been found to be particularly effective for promoting academic performance during early adolescence (Hill & Tyson, 2009). Through these forms of involvement, parents

place high value on education by implicitly communicating its importance. In contrast, students who experience parents as uninvolved may receive the implicit message that education doesn't matter. Overtime, students internalize the educational beliefs and values imparted by their parents and carry them into their classrooms (Cheung & Pomerantz, 2015). When these values are pro-learning, they serve as motivational resources that energize students' engagement with classroom activities (Epstein, 1988; Grolnick & Slowiaczek, 1994); however, when they are not, they may be a liability. Parental involvement can also facilitate the development of students' self-perceptions of academic competence (Juang & Silbereisen, 2002) and mastery orientation (Grolnick & Slowiaczek, 1994; Pomerantz et al., 2006), which, in turn, promote and sustain school engagement, performance and achievement (Furrer & Skinner, 2003; Grolnick & Slowiaczek, 1994; Mo & Singh, 2008; Kurdek & Sinclair, 2000; Sirin & Rogers-Sirin, 2004; Jeynes, 2005; McWayne et al., 2004).

While an accumulation of evidence points to the importance of parent involvement for student motivation and engagement, studies also suggest that parent involvement decreases as students get older, with particularly sharp declines coinciding with the elementary/middle school transition (Eccles & Harold, 1993; Hill & Tyson, 2009). Although it has been noted that a host of factors likely underlie this decline— factors residing both in schools and the larger communities in which schools are embedded (Eccles & Harold, 1993; Feuerstein, 2000; Hornby & Lafaele, 2011)—there is evidence that shifts in the quality of parent/child relationships spurred by the child

maturation are also centrally involved. It has been noted that many students begin to experience a surge in cognitive development and a coalescence of self during the time they are transitioning into middle school. These changes elevate the role they play in their education to a more active and autonomous position. In response, it is common for parents to view students' increased need for autonomy as a cue to draw back their involvement; thus, in renegotiating the role they play in their child's schooling, parents too often become less involved at a time when maintaining their involvement is vital (Hill & Tyson, 2009).

Because of its central role in promoting student motivation and its well-documented decline at the middle school transition, the current study focused on the role of parent involvement, specifically, students' experiences of their parents as involved (affectionate, caring, and dependable), as a potential predictor of students' engagement in the classroom.

Peer groups and student engagement. Decades of research suggests that peers also play an important role in shaping student motivation and engagement in school (Wentzel, 2009b). Although much of the focus of this work has centered on friendship as a source of students' enjoyment of and success in school (Altermatt & Pomerantz, 2005; Berndt et al., 1999; Hallinan & Williams, 1990; Ladd, 1990), research examining the role of peer groups has drawn an increasing degree of interest. Within small groups of peers, students experience frequent, dyadic social interactions through which friendships form (Kindermann & Skinner, 2012). In addition to providing a context for

friendship, such interactions provide channels through which peer influence may flow. Peer influence can be conveyed directly, through mechanisms of socialization, including modeling, reinforcement, encouragement, or pressure to conform to group norms (Altermatt & Pomerantz, 2005; Harris, 1995; Kindermann, 2003; Lynch et al., 2013), and indirectly, for example, by fulfilling needs for relatedness (Anderman & Anderman, 1999; Nelson & DeBacker, 2008; Furrer & Skinner, 2003) or providing academic help and support (Lempers & Clark-Lempers, 1992; Wentzel & Watkins, 2011).

Affiliating with groups of peers who are engaged or disaffected from school has the potential, in addition to the contributions of friendship relationships and dyadic interactions with peers, to impact students' own emotional and behavioral engagement in their classrooms (Kindermann & Skinner, 2012). Because students tend to affiliate with peers to whom they are similar, peer groups may come to reflect a concentration of students' own qualities. Specifically, in the case of engagement and disaffection, peers selected by highly engaged students may be limited to those who are similarly engaged and, likewise, disaffected students may choose to affiliate within groups containing a higher concentration of similarly disaffected peers. Research has found that such concentrated peer contexts, in turn, may potentially amplify students' initial motivational states over time, leading those who affiliate with groups of engaged peers to become more engaged, and those affiliated with disaffected peers to become more disaffected. For example, peer group profiles of school enjoyment have been found to

predict changes in students' own enjoyment of school (Ryan, 2001), and similarly, peer

group profiles of engagement have been found to be small but robust predictors of

changes in students' own engagement across a school year, during both elementary and

middle school (Kindermann, 1993, 2007). Because of their potential importance to the

development of students' engagement, the current study focused on the role of peer

groups, specifically, the extent to which the members of an individual student's peer

group were engaged versus disaffected with academic activities in the classroom.

   Challenges to the study of peer groups. As evidence of the central role peer

groups play in the development of student engagement and motivation has accumulated,

two key challenges to investigating their effects have persisted. First, reliable

identification of children's peer groups in naturalistic contexts, like schools, is difficult.

Naturally occurring peer groups, which consist of the age mates with whom children

choose to spend their time, are often hard to define because they are self-organized,

highly fluid, and are weakly delineated. Furthermore, in some cases peer groups

organize outside of adults' (e.g., teachers or parents) immediate awareness. To address

this challenge, the current study used Socio-Cognitive Mapping (SCM; Cairns et al.,

1985), in which students, who may be in the best position to witness their schoolmates'

public exchanges, serve as expert observers of peer interactions. By using reports from

multiple student observers, SCM may afford access to information about naturally

occurring peer groups that is most complete, and reliable (this can be assessed by

testing the level of agreement between reporters). Furthermore, compared to self-

reports, which require near complete participation (otherwise each non-participating child is also missing as a potential peer group member of participating children), the accuracy of SCM is less affected by participation rates, because other students typically report on missing group members. In fact, it has been estimated that reports from slightly more than half the student body are enough to yield reliable networks when the sample of reporters is sufficiently representative (Cairns & Cairns, 1994).

Once members of peer groups have been identified, figuring out how to capture meaningful characteristics of those groups presents a second challenge. One method used to address this challenge is to create peer group profile scores for each child, that summarizes key characteristics obtained for each individual identified as a member of a target child's peer group (Kindermann, 1993; 1996; Kurdek & Sinclair, 2000; Ryan, 2001). Most commonly, peer profiles are calculated for a given student by averaging the key characteristic scores (e.g., academic engagement) of each member of his or her peer group. In the current study, SCM was used to identify the members of each child's peer groups, and peer profiles of engagement versus disaffection were used to capture the motivational composition of each child's local peer context, with the expectation that these profiles might predict changes in individual student's engagement over the school year.

Studies of Joint Effects of Parents and Peers

Findings from an accumulation of research on peer group influences has converged on their potential importance to student motivation and engagement

(Wentzel & Muenks, 2016); however, few studies have examined peer influence on student engagement and motivation within a broader set of contexts that includes social partners in students' home environments, namely, parents. In fact, in our review of the literature to date, only six studies were found that had incorporated the effects of both parents and peers by examining their joint influence on student academic engagement and motivation, a majority of which looked only for cumulative effects. To use these studies as a guide for our own examination of joint parent and peer influence, we looked carefully at the parent and peer attributes they targeted, as well as the methods used to analyze different configurations of joint parent and peer influence.

Evidence for Cumulative Effects. Three studies have found evidence in support of an additive model of joint effects, in which both peers and parents make significant but largely separate contributions to students' engagement. In a longitudinal study of a representative sample of 960 students from 57 schools across 13 U.S. states, Li et al. (2010) found that both parent and peer influence on academic competence were mediated by the unique effect each had on students' behavioral and emotional academic engagement. No moderations were tested. In a second study, testing a similar mediation model, Chen (2005) examined how perceived support from peers and parents (and teachers) shapes student academic achievement indirectly through its effect on student academic motivation. Utilizing a sample of 270 adolescents from a secondary school in Hong Kong, parents and peers were both found to have unique effects on students' academic engagement. Furthermore, evidence that peer, parent, and teacher effects on

student achievement were mediated by students' engagement was found, with the

relationship between perceived peer support and academic achievement being fully

mediated by academic engagement. Again, no moderations were modeled to test

dependencies between these contexts. In a third study, Ricard and Pelletier (2016)

examined whether parent (and teacher) support for autonomy, competence and

relatedness, and having at least one reciprocal friendship predicted students' concurrent

academic motivation in Grade 10 ($N = 624$) and dropping out by Grade 12. Results

suggested that having one reciprocal friendship predicted both motivation and

persistence, above the effects of experiencing high parent and teacher support for

autonomy, relatedness, and competence. Parent supports appeared to be the most

significant predictor of academic motivation and dropping out; however, a lack of

reciprocal friendships predicted both lower academic motivation and higher likelihood

of dropping out. No interactions were tested.

Finally, Wang and Eccles (2012) examined growth curves of behavioral,

emotional, and cognitive engagement from grades 7 to 11, which they assessed using

student-reports of school compliance, identification with school, and subjective value of

learning, respectively. Although, in general, all three dimensions of engagement showed

the normative declines typical for these ages/grades, students' reports of peer support

predicted more favorable trajectories, that is, less steep declines, over and above the

effects of support from parents (and teachers). No two-way interactions with support

from parents (or teachers) qualified the protective effects of peers, but these effects

were more pronounced for the trajectories of emotional and cognitive engagement of African-American students. Moreover, protective effects of peer support on behavioral engagement were found only for students who reported more pro-social friends; for students reporting more anti-social friends, higher levels of peer support actually exacerbated declines in engagement.

