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RELATIONSHIPS AMONG ACADEMIC-RELATED CHARACTERISTICS OF
PEERS, SOCIAL SUPPORT PROVIDED BY PEERS, ACHIEVMENT
MOTIVATION, AND ACHIEVMENT IN ADOLESCENTS

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RELATIONSHIPS AMONG ACADEMIC-RELATED CHARACTERISTICS OF
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MOTIVATION, AND ACHIEVMENT IN ADOLESCENTS

A Dissertation APPROVED FOR THE
DEPARTMENT OF EDUCATIONAL PSYCHOLOGY

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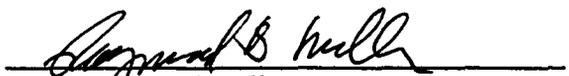
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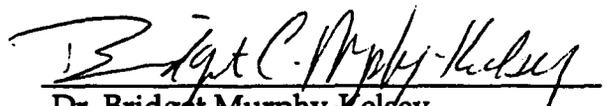
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Abstract

This study investigates relationships among perceived academic-related characteristics of a best friend, perceived social support provided by a best friend, perceived academic-related characteristics of classmates, perceived social support provided by classmates, students self-reports of learning goals, performance-approach goals, performance-approval goals, social responsibility goals, social affiliation goals, social approval goals, perceived ability, and achievement. Self-report surveys were administered to 255 adolescents in their science class. The achievement-related behaviors of peers and the social support provided by peers were related to adolescents' motivation during science class. Adolescents who believed they were valued and respected members of the learning community were more likely to pursue learning goals, performance-approach goals, responsibility goals, and affiliation goals to work with others because it's enjoyable. When adolescents perceived that members of the classroom devalued learning they were likely to pursue performance-avoidance goal, and approval goals to not do class work to fit in with other class members. Of note was the role that having a quality best friendship with a student who valued learning had on minimizing the negative motivational impact of being in a classroom where it was perceived that students did not care about learning.

Introduction

School children of all ages have daily contact with peers which is encouraged and generally supported by parents and schools as necessary for positive development and adjustment. Opportunities to develop peer networks and close friendships are provided by parents from an early age, and the sponsoring of social activities that provide positive and safe environments for students to meet and develop friendships is a normal function of American schools. These actions on the part of parents and schools are often a proactive attempt - at least from the perspective of parents and schools - to connect children to peers who have attributes which are valued by the parents and schools.

Furthermore, with the move toward more constructivist teaching approaches, students are increasingly placed together with the purpose of assisting one another with learning. Sometimes this occurs within structured cooperative learning groups and at other times within a more student regulated process such as a "community of learners" approach. In both cases the quality of learning is in some part dependent on the interactions which occur among classroom peers.

Older children and adolescents spend substantial portions of their day socializing or creating opportunities to socialize with others. They walk or ride with friends to school, mill around in the halls during passing time, pass notes in class, gossip on the phone, chat on the Internet, and make and remake plans for the weekend to maximize time spent with friends.

Developmental studies document the increased prominence of peers within the life space or experiences of adolescents. Peers spend more time with one another during adolescence than they did in late childhood (Berndt, 1982; Steinberg, 1986), peer opinions become increasingly important compared to adult opinions (Coleman, 1974; Brown, Eicher, & Petrie, 1986), and susceptibility to peer pressure peaks in adolescence (Berndt 1979; Bixenstine, DeCorte, & Bixenstine 1976). Larson and Richards (1991) found that time spent interacting within the family unit decreased dramatically from late childhood to early adolescence, and interactions with friends became more enjoyable and rewarding while interactions with family became less positive. Raffaelli and Duchett (1989) observed that peers became sources of information on topics ranging from school to sex, and peers used one another as sounding boards on which to try out new ideas and define one's place or role within the larger community.

With all the time and energy spent by adolescents, parents, and schools on creating opportunities for social interactions with peers and fostering friendships it seems imperative that we understand how peers influence one another's actions and behaviors. In regard to student learning several questions arise. Does the social contexts in which peers interact (e.g. friendships, cliques, crowds, clubs, and classrooms) contribute to explaining students' motivation and achievement? Do the behaviors and beliefs of peers help us to understand students' motivation to learn and their achievement? Is the quality of peer relationships associated with students' motivation to learn and their achievement?