Evidence for Contextualized Effects. In contrast to findings that support additive models of parent and peer effects, is the notion that the effects of these social partners are interactive. From this perspective, joint effects are contextualized, in that it is only possible to understand the effects of peers, for example, by examining them in the context of students' relationships with their parents. Only two studies have found evidence of contextualized joint peer and parent effects on the development of students' engagement. In an early study on 641 third through sixth grade students, Furrer and Skinner (2003) examined the joint effects of student relatedness to parents and peers (as well as teachers) on self- and teacher-reported behavioral and emotional engagement. Using median splits, groups of students with high relatedness to none, one, two, or all three of these social partners were created. Group comparisons revealed that high relatedness to parents could compensate for low relatedness to classroom social partners (peers and teachers); evidence that peers could partially compensate for low relatedness to parents (and teachers) was also found. In a more recent study investigating friend influence on the schoolwork engagement of 320 Finnish adolescents, Marion et al. (2014) examined the extent to which friend influence on schoolwork engagement varied

as a function of school burnout and maternal affection. Within 160 same-sex friendship dyads, students who scored relatively higher on school burnout compared to their friend were identified. Actor-Partner Interaction Model (APIM) analysis was used to examine whether the engagement of high burnout students in fall predicted changes in the engagement of their (less burnt out) friend across the school year. The extent to which maternal affection buffered against the influence of high burnout friends was tested using a multiple group comparison. Results suggested that friend influence was strongest among students who reported the lowest levels of maternal affection; friend influence effects were non-significant among students who reported the highest levels of maternal affection.

Critique of Current Studies of Joint Effects of Peers and Parents

Taken together, evidence presented in these studies supports two complementary, yet seemingly paradoxical perspectives on how parents and peers jointly influence students' academic motivation and adjustment. One the one hand, all six studies found evidence of cumulative effects, suggesting that peers are uniquely important, over and above the substantial influence of parents (Chen, 2005; Furrer & Skinner, 2003; Li et al., 2010; Marion et al., 2014; Wang & Eccles, 2012). On the other hand, two studies suggest that peer influence may also be qualified to some extent by students' relationships with their parents (Furrer & Skinner, 2003; Marion et al., 2014). In an attempt to follow both these leads, the current study investigated both additive and contextualized joint effects of peers and parents, including exploration of differential

susceptibility to peer influences and comparison of configurations that might suggest

compensatory effects. As the target outcome, changes in sixth-graders' engagement

over the school year were focused on, since middle school is a time of normative

increases in peer influence. We also incorporated key methodological strategies used in

previous studies to overcome the challenges inherent in capturing the effects of peers.

The Interplay of Parent and Peer Group Influences on Student Engagement

Although existing research highlights the significant impact students' peers and

parents have on the development of their classroom engagement, virtually all such

studies have been guided by an additive model perspective, and have focused on unique

parent and peer effects. However, further exploration of how these two social contexts

work together, possibly partially compensating for each other, is needed. Therefore, the

overarching goal of this project was to build a clearer understanding of how these two

components of students' social ecology work jointly to effect students' developing

school engagement. A primary set of analyses looked at whether the degree of influence

peer groups have on students' engagement depends on qualities of the relationships

students have with their parents. It was expected that peer group effects on academic

engagement would be greater among students who experience less involved parents

than students whose parents were involved. Following this, a second set of analyses

identified the contexts in which peer effects are associated with increases in student

engagement, and the contexts in which they are associated with decreases in student

engagement. Given the expectation that they would be less susceptible to peer group

influence, it was expected that students with highly involved parents would maintain their classroom engagement across the school year, regardless of their peer groups' motivational profile. However, growth of classroom engagement among students with less involved parents were expected to differ depending on their peer groups' motivation profile. Of these students, those affiliated with the least academically engaged peer groups were expected to suffer the sharpest declines in their own classroom engagement.

Method

For this study, Kindermann's (2007) dataset was reanalyzed. Of 366 sixth-grade students (age 11-13) enrolled at the sole middle school in a small rural/suburban town, 340 (93%) participated. Most students identified themselves as Caucasian, less than 5% identified themselves as non-white. Students were predominately from working to middle class families (87% of the adult population had at least a high school degree); the number of male and female participants was roughly equivalent.

The school was organized around Homeroom classes. Homeroom classes were assigned to students with the goal that their homeroom teachers would see them daily. Although these teachers taught varying subjects, their role as homeroom teacher was to serve as liaisons to students' other teachers, thus positioning them to have the fullest information about their students. All 13 of the sixth-grade homeroom teachers participated, and all indicated that they knew their students very well and were familiar with their academic development.

Assessments and Measures

Student Engagement. Students' academic engagement was assessed using a 14-item Likert-type scale measuring teachers' perceptions of students' engagement in academic activities (Wellborn, 1992). The scale assesses students' general behavioral engagement (e.g., "This student works as hard as he/she can") and emotional engagement (e.g., "In my class, this student appears happy"). Prior studies on fourth through seventh graders have shown moderate to strong intercorrelations between the components ($r = .72$, $n = 1,018$; Skinner et al., 2008) and that they form an internally consistent indicator of engagement ($ = .90$, $n = 1,018$). Teacher reports of engagement have been found to be stable over time ($r = .73$, $p < .001$, $n = 144$; Wellborn, 1992; $r = .78$, $p < .001$, $n = 1,018$; Skinner et al., 2008) and moderately correlated with academic achievement in the expected direction ($r = .40$ with math achievement, $r = .58$ with reading achievement; Skinner & Belmont, 1993; Skinner et al., 1990).

Teacher perceptions of student engagement were obtained at two time points during the school year, first in October and then again in May. At the first time point, homeroom teachers reported on 318 students (93% of the consenting students; 87% of the total population). At the second time point, homeroom teachers reported on 322 students (the sample size differs due to a combination of student attrition and new students entering the school). Three hundred students had teacher reports at both time points.

Naturally occurring peer groups. In fall, students reported on naturally occurring peer groups using Social Cognitive Mapping data collection procedures (SCM; Cairns et al., 1985). In SCM methods, participants serve as "expert observers," reporting on whom they frequently see "hanging around" together while at or away from school. An advantage of this approach to capturing students' peer networks is that it allows for accurate reflection of naturally occurring peer groups with less than complete sampling. Other, traditional methods that rely on self-reports require near complete sampling. With self-reports, if a student does not participate, he or she is also not available as a friend. This leads to losses in network completeness because it is possible that students who do not participate in questionnaire assessments are students who experience problems at school. Then, self-report assessments can lead to falsely assuming that motivationally disaffected students would be socially isolated. Observational strategies, such as those used in SCM, overcome that potential problem.

For the present study, student participants were provided with a form containing space for observations of up to twenty groups, each group having space for up to twenty members. Of the 280 participating students (77% of the sample; 56% female), none exhausted the space provided on the form. Students were encouraged to consider all students in their entire school, to list as many groups as they could from free recall, and were instructed to include dyadic groups as well as their own groups. Students could be nominated as being members of many separate groups at the same time so that multiple and overlapping groups were retained.

Groups were identified by first arranging students' reports of "who hangs out with whom" in a co-occurrence matrix, indicating the frequencies with which each student was observed in interactions with any other student. Binomial z-scores were calculated for each co-occurrence in the matrix, and a 1% significance level was used to determine whether a student was more likely to be nominated as being in a group with any other student than could be expected by chance (for details, see Kindermann, 2007). To guard against self-enhancement biases, significant connections that were based on one single observation were not accepted, as in almost all cases these were children's own self-nominations.

Peer Group Characteristics. Three key characteristics of peer group networks were calculated. The number of members, excluding the target student, who were identified in each student's peer group was used as a measure of group size. The percentage of peers whom a student maintained as group members across time was taken as an indicator of peer group stability. Finally, peer group profiles of engagement were calculated by averaging the teacher-rated engagement scores across the members of each child's group connections.

Parental Involvement. In fall, parental involvement was assessed using an 10-item self-report questionnaire (Wellborn, 1992). Four of the items assess a student's perception of their parents' *knowledge* and consist of items such as "my parents know a lot about what's important to me in school." Two of the items assess a student's perception of their parents' *time spent* and consist of items such as "my parents spend

time with me on schoolwork." Four of the items assess a student's perception of their

parents' *dependability* and consist of items such as "I can count on my parents when I

have problems in school." Students were asked to rate from one to four (i.e. "not at all

true" to "very true") how accurately each statement described how they felt.

Results

Descriptive statistics and correlations can be found in Table 4.1. In all analyses, a Full

Information Maximum Likelihood method was used to estimate missing data. Overall,

students showed moderate levels of engagement in both fall ($m = 3.07$, SD = .57) and

spring ($m = 3.07$, SD = .61), with relatively high stability between time points ($r = .75$,

$p < .001$). On average, members of students' peer groups were moderately engaged in

fall ($m = 3.09$, $SD = .34$), with larger groups showing a tendency toward higher

engagement ($r = .25$, $p < .001$). Peer groups were modest in size ($m = 4.81$, $SD = 3.99$),

and relatively stable across the school year, with just about half of students' affiliations

in fall continuing into spring ($m = .46$, $SD = .33$). As seen in Figure 4.1, students tended

to affiliate in groups with peers to whom they were similar. Finally, students, on

average, rated their parents as being fairly involved ($m = 3.17$, $SD = .54$). While no

significant differences in ratings of parental involvement were found between boys and

girls ($r = .07$, $p > .05$), students who experienced their parents as more involved were

more engaged themselves both in fall ($r = .30$, $p < .001$) and in spring ($r = .30$, $p <$

.001), and tended to be affiliated with peers who were more engaged in fall ($r = .15$, $p <$

.01).

Cumulative Effects: Do Peer Groups Contribute to Engagement over and above the Effects of Parents?

Cumulative effects of parents and peers were examined in two steps. First, in analyses of each social partner separately, peer group engagement profiles in fall were found to predict changes in students' engagement from fall to spring, $\beta = .11$, $p < .05$; $\chi^2(36) = 60.250$, $p = .007$; CMIN/DF = 1.674, CFI = .988, RMSEA = .043, as did parent involvement, $\beta = .09$, $p < .05$; $X^2(39) = 56.988$, $p = .031$; CMIN/DF = 1.461, CFI = .992, RMSEA = .036. Both models controlled for sex, peer group stability, and peer group size. In a second set of analyses, the contributions of peer group engagement and parent involvement were modeled simultaneously, again controlling for peer group size and stability, and sex. This model fit the data well, $X^2(66) = 111.373$, $p < .001$; CMIN/DF = 1.687, CFI = .984, RMSEA = .043, and indicated that peer group

Table 4.1
Construct Means, Standard Deviations, and Correlations (Study 2).

	1	2	3	4	5	6	7	*m*	*SD*
1. Student Engagement Fall	-							3.07	.57
2. Student Engagement Spring	.75***	-						3.07	.61
3. Peer Engagement Fall	.42***	.39***	-					3.09	.34
4. Parent Involvement	.30***	.30***	.15***	-				3.17	.54
5. Sex	.16**	.21***	.19***	.07	-			1.47	.50
6. Group Stability	.17*	.17*	.03	.15**	.20***	-		.46	.33
7. Group Size	.19***	.08	.25***	.06	.27***	.13*	-	4.81	3.99

Note. $N = 366$. *** $p < .001$ ** $p < .01$ * $p < .05$ † $p < .07$.

Figure 4.1
Network of Peer Group Affiliations of a Cohort of 6th Graders.
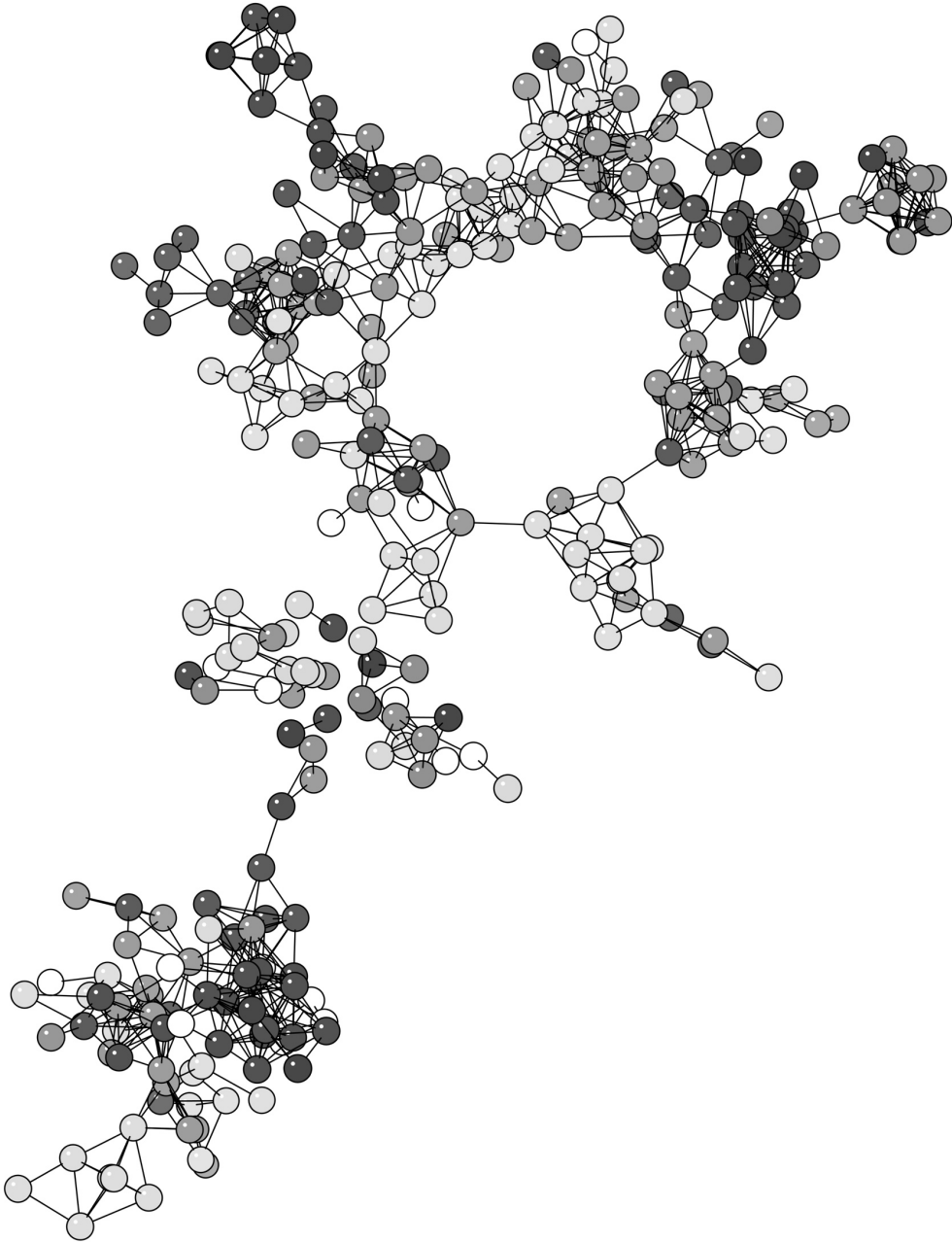
Note. Shade indicates level of student engagement, with darker shades indicating higher engagement. White indicates no data available. For the purposes of this graph students with no peer group network connections were omitted. Network graph was generated using KiNG v.2.23 (Davis & Chen, 2016).

engagement in fall predicted changes in students' engagement across the school year (β = .10, p < .05), over and above the contribution of parental involvement (β = .09, p < .05), suggesting that peers and parents each uniquely contributed to students' engagement.

Contextualized Effects: Do the Effects of Peers Differ for Students with Different Levels of Parent Support?

To investigate differential susceptibility, in which students' experiences of parental involvement can magnify or reduce the impact of their peer groups on academic engagement, data were analyzed using two complementary modeling strategies. First, a latent moderated model examined whether peer group effects on the development of students' engagement depended on the experiences they had with their parents. Then, to aid the interpretation of the interaction, a multiple-group model examined whether peer group effects on students' academic engagement were significantly different between students who experienced highly involved parents and students who experienced less involved parents. Both modeling strategies used AMOS 19 (Arbuckle, 2010).

The moderated model (Figure 4.2), which was tested using the orthoganilizing procedure described by Little et al. (2006), showed good fit to the data, $X^2(203)$ = 239.206, p < .05; CMIN/DF = 1.178, CFI = .994, RMSEA = .022. As indicated by the model, the interaction between peer group engagement and parental involvement was a significant predictor of changes in students' engagement from fall to spring (β = -.08, p

< .05), suggesting that peer group contributions to changes in students' academic engagement were dependent on students' experiences of involvement from their parents. The negative interaction parameter indicates that lower parental involvement was associated with stronger peer effects.

Multiple-group SEM analyses further explored whether differences in the extent to which peer groups contributed to students' engagement could be found between students who experienced highly involved parents versus students who experienced their parents as less involved. Two groups of nearly equivalent size were identified: students who perceived their parents as most involved (1 *SD* above the mean for parental involvement; n =64, mean involvement = 3.87), and students who perceived their parents as less involved (1 *SD* below the mean for parental involvement; n =68, mean involvement = 2.56). Compared to students who experienced parents as least involved, students of highly involved parents were more engaged both in fall andspring, and had more stable affiliations with more engaged peers (see Table 4.2). To test for differences in peer group effects between these groups, a 3-step model invariance procedure was used (Kline, 2011; Tabachnick & Fidell, 2007). First, a configural model (Figure 4.3) was fit to the data, freely and simultaneously estimating model parameters for both groups. This model showed good fit to the data, χ^2 (72) = 72.440, *p* > .05; *CMIN/DF* = 1.006; *CFI* = .999; *RMSEA* = .007; 90% C.I. = .000 to.051. As expected, peer group contributions to changes in student engagement were

Figure 4.2

The Interplay Between Peer and Parental Influences on the Development of Students' Engagement.
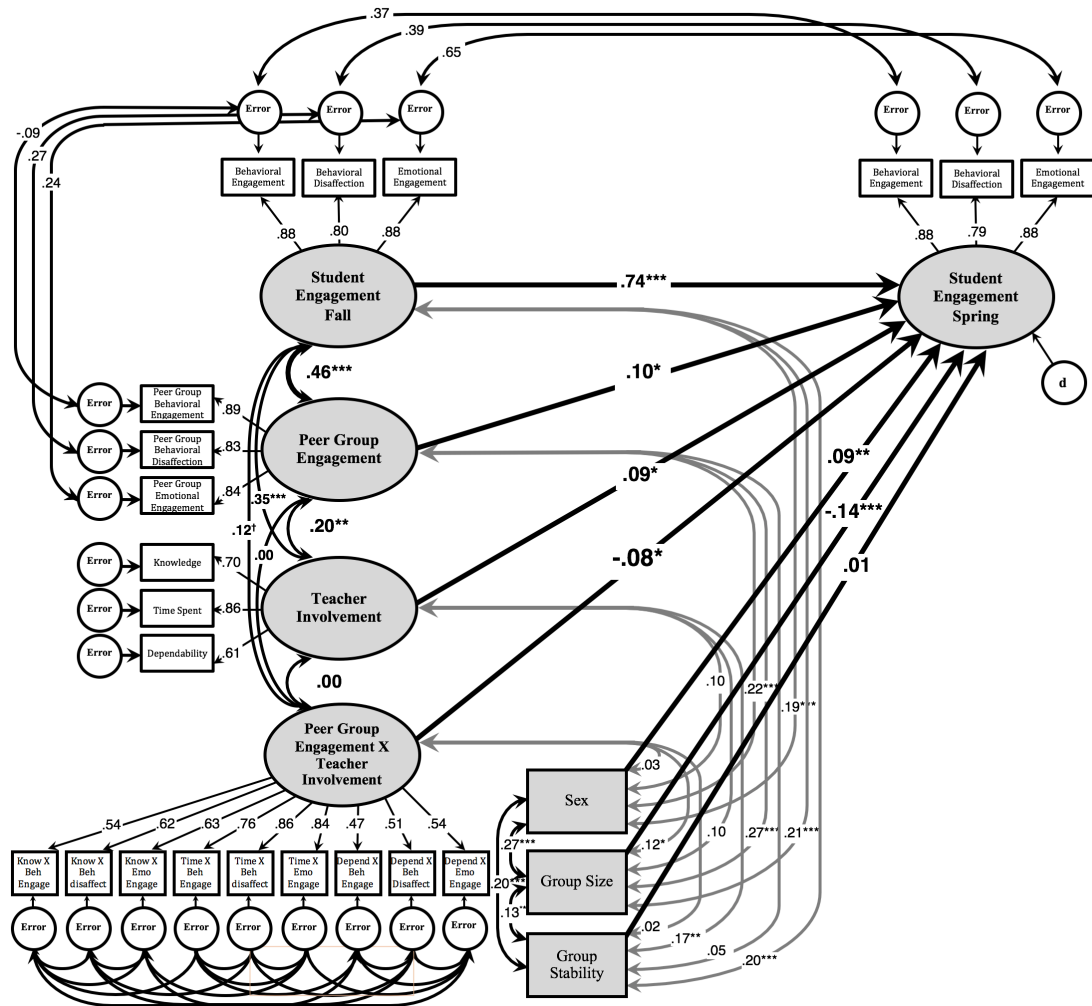
Note. χ^2 (203) = 239.206, *p* = .042; CMIN/DF = 1.178; CFI = .994; RMSEA = .022; 90% confidence interval = .005 to .033. *** *p* < .001, ** *p* < .01, * *p* < .05 † *p* < .07.