I investigated peer influence on motivation to learn and achievement using a goal theory framework. Goal theory provides a conceptual framework that links social context with student motivation and posits that the context in which learning occurs, as well as, social contexts outside the learning environment influence motivation and achievement. Previous research has linked variables situated in the social contexts (family, classroom, peer groups) in which students interact to achievement motivation (e.g. Ames & Archer, 1988; Battistich, Soloman, Watson, & Schaps, 1997; Kinderman, 1993; Wentzel, 1998).

Because the nature of relationships between an individual and his or her best friend versus classroom peers is different, it seems reasonable that there would be differences in the influence arising from these two contexts. The private intimate relationship that characterizes a friendship provides opportunity for individuals to share and discuss values and beliefs that may become internalized through the interactions. In contrast, classroom peer relationships would be more public and may be influential in enforcing or modeling norms for public behavior (Berndt & Savin-Williams, 1993; Brown, 1990; Kindermann, McCollam, & Gibson, 1996).

Berndt (1999) proposed that peers influence one another through two conceptually distinct pathways. One pathway involves influence occurring through interaction with and observation of peers with specific characteristics. The behaviors of classroom peers are likely to provide information about the academic norms of a given classroom, while the academic characteristics of a best friend may provide more generalized information about the importance of school now and in the future.

In the other pathway peers impact one another through the affective quality of the relationship. Classroom peers are likely to provide information about whether one is considered to be a valued member of the classroom community and a best friend may provide information about whether one is personally valued by a significant other. Receiving positive regard from others may result in one being more amenable to the beliefs and behaviors of others.

Receiving social support from members of a classroom where academic achievement is the norm or having a supportive relationship with a best friend that values academics is likely to encourage one to be motivated to learn and to achieve. In contrast, being valued by members of a classroom that devalue learning or having a close relationship with a best friend that believes academics to be unimportant may be detrimental to motivation to learn and to achievement (Berndt, Laychak, & Park, 1990; Hallinan, 1983).

This study investigated relationships among perceived academic-related characteristics of a best friend, perceived social support provided by a best friend, perceived academic-related characteristics of classmates, perceived social support provided by classmates, students self-reports of learning goals, performance-approach goals, performance-approval goals, social responsibility goals, social affiliation goals, social approval goals, perceived ability, and achievement.

I will first examine the role of peer social context in understanding adolescents' motivation to learn and achievement. This is followed by a discussion of peer influence based on Berndt's (1999) conceptualization that peer influence occurs through two primary pathways – peer characteristics and quality of peer social support. Next I review research on the relationship of best friends and classmates to adolescents' behaviors, beliefs, and attitudes. In the last part of this chapter I review research on achievement goals, social goals, and perceived ability and their role in understanding student achievement.

Peer Social Contexts

Goal theory researchers are interested in developing an understanding of how the various contexts in which students interact influence the achievement and social goals pursued in educational settings. Maehr (1984) proposed that it is the meaning a person constructs in a given situation that motivates an individual to invest time and energy in a task. From this viewpoint, the goals that students adopt during an academic task in a classroom setting is a result of how they construct meaning from the events occurring around them. In addition to events occurring in the classroom the goals students choose to pursue during school are influenced by life experiences that occur outside the classroom and outside of school.

Since the various settings where adolescents interact are not independent of each other, actions and decisions that occur in one context impact their response in other contexts (Bronfenbrenner, 1979, 1989). To understand why a

student chooses to pursue a particular goal we need to study social context outside the classroom in which adolescents are a part, as well as the classroom context. Goal theory research has linked parenting practices and beliefs (e.g. Wentzel, 1998), school climate (e.g. Battistich et al., 1997; Eccles & Midgley, 1989), teacher practices (e.g. Ames, 1992; Ames & Archer, 1988; Montalvo, 1997; Wentzel, 1997), and peer influence (Urdan, 1997) to achievement goals and social goals.

A consistent finding across contexts was that supportive and caring interpersonal relationships were positively associated with learning goals. Another finding of importance was that academic-related characteristics of the classroom environment and academic-related characteristics of peers were related to the goals pursued by students in those classrooms.