Table 4.2
Mean Level Differences Between Students with High or Low Parental Involvement.

| | High Parental Involvement | | Low Parental Involvement | | | | |
	M	*SD*	*M*	*SD*	*M$_{diff}$*	*t*	*p*
Student Eng. Fall	**3.25**	.50	**2.77**	.55	-.47	-5.16	< .001
Student Eng. Spring	**3.25**	.51	**2.73**	.62	-.51	-5.18	< .001
Peer Engagement Fall	**3.17**	.32	**3.02**	.38	-.16	-2.52	< .05
Peer Group Size	4.75	4.16	4.66	3.90	-.09	-.13	*ns*
Peer Stability	.52	.42	.34	.36	-.18	-2.34	< .05

Note. n = 64 for the high parental involvement group. *n* = 68 for the low parental involvement group.

greater for students who perceived their parents as least involved ($ß$ = .27, *p* < .001). By comparison, results indicated that no significant peer group effects were found among students who perceived their parents as most involved ($ß$ = -.13, *p* > .05).

To test the significance of this difference, cross-group equality constraints were imposed on the model, beginning with the factor loadings. Significant reductions in model fit did not result from constraining the measurement portion of the model, $\Delta\chi^2(6)$ = 10.971, *p* > .05, indicating measurement equivalence between the two groups. The model fit the data well, χ^2 (78) = 83.411, *p* > .05; *CMIN/DF* = 1.069; *CFI* = .991; *RMSEA* = .023; 90% C.I. = .000 to .056. In a final step, the model was estimated with an additional cross-group equality constraint imposed on the model parameter representing peer group effects on changes in students' engagement. Model fit remained

Figure 4.3

Comparison of Peer Effects Between Students Who Perceive Parents as Highly Involved and Students Who Perceive Parents as Least Involved.
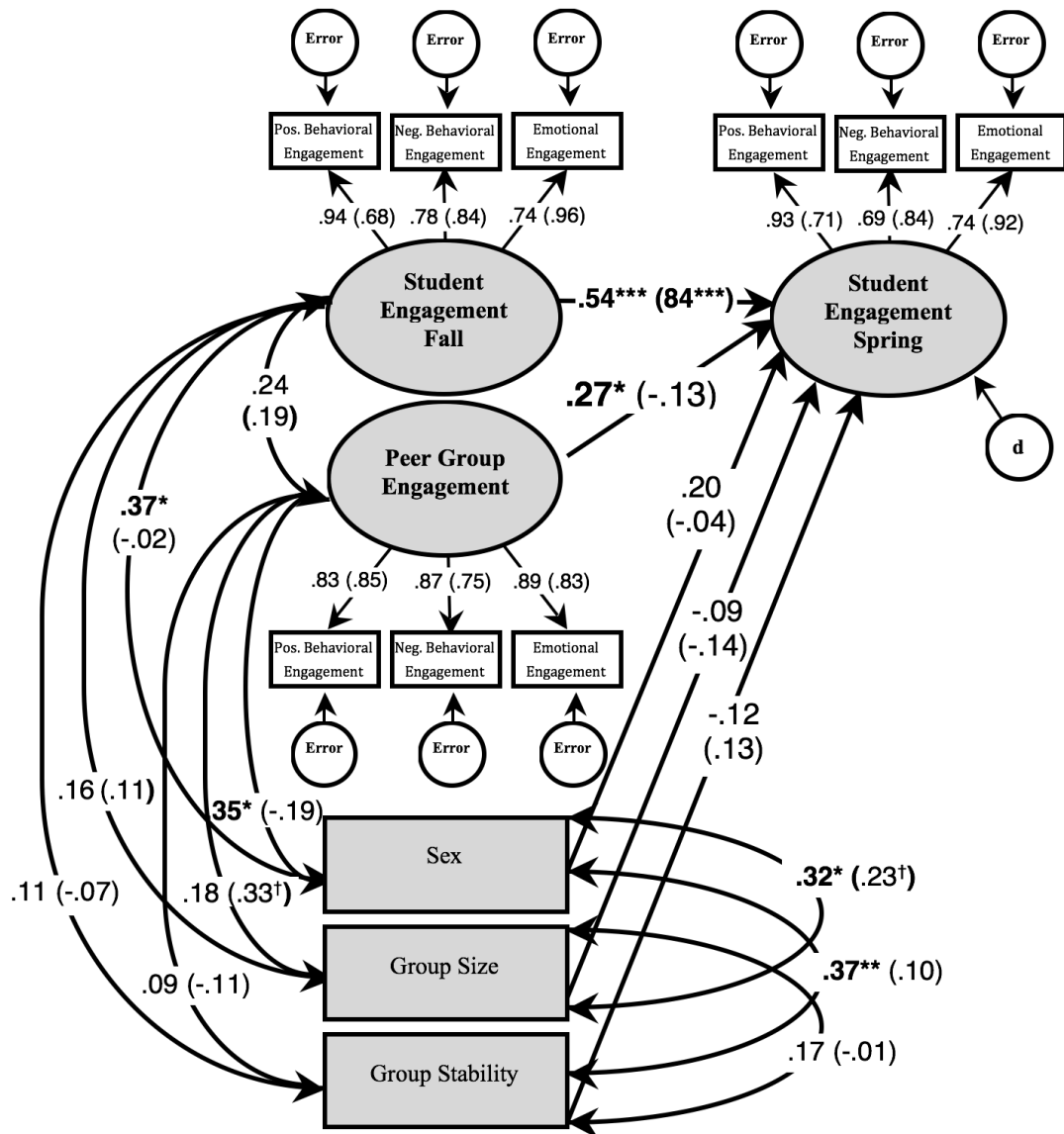
Note. χ^2 (72) = 90.632, *p* = .068; CMIN/DF = 1.259; CFI = .987; RMSEA = .032; 90% C.I. = .000 to .051. The model parameters for students who experienced their parents as highly involved appear in parentheses. Error correlations have been omitted from the figure for clarity. *** *p* < .001, ** *p* < .01, * *p* < .05, † < .07.

good, χ^2 (79) = 87.319, $p > .05$; *CMIN/DF* = 1.105; *CFI* = .986; *RMSEA* = .028; 90%

C.I. = .000 to .059; however, the imposition of this constraint lead to a significant

reduction in model fit, $\Delta\chi^2(1) = 3.908$, $p < .05$, confirming the expectation that this

parameter of the model should differ between groups. These results complement

findings from the latent moderated model and support a contextualized view of peer

influence on student engagement, suggesting that peer group contributions to students'

engagement were greater for students who experienced their parents as least involved.

Cumulative and Contextualized Effects: Do Students with Different

Configurations of Peer Group and Parental Support Show Differential Change in

Engagement?

To explore cumulative and contextualized effects, that is, to examine whether

the joint effects of parents and peer groups can be additive and compensatory, data were

analyzed using a person-centered approach. Specifically, groups of students were

identified who had different combinations of peer and parent contexts, and these groups

were compared to see whether they differed in the way their engagement changed

across the school year. For these analyses, types of students were identified from the

entire sample using latent profile analysis (LPA) modeling using MPLUS version 7.2

(Muthén & Muthén, 2012). Four separate LPA models were tested, with 2, 3, 4, or 5

profiles specified. All LPA model solutions were stopped at 60,000 iterations, and

relative fit was assessed by comparing the Akaike Information Criterion (AIC),

Bayesian Information Criterion (BIC), and the Sample Size-Adjusted Bayesian

Table 4.3
Latent Profile Analysis Model Fit Results.

	Model Fit Criteria		
	AIC	BIC	Adj. BIC
2-profile Model	995.484	1046.218	1004.974
3-profile Model	978.956	1053.106	992.827
4-profile Model	**962.659**	**1060.225**	**980.91**
5-profile Model	959.389	1080.371	982.02

Note. AIC = Akaike Information Criteria, BIC = Bayesian Information Criteria, Adj. BIC = sample-size adjusted Bayesian Information Criteria (n*=(n+2)/24). Lower AIC, BIC, and Adj. BIC values indicate better fit. Indices of fit for the chosen model appear in bold. The five-profile model was removed from consideration because it identified profiles of inadequate size (n < 10).

Information Criterion (Adj. BIC) for each model (see Table 4.3). With each of these

assessments of fit, lower values indicate better model fit (Nylund, Asparouhov, &

Muthén, 2007). In addition to assessing relative model fit, model preference was also

based on the presence of adequately sized profile groupings, and whether groups fit well

with theoretical expectations. While the 5-profile model showed the best fit (as assessed

by AIC and Adj. BIC), one of the profile groupings identified was inadequately sized (n

< 10), and substantively indistinguishable from another profile grouping; thus, profiles

identified using this model were not used. Profiles based on the 4-profile model were

chosen for use in subsequent analyses, as this model showed the best fit (when

compared only to all models except the 5-profile model), produced adequately sized

profile groupings, and aligned well with theoretical expectations for the variety of

configurations represented. This model identified the following types of students:

members of engaged peer groups (*m* = 3.51, *SD* = .20) who experienced high parent

involvement (*m* = 3.58, *SD* = .26; *n* = 78), members of engaged peer groups (*m* = 3.27, *SD* = .24) who experienced low parent involvement (*m* = 2.63, *SD* = .34; *n* = 108), members of disaffected peer groups (*m* = 2.95, *SD* = .22) who experienced high parent involvement (*m* = 3.55, *SD* = .28; *n* = 117), and members of disaffected peer groups (*m* = 2.56, *SD* = .27) who experienced low parent involvement (*m* = 2.73, *SD* = .29; *n* = 63).

Changes in engagement across the school year are shown in Figure 4.4 for each of the four different types of students identified by LPA. An ANCOVA showed mean level-differences in student engagement between the four types of students in both fall, $F(3,359) = 12.99$, $p < .001$, and spring, $F(3,359) = 15.22$, $p < .001$, accounting for the covariates of sex, peer group size, and group stability. The strength of the relationship between cluster membership and student engagement was moderate in both fall ($\omega^2 = .08$) and spring ($\omega^2 = .10$), accounting for the covariates. Post-hoc comparisons examined pairwise differences between the groups. As expected, most engaged were those students who both affiliated with highly engaged peers and also experienced their parents as highly involved; these students showed the highest levels of engagement both in fall (*m* = 3.34, *SD* = .54) and in spring (*m* = 3.35, *SD* = .53). They were more engaged than students who experienced only favorable parent contexts (*m* difference = .18, $p < .05$, in fall; *m* difference = .18, $p < .001$, in spring), as well as students who experienced only favorable peer contexts (*m* difference = .34, $p < .001$, in fall; *m* difference = .32, $p < .001$, in spring). Conversely, the most disaffected students were

Figure 4.4

Differential Growth of Students' Academic Engagement Based on Students' Combined Experiences of Parent Involvement and Peer Group Engagement.
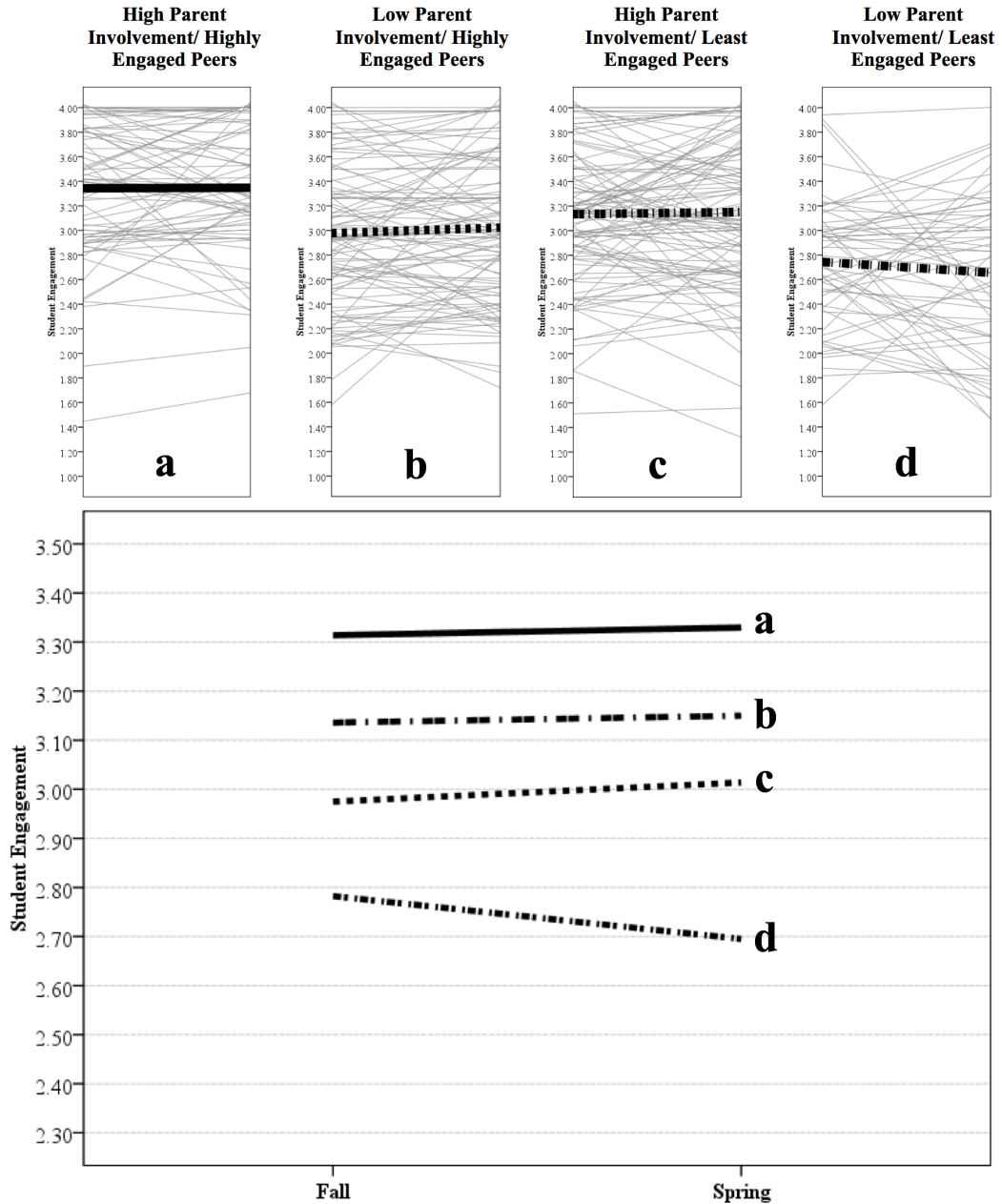
Note. Changes in academic engagement are shown for students who (a) affiliate with highly engaged peers and experience high parent involvement ($n = 78$), students who (b) affiliate with least engaged peers and experience high parent involvement ($n = 108$), students who (c) affiliate with highly engaged peers and experience low parent involvement ($n = 117$), and students who (d) affiliate with least engaged peers and experience low parent involvement ($n = 63$).

those who both affiliated with disaffected peers and experienced parents as least

involved; these students showed the lowest levels of engagement in both fall (*m* = 2.74,

SD = .49) and spring (*m* = 2.66, *SD* = .60). They were less engaged than students who

experienced only favorable parent contexts (*m* difference = -.35, *p* < .001, in fall; *m*

difference = -.46, *p* < .001, in spring), as well as students who experienced only

favorable peer contexts (*m difference* = -.19, *p* < .05, in fall; *m difference* = -.32, *p* <

.001, in spring). While students who experienced only favorable parent contexts were

more engaged in fall than students who experienced only favorable peer contexts (*m*

difference = .16, *p* < .05), by spring these differences were non-significant (*m difference*

= .14, *ns*).

Additional analyses showed that engagement differences between these profiles

of students persisted across the academic year. Results from a repeated-measures

ANCOVA showed no significant differences between the LPA-identified groups in how

their engagement changed across the school year, *F*(3, 359) = 1.26, *p* > .05. Students

who experienced parent and peer group contexts that were both favorable (i.e., having

involved parents and affiliating with engaged peer groups) fared best over time,

showing high and stable engagement across the year (Δ*m* = .004), *t*(77) = .096, *ns*. In

contrast, students with the least favorable contexts (i.e., who experienced the least

involvement from their parents and also affiliated with the most disaffected peers) were

the least engaged, consistently, across the academic year. Although slight decreases in

engagement across the year were found among these students, these changes did not

reach a level of significance (Δm = -.08), $t(62)$ = -1.181, *ns*. Students who affiliated

with disaffected peers, but who viewed their parents as more involved evinced moderate

levels of academic engagement (showing higher levels than the most disaffected group

but lower levels than the most engaged group) stably from fall to spring (Δm = .02),

$t(116)$ = .417, *ns*. Similarly, students who viewed their parents as less involved, but

nevertheless affiliated with engaged peers also showed moderate levels of academic

engagement that remained stable over the year (Δm = .04), $t(107)$ = 1.112, *ns*.

Together these results support an additive model of the joint contributions of

peer groups and parents to students' engagement: Although it was better to have either

an engaged peer group or an involved parent than having neither, for students to have

the highest levels of engagement, support from *both* peers and parents was needed. At

the same time, evidence for partially compensatory effects was also found. Specifically,

students who, despite affiliating with disaffected peers, experienced involved parents

maintained moderate levels of engagement across the academic year. This suggests that,

through their involvement, parents can offset some of the motivational costs of

affiliating with disengaged peers. Similarly, students who surrounded themselves with

engaged peers who were enthusiastic about learning maintained moderate levels of

engagement, suggesting that academically enthusiastic peer group members can protect

against the worst motivational costs of experiencing parents as unsupportive.

Discussion

The current study was guided by an ecological perspective on human

development (Bronfenbrenner & Morris, 2006), which suggests that a complete understanding of the interactions occurring between two people in a setting is possible only when the interactions those two people have with others, in and outside that setting, are considered. From this perspective, the impact that peer groups have on students' engagement and motivation should be expected to be interdependently linked to the quality of relationships maintained with students' other social partners, in and outside of school. In this spirit, this study sought to contribute to an emerging body of work focused on the joint effects of parents and peers by examining how these two components of students' larger social ecology work together, both independently and interdependently, to shape students' active and engaged learning during classroom activities.

To extend upon research suggesting the possibility of cumulative (or additive) and contextualized (or interactive) effects of peer and parent subsystems, the present study tested whether cumulative and contextualized models could explain changes in students' engagement from fall to spring of their first year in middle school—during a period of development when peer influences are normatively increasing and parents normatively draw back their involvement in response to qualitative shifts in parent-child relationships (Hill & Tyson, 2009). Evidence was found supporting the parallel notions that parent and peer effects on students' academic engagement are cumulative as well as contextualized. In line with prior studies (Kindermann, 2007; Ryan, 2001; Cheung & Pomerantz, 2015; Mo & Singh, 2008), results from separate SEM models testing either

peer or parent effects indicated that both peer group engagement and parent involvement individually predicted changes in student engagement over the school year. A model testing their simultaneous contributions revealed unique peer group effects on changes in students' engagement, over and above parents' substantial influence. These results support prior findings that peers and parents each contribute uniquely to students' engagement, and that the effects of one adds to the effects of the other. At the same time, results from the present study suggest that the effects of peer groups were also contextualized. As expected, interactions between peer groups' engagement and parents' involvement were significant as predictors of changes in students' own engagement, suggesting that the extent to which peer groups influenced students' engagement was dependent on students' experiences of involvement from their parents. Moreover, tests of multi-group models confirmed the expectation that peer group profiles of engagement were significantly stronger as predictors of changes in engagement among students who perceived their parents as less involved. These more pronounced peer group effects were associated with relative gains or losses in students' engagement, depending on the motivational composition of each child's peer group.

Findings from person-centered analyses supported both cumulative and contextualized models. On the one hand, joint effects of peer groups and parents were clearly cumulative. Neither parent involvement nor peer group engagement alone were sufficient to foster the highest levels of student engagement, suggesting that each social partner contributes something that the other cannot. At the same time, levels of

engagement were consistently lowest, across the school year, among students who both affiliated with disaffected peers and reported lower levels of parent involvement. On the other hand, of students affiliated with disaffected peers, those who experienced their parents as highly involved in their schooling, actually showed moderate levels of engagement that persisted across the school year, suggesting that parent involvement could partially compensate for the negative effects of belonging to disaffected peer groups. Perhaps most surprisingly, these configural analyses also suggested that peer groups partially compensated for low involvement from parents: Students who affiliated with more engaged peers, despite experiencing their parents as less involved, also showed moderate levels of engagement in fall that, by the end of the academic year, became comparable to the levels of engagement observed among students who affiliated with disaffected peers and also experienced parents as involved. These results suggest that maintaining social connections with peers who are enthusiastic about learning may have the potential, at least in the short run of a school year, to buffer some of the motivational costs otherwise associated with a perceived lack of parent support.

Limitations and Future Directions

As always, interpretations of the findings from the current study must be couched in a consideration its limitations. First, the present study was narrowly focused on changes in engagement across only two time points within a single year. Following the joint effects of parents and peers across subsequent school years, as students matured and their relationships with their parents and peer networks developed, was not

possible with this design. An examination of these joint effects across more measurement points spanning a longer period time is needed. This would allow for examinations of long-term, compounding effects, or to explore meditational models, reciprocal effects, or growth curves, which may be useful for explicating mechanisms and directions of these effects. Previous studies of joint effects suggest that all of these processes are important targets (e.g., Wang & Eccles, 2012).

Second, in terms of measurement, the strategies used in the current study to assess student engagement limited our ability to map the complex nature of students' engagement during middle school. Although using students, peers, and teachers as multiple, independent reporters can be viewed as a strength of the study, the decision to employ homeroom teachers as the sole reporters of students' engagement may fall short of capturing the range of engagement that students exhibit from class to class over the course of a day. Even though homeroom teachers indicated that they knew very well the students on which they were reporting, their access to information on students' engagement, from classroom to classroom, was very likely limited. Although teacher-reports of student engagement might have advantages over self-reports, it is not clear whether results from the current study will replicate in research using other measures of engagement, such as classroom observations or aggregates that combine engagement ratings from multiple teachers.

Finally, the current study is limited in that it did not supplement longitudinal correlational findings by explicitly incorporating markers of potential mechanisms of

joint influence. As previously discussed, research has identified a variety of mechanisms through which parents' influence on students' engagement and motivation operate (Eccles & Harold, 1993; Hill & Tyson, 2009) and an accumulation of studies have identified pathways of peer influence, which seem to be both cognitive (for a review, see Brechwald & Prinstein, 2011) and behavioral (Kandel, 1985; Sage & Kindermann, 1999) in nature. Our interpretations of the current correlational findings are strengthened by this evidence, but additional work is needed that explicitly incorporates measures of the possible mechanisms of joint parent-peer effects, and tests their viability using meditational analyses. Such studies, complemented by experimental research, would help strengthen causal interpretations by ruling out alternative third variable explanations that are otherwise plausible. Future studies that directly examine potential mechanisms would begin to identify the pathway or, more likely, multiple pathways through which peers and parents jointly influence students' academic engagement.

Implications for Future Research

The current study supports previous research examining the joint effects of peer and parent relationships on the development of students' academic functioning, but it also contributes to this area of study in four key ways. First, findings highlight the importance of examining the motivational composition of peer groups, in addition to features of the peer context previously identified in other studies of joint parent-peer effects, as an additional peer attribute that may add to and be contextualized by parental

contributions to student motivation and engagement. Second, the current investigation emphasizes the potential benefits of using distinct sources of information about the three players in processes of joint effects. As in our prior work on joint teacher-peer effects (Vollet et al., 2017), the present study used information provided by students (i.e., reports on parent involvement), peers (i.e., observations of peer group affiliations), and teachers (i.e., reports on students' engagement). This design strategy may have helped to elucidate certain forms of contextualized effects. Third, this investigation demonstrates the usefulness of specific methodological strategies, such as SCM, for identifying peer groups and capturing their active ingredients.

Finally, the current study underscores the importance of expanding the focus of research investigating social antecedents to students' engagement beyond examining the influence of just one type of social partner. It points to ecological perspectives as offering a useful framework within which to consider the joint influences of peer and parent subsystems. An ecological perspective offers conceptual terms, such as "cumulative" and "contextualized", that may be used to convey the meaning of additive and interactive effects in a way that goes deeper than the statistical terminology on which researchers more typically rely. This perspective can also be usefully extended to other subsystems, such as dyadic friendships, school environments, and neighborhood subsystems. Specific theories, like SDT, are useful in guiding expectations about how joint influences will play out, and may help explain both the processes and mechanisms that give rise to contextualized effects, and the forms that such effects might take.

Future work examining potential mechanisms should include students' sense of relatedness to peers and parents, and examine whether they mediate the effects of peer group engagement and parent involvement on changes in student engagement.

Models of joint parent-peer effects. Future research on joint effects may also benefit from broader discussion of the different ways in which influences from peers and parents can work together. In the present study, we tested a model of differential susceptibility, in which the lack of parent involvement renders students more open to peer group influences; however, if other kinds of contextualized effects could be imagined then examining them could also be fruitful. Alternative models are not necessarily mutually exclusive; some are complementary. For example, in the present study, evidence was found suggesting that joint effects are cumulative (i.e., additive), in that both parents and peers are clearly important, and that support from one partner cannot fully substitute for poor relationships with the other. However, results also suggest that joint effects are contextualized (partially compensatory), that each partner can still buffer or protect students from the worst motivational consequences of low levels of support from the other.

The current study used a person-centered approach to identify types of students who occupy qualitatively different peer-parent niches, and examined differences between them in how their motivational functioning changed across a school year. Future studies should be encouraged to use similar strategies for discerning contextualized effects that move away from more typically used statistical models of

interactive effects and toward using methods that fit more closely to conceptual models of more complex, contextualized, and systemic influence. Moving beyond basic moderation models would allow researchers the analytic flexibility to explore complex conceptual models similar to those used in research on developmental psychopathology (Luthar et al., 2000) and environmental reactivity (e.g., Moore & Depue, 2016). In these areas, researchers have explored more complex forms of contextualized models, including protective or buffering effects, immunization, thresholds, cumulative risk, diathesis-stress, and other forms of differential vulnerability or susceptibility to the environment (e.g., Ellis et al., 2011).

Implications for Practice

Results from the current study are consistent with previous research showing that interventions targeting either parents or peers can have positive consequences for students' engagement. Support for additive models of joint effects found in the current study, suggest that evidence-based policy and practice targeting parents or peer relationships should each, on their own, exert positive effects on students' engagement. At the same time, cumulative models of parent and peer effects suggest that school-based interventions targeting either parents or peers alone would likely be insufficient to optimize student engagement over the long term. Results from this and other studies suggest that interventions focusing only on peers, or only on parents, will only produce optimal engagement for a subset of students, namely, those whose engagement is already supported by the other partner. The students most in need of support, namely,

highly disaffected students, will likely reach the highest levels of engagement only in response to interventions and innovative school practices that target both parent and peer contexts—by encouraging parents to engage in their child's schooling and structuring learning environments in ways that help disaffected students bridge connections to engaged groups of peers.

However, evidence that parents' and peers' joint effects are also contextualized, suggests that policies and practice targeting a single social context (e.g., parents) might also contribute to students' engagement indirectly, by buffering against the worst motivational costs of experiencing a lack of support for learning from the other partner (e.g., affiliations with disaffected peers). Although interventions targeting a single social context will likely have limited impact on fostering ideal levels of student engagement, findings from the current study suggest that improving either parent or peer supports might protect some students from becoming most disaffected.

If the effects of peers are indeed contextualized, then interventions designed to improve student-parent relationships may not only take on an added urgency, they may also benefit from an expanded focus. The sense of urgency follows from findings suggesting that low levels of parent involvement may pose a double risk for student motivation: once because of the direct impact of unsupportive parents, and once because this lack of involvement may leave students at the mercy of peer group influences which, in the absence of adult oversight, are not likely pro-learning. Hence, this study adds to the large body of research highlighting the crucial importance of

parents' engagement and involvement in their students' learning processes, especially during the transition to middle school, when students' interest in school normatively declines and their focus on peers normatively increases. Unfortunately, evidence suggests that just at this crucial juncture, parents tend to reduce the level of their involvement. However, if schools can help parents can overcome this natural reflex, and maintain higher levels of involvement, availability, and support, students may be protected from the worst effects of affiliating with disaffected peers.

Finally, findings from the current study may lead researchers, interventionists, and educators to a renewed appreciation of engagement, not only as a malleable motivational state that protects students from risky behaviors and contributes to their academic success, but also as an energetic resource that students themselves can offer their classmates through shared interaction. Adding to the list of peer attributes that predict motivational development, such as peer relatedness, kindness, emotional support, and instrumental help, the current study highlights the potential impact of engaging in joint activity with peers who are behaviorally and emotionally engaged. Such interactions may help to sustain or rekindle students' own enthusiastic participation in learning activities. The more that theories and research can succeed in capturing the interplay among the various interaction partners in students' complex social ecologies, the more helpful they will be to educators and interventionists dedicated to the hard work of optimizing students' engagement, motivation, and academic development.

Chapter 5:

Integrative Discussion

This dissertation was organized around two empirical studies which examine peer/teacher joint contributions (chapter 3) and peer/parent joint contributions (chapter 4) to changes in students' engagement across a single school year. The first two chapters provide an introductory discussion of the construct of academic engagement and an overview of research on how it is supported or undermined by the teacher, parents, and the groups of peers with whom students maintain relationships. In chapters 3 and 4, empirical work examining joint teacher/peer and joint parent/peer influences on students' engagement is presented. This chapter will briefly summarize those studies, and integrate their findings with results from a handful of studies that have begun to coalesce into an area of work focused on the joint influences among members of students' social ecologies. Finally, the studies' strengths and limitations, as well as their implications for research and practice will be discussed.

Summary of Studies

  Study 1: An Examination of the Joint Effects of Peer Group and Teacher Influences on Students' Engagement. Despite two voluminous bodies of work examining teachers' (Eccles & Roeser, 2009, Skinner & Belmont, 1993; Wentzel, 2009a; Wigfield et al., 2015) and peers' (Altermatt & Pomerantz, 2005; Kindermann, 1993, 2007; Ryan, 2000, 2001) unique contributions to students' engagement, few studies have examined how these two social contexts work in concert to influence

students' motivational development. Building on this emerging body of research, and guided by an ecological perspective and motivational theory (Self-Determination Theory; Connell & Wellborn, 1991; Deci & Ryan; and theories of Stage-Environment Fit; Eccles et al., 1993; Eccles & Roeser, 2009) it was expected that teachers' and peers' influence on students' engagement would both be uniquely important, as captured by "cumulative" effects models, and interdependent, as captured by "contextualized" effects models. Evidence was found in support of both cumulative and contextualized models of joint teacher and peer effects on students' engagement. In line with prior research (Danielsen et al., 2010; De Laet et al., 2015; Kindermann, 2007; Wang & Eccles, 2012; Wentzel et al., 2010), peers and teachers were each found to make unique contributions to students' engagement, suggesting that cumulative contributions that are additive in their effects.

However, evidence supporting contextual models of joint influence, in which their joint contributions were also dependent on each other, was also found. Specifically, results from moderated and multiple group analyses suggested that peer groups' influence on students' engagement was dependent on teacher involvement, and that such influence was stronger among students who experienced their teachers as least involved than among students who experienced highly involved teachers. Additional person-centered analyses revealed corroborating support for both cumulative and contextualized models. Four profiles of students were identified: students (1) affiliated with engaged peers who also experienced teachers as most involved, (2) affiliated with

engaged peers who also experience teachers as least involved, (3) affiliated with disaffected peers who also experienced teachers as most involved, and (4) affiliated with disaffected peers who also experienced teachers as least involved. On the one hand, results provided support for a cumulative model of joint influence. Students who experienced involved teachers and affiliated with engaged peers fared best over time. This suggests that neither teacher involvement nor peer group engagement alone were sufficient to foster the highest levels of student engagement, and that each social partner provided supports that the other could not. On the other hand, results also supported contextualized models of joint influence. The lowest levels of and steepest declines in engagement were found among students who both affiliated with disaffected peers and reported lower levels of teacher involvement. However, students who experienced teachers as highly involved, despite affiliating with groups of disaffected peers, improved their moderate levels of engagement across the school year, suggesting that teacher involvement could at least partially compensate for the negative effects of belonging to disaffected peer groups. Similarly, and perhaps surprisingly, students who affiliated with engaged peer groups, despite experiencing less involved teachers, also maintained moderate levels of engagement across the school year, suggesting that peer groups can partially compensate for low involvement from teachers.

Taken together, results from the moderated, multiple-group and person-centered analyses support prior research that has found support for contextualized models of teachers' and peers' joint influence on students' engagement (Davidson et al., 2010;

Furrer & Skinner, 2003; Raufelder et al., 2013). Results from this study build on evidence that suggests that experiencing positive connections with one social partner in school, either engaged peers or involved teachers, can potentially compensate, at least in the short run of a school year, for the motivational costs of experiencing negative connections with the other.

Study 2: An Examination of the Joint Effects of Peer Group and Parent Influences on Students' Engagement. Following a similar approach, the study presented in Chapter 4 explored different ways in which parents and peer group work together to jointly influence students' engagement. Findings from this study supported both models of joint influence, suggesting that parents' and peers' joint influence were both cumulative and contextualized. In line with prior research (Chen, 2005; Kindermann, 2007; Li, et al., 2010; Ricard & Pelletier, 2016; Wang & Eccles, 2012), peers and parents were each found to make unique contributions to students' engagement, suggesting that their contributions are cumulative and additive in their effects. However, moderated analyses supported contextualized models of effects, suggesting that peer groups' influence on students' engagement may also be dependent on parental involvement. Follow-up multiple group analyses suggested that peer group profiles of engagement were stronger predictors of changes in students' engagement for students who experienced their parents as least involved, compared to students who experienced highly involved parents.

Person-centered analyses revealed similar support for both cumulative and

contextualized models. On the one hand, neither parent involvement nor peer group engagement alone were sufficient to foster the highest levels of student engagement, suggesting that each social partner provided students with supports that the other could not. Furthermore, the lowest levels of engagement were found among students who lacked supports from both contexts, by affiliating with disaffected peers and experiencing lower levels of parent involvement. On the other hand, results from these analyses also suggested that having either a supportive parent or peer group context can partially compensate for experiencing the other context as unsupportive. Specifically, results suggest that having involved parents could partially compensate for the negative effects of belonging to disaffected peer groups. Students who fit this profile maintained moderate levels of engagement across the school year. Evidence that peer groups can partially compensate for low involvement from teachers was also found. Students who affiliated with engaged peer groups, despite experiencing less involved teachers, also maintained moderate levels of engagement across the school year. Together these results support prior research that has found support for contextualized models of joint parent and peer influence on students' engagement (Furrer & Skinner, 2003; Marion, et al., 2014), and suggest that experiencing positive connections with either engaged peers or involved teachers, can potentially compensate, at least in the short run of a school year, for the motivational costs of experiencing negative connections with the other.

Strengths and Limitations

Findings from both studies must be considered in light of their strengths and

their limitations. This section will discuss notable strengths and limitations of the current studies, specifically as they relate to issues of measurement, design, and generalizability.

Measurement. A major strength of both research projects is that they rely on data collected from multiple reporters. Specifically, both studies use teacher reports of students' engagement and students' reports of either their teachers' involvement (in study 1) or their parents' involvement (in study 2). Using data provided by different reporters helped to rule out the possibility that effect sizes were artificially inflated due to common-method bias, thus strengthening confidence in the interpretation of results. Furthermore, using peers and teachers as reporters of different constructs, may have facilitated the possibility of detecting contextualized effects, in addition to cumulative effects which are more commonly reported. To this point, it is possible that studies that failed to find evidence of contextualized effects, did so because they used only one source (e.g., student reports) for information on all of the constructs used in their models. Future work on joint effects, particularly those that seek to explore models of contextualized joint influences, should make similar use of multiple reporters, ideally incorporating information provided by additional reporters who may also be well positioned to report on students' engagement (e.g., observers, parents, and additional teachers) parents' involvement (e.g., observers, teachers, and school administrators), and teachers' involvement (e.g., parents and school administrators). Use of these additional sources of information could help to better triangulate on these constructs,

and provide further separation of measures that may be necessary when trying to detect joint effects.

The method used to identify students' peer groups also represents a strength of both studies. As described in more detail in Chapter 2, Socio-cognitive Mapping (SCM; Cairns et al., 1985) is a method by which students report on "who hangs out with who". By using a peer-report strategy of capturing students' peer groups, problems otherwise common to self-report methods (i.e., self-enhancement bias) were avoided. Use of this measurement strategy, which is present in both studies, strengthens confidence that the social network of peer affiliations that was captured is complete and accurate.

While findings from both studies are strengthened by their general measurement strategies, three potential limitations related to measurement should be addressed. First, in both studies, using a single teacher (i.e., homeroom teacher) as the sole source of information on students' engagement might have made capturing the complex fluid nature of students' engagement (as it potentially changes from class to class) impossible. Homeroom teachers were chosen because they saw their students every day and were presumed to be in the best position, compared to other teachers, to report on their students' engagement. However, it is an empirical question whether results similar to those reported in both studies would replicate in studies using alternative methods used to capture students' engagement (e.g., observations, or an aggregation of reports from multiple teachers). Similarly, specifically in the study on joint teacher/peer influences, the decision to ask students about the involvement of "my teacher" might

not have captured the range of involvement that middle school students experience from the multiple teachers with whom they interact every day. Future work that replicates findings from this study, using an aggregation of the involvement scores for every teacher with whom a student interacts, is needed. Second, both studies focus only on one aspect of the peer context, the *peer group*. Based on the Bronfenbrenneraian assumption that "interaction is the engine of development" the current studies were narrowly focused on the role frequent interaction with peers plays shaping students' engagement. However, as borne out in parallel areas of research, students' friendships are also important for students' motivational development. By ignoring this component of students' peer contexts, the current studies may have underestimated the effect that peers have on children's academic engagement. Future research on joint teacher, parent, and peer effects should incorporate a broader conceptualization of the peer context, that includes both students' friends and members of their peer groups.

Finally, findings from both studies may also be limited by their complete reliance on questionnaire data (from the same questionnaire). Although prior research has found the measures used in both studies to be both internally consistent and reliable, future research would benefit from using a broader array of data collection procedures. Specifically, as many of the constructs that were examined in both studies can be observed in classroom, school, and home settings, future work examining the joint contributions of students' social partners might benefit from including the use of systematic observations.

Design. Two features of the research design used by both studies strengthen their collective findings. First, the use of two time points allowed for an examination of how qualities of students' relationships with their teachers, parents, and peers predict (uniquely and interdependently) predict changes in their engagement across a school year. With a *cross-sectional* design, in which data are collected at only a single time point, only inter-individual differences and concurrent associations can be observed. However, the temporal separation afforded by the longitudinal design employed in both studies allowed for an examination of *changes* in students' engagement across an academic year. Furthermore, using a longitudinal design is particularly important in research on peer influence. Having more than one time point is needed for the use of time-lagged models (e.g., cross-lagged panel models) that are frequently used to separate the effects of peer selection from effects of peer socialization or influence.

While the use of longitudinal design is a strength of both studies, the short term longitudinal design used in these studies limits their results to the small window of time—the first year of middle school—in which joint teacher, parent, and peer group influences on children's own school engagement were examined. It is possible in contexts of chronically low parent or teacher involvement that the detrimental influence that disaffected peers have on students' engagement accumulates or intensifies as they get older and progress through multiple grade levels surrounded by the same group of peers. Similarly, while it was found in both studies that teachers and parents can buffer 6th grade students from the worst effects of affiliating with disaffected peers, it remains

unclear if their protective effects continue into later stages of adolescence. The span of time examined in the current studies cannot address these or other questions that are similarly reliant on data collected over longer periods of time. Future research needs to examine the long-term contributions peers make to students' engagement, jointly with teachers and parents, by using a sequential—multi-year, multi-cohort--design.

A second design strength of both studies comes from their use of a naturalistic design. Although causal relationships can be more safely inferred from experimental studies, because they rely on random assignment to control for the effects of unmeasured variables, findings from experiments often suffer from not translating well into real-world practice. For example, one might imaging an elaborate experimental study that tracks the engagement trajectories of students who are randomly assigned to either highly engaged or highly disaffected peer groups. Any findings from such a study would be limited in their application to real world settings, because, in real world, students are not sorted randomly by adults—they select their friends and peer groups very non-randomly. The currently study made use of existing data on student's engagement, their peer group affiliations, and their experiences of teachers and their parents involvement—as it occurred in the real world. Although use of naturalistic design sacrificed a level of control needed to detect causal relationships, findings from this study are more likely to bear out in school policies and interventions implemented in the real world.

Finally, a major limitation of these projects is that they do not explore the

mechanisms through which peer influence occurs. Previous research suggests that children may influence each other through processes of reinforcement (Sage & Kindermann, 1999), role-modeling (Kandel, 1985), and adherence to group norms (Schofield, Pattinson, Hill, & Borland, 2001). More recently, research documenting the *content* of students' interactions, both in text message and social media, has provided a compelling look into the social lives that adolescents maintain with their peers (Underwood, Ehrenreich, More, Solis, & Brinkley, 2015). Such research methodologies could be used to explicate common mechanisms of peer influence. The more future research can examine *both* peer group structure (based on frequency of interaction) and mechanisms of influence (gleaned from the content of interactions) the richer our understanding of processes of peer group influences on students' engagement will be.

      Generalizability. Because both studies used data on sixth-grade students who were predominantly white, middle-class, and from a specific geographical region in the United States, findings from the current studies generalize to may be limited to only part of the general population. Homogeneity of the sample—in terms of cohort, race, socio-economic status, culture, and age—likely limit how well findings would generalize to other cohorts of students of different ages and grades who are racially and socio-economically diverse, and live in other cultures. Research replicating (or failing to replicate) findings from the current study is necessary, and would further add to the "contextualization" of peer group influences by indirectly examining exosystem-macrosystem- and chronosystem-level effects.

Recommendations for Future Research

Steinberg, Darling, and Fletcher (1995; p. 424) point out that "No process occurs outside of a context. If we want to understand context, we need to take it into account, not pretend to control it away." In this spirit, research on peer influences that incorporates a broader, contextual view has continued to accumulate (Shin & Ryan, 2017; Wentzel, Muenks, McNeish, & Russell, 2017). However, a majority of research in this area still examines their contributions in isolation (Fortuin, Geel, & Vedder, 2016; Gremmen, Dijkstra, Steglich, & Veenstra, 2017; Rambaran et al., 2016). While there is near unanimous concensus that peer groups play an important part in guiding the development of students' academic engagement, that they are only *part* of students' social ecosystems is still often overlooked. Research focused solely on the role peers play on child development can only provide "one-size-fits-all" interpretations of findings, in which processes of peer selection and socialization are seen as having uniform effects on all students. From this approach, research is limited in its ability to provide a deeper understanding of factors residing outside of the peer group that can buffer against or magnify its influence. While there are likely not any students who are completely immune to peer groups' influences, findings from the current studies add to a growing body of work which suggests that students may be buffered from the effects of peer group influences on their engagement when parents or teachers are supportive, active, interested, and involved in their learning. Future work examining any aspect of

the peer context—friendships, peer affiliations, crowds, peer status and popularity—should be encouraged to examine their effects with joint consideration of the broader context within which students are embedded. Using contextualized models of peer influence may present peer researchers the opportunity to identify factors that may be leveraged through intervention to reduce the impact of negative peer influences on students' engagement.

Both studies sought to expand the focus of research on peer group influences on students' engagement beyond the student/peer microsystem. By adding joint consideration for student/teacher and student/parent microsystems, the current studies expanded the focus to include mesosystem-level effects. While an increase in the number of studies using models of joint influence may represent an incremental step forward for peer research, more work is needed. Future research incorporating joint influences of multiple contexts (e.g., peers, teachers, and parents) could provide deeper insights into how the influence of students' complete social networks channels the development of their engagement and motivation in the classroom. While a handful of studies have already taken this approach (Furrer & Skinner, 2003; Wang & Eccles; Wentzel et al., 2010), this research has mostly focused on joint effects of students' perceptions of social support from parents, teachers, and peers. Future work examining additional ways that the influence from students' parents, teachers, and peer contexts work jointly is needed. For example, the present studies found that students were partially protected from the ill effects of experiencing either their parents *or* their

teachers as uninvolved if they affiliated with peers who endorsed school and learning. However, neither study could examine whether belonging to an engaged peer group could offset the joint effect of experiencing both parent *and* teacher contexts as uninvolved. Similarly, evidence from both studies suggests that experiencing optimal forms of two contexts (i.e., either peer and teacher, or peer and parent) is needed to help students achieve their most motivated state. However, these studies did not examine whether experiencing all three contexts as providing motivational supports (i.e., having involved parents and teachers, and affiliating with engaged peers) was necessary for optimal student engagement. It is possible that affiliating with engaged peers and experiencing *either* parents *or* teachers as supportive is good enough. To answer these and similar questions, future work examining students' complete social systems—which include teachers, school administrators and staff, peers, parents, siblings, extended family, neighbors, and others—is needed.

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Appendix
Measures

Student Engagement vs. Disaffection – Teacher-report (14 items; 4-point scale)

Behavioral Engagement	When we start something new in class, this student participates in discussions.
	In my class, this student works as hard as he/she can.
Behavioral Disaffection	When we start something new in class, this student doesn't pay attention.
	When we start something new in class, this student thinks about other things.
	In my class, this student does just enough to get by.
	In my class, this student comes unprepared.
Emotional Engagement	In my class, this student appears enthusiastic.
	When working on classwork in my class, this student appears involved.
Emotional Disaffection	When I explain new material, this student seems bored.
	In my class, this student appears depressed.
	In my class, this student appears angry.
	In my class, this student appears anxious.
	When working on classwork in my class, this student appears worried.
	When working on classwork in my class, this student appears frustrated.

Teacher Involvement – Student-report (11 items; 4-point scale)

Affection	My teacher likes me.
	My teacher really cares about me.
	My teacher doesn't seem to enjoy having me in her class.
Availability	My teacher is always there for me.
	My teacher is never there for me.
	My teacher never seems to be around for me.

Dependability	I can count on my teacher to be there for me.
	I can rely on my teacher to be there when I need him/her.
	I can't depend on my teacher for important things.
	I can't count on my teacher when I need him/her.
	I can't rely on my teacher when I really need him/her.

Parent Involvement – Student-report (10 items; 4-point scale)

Knowledge	My parents know when it is time for my report card to be out.
	My parents know a lot about what is important to me in school.
	My parents don't know a lot about what happens to me in school.
	My parents don't seem to know how I feel about school.
Time Spent	My parents spend time with me on schoolwork.
	My parents talk with me about schoolwork.
Dependability	I can count on my parents when I have problems in school.
	When things go wrong in school, I can depend on my parents.
	I can't always depend on my parents when things get hard in school.
	I can't count on my parents for help with my schoolwork.