Developmental studies document the increased prominence of peers in the lives of adolescents (e.g. Berndt, 1982; Brown, 1990; Brown et al., 1986; Coleman, 1974; Hartup, 1996; Steinberg, 1986). Given the importance adolescents place on their social interactions with one another it appears that the influence of peers on students' classroom motivation deserves more attention than it has received in the achievement goal literature. The current study contributes to the literature by investigating perceived peer influences arising through best friendships and perceived peer influences emanating from student members of the classroom on students' achievement goals, social goals, and perceived ability in science class and on their achievement in science.

Science was selected as the content area for the current investigation because of the frequent opportunities provided by teachers for students to work together and share ideas during class activities. Reform movements started in

the late 80's and early 90's such as the Scope and Sequence Coordination Project (1990), Project 2061: Science for All Americans (1989), and the National Science Education Standards (1992) stressed that the learning of science should be an active process involving the sharing and discussion of information between learners. This was reflected in the teaching practices of the teachers selected to participate in the current study.

Best friendship was included in the study for two reasons. First, best friendships provide opportunities for adolescents to develop a high degree of knowledge about other's personal values and beliefs regarding school and academics. Best friends spend more time together and have higher levels of social interaction than they do with other peers (Hartup, 1992; Hartup, Laursen, Stewart, & Eastenson, 1988). In the literature, best friendships are characterized as being high in affection, companionship, caring, loyalty, sharing, helping, and trust (Berndt & Perry, 1986; Bukowski, Hoza, & Boivin, 1994; Furman & Buhrmester, 1992; Hartup, 1996; Parker & Asher, 1993; Youniss & Smaller, 1985).

Second, best friends have a greater socializing influence on one another than peers do in other contexts. There is empirical evidence that best friends contribute more to explaining the behaviors, attitudes, and beliefs of adolescents than non-friends (Erwin, 1985; Haselager, Hartup, van Lieshout, & Riksen-Walraven, 1998; Kandel, 1978; Kupersmidt, DeRoser, & Patterson, 1995; Newcomb & Bagwell, 1995), casual friends (Cause, 1986; Ladd, 1990; Ladd & Emerson, 1984), non-reciprocated friendships (Cairns, Cairns, Neckerman, Guest, & Gariepy, 1988; Epstein, 1983), crowds (Cohen, 1983; Urberg, 1992), and members of school clubs and academic tracks (Ide, Parkerson, Haertel, & Walberg, 1981).

Classroom peers were selected for inclusion in this study for three reasons. First, the interactions that occur among classmates are different from friendships in that they frequently involve working on an academic task that may limit the opportunity to socialize (Meloth & Deering, 1994; Phelps (1990); Roedel & Nelson, 1996). Second, in contrast to best friendships where selection is voluntary, selection of classroom peers is not voluntary for middle school, junior high school, or high school students. In friendships the adolescents themselves determine membership, while other entities within a school determine the class in which a student is placed. Third, because of classmates' immediate proximity to the learning environment they, like teachers, provide contextual clues about how other students perceive the current learning environment (Moos & Tricket, 1974; Tricket & Moos, 1973).

Paths of Peer Influence

Through what processes are adolescents likely to influence one another as best friends and as classmates? Recall that achievement goal studies investigating the contexts in which adolescents interact found that the perceived characteristics of the social context and the perceived quality of the interpersonal relationships were related to the achievement motivations reported by students (e.g. Ames & Archer, 1988; Battistich et al. 1997; Urdan, 1997; Wentzel, 1998). Likewise, Berndt (1999) has proposed a conceptual framework that presents peer characteristics and peer social support as factors that influence the behaviors, beliefs, and attitudes of adolescents.

Berndt (1999) conceptualized peer influence as occurring through two primary pathways. One pathway is concerned with the influence of having

peers with specific sets of characteristics. The other pathway proposed by Berndt (1999) focuses on the quality of interactions occurring among peers. While Berndt (1999) discussed these pathways only in the context of friendships, the current study will investigate these pathways in terms of friendships as well as in terms of relationships with classmates.

The first pathway is based on the premise that people are influenced by the behaviors, beliefs, and attitudes of others, particularly individuals with whom they spend a great deal of time, such as a best friend. From this perspective friends can have positive and negative influence on each other. With regards to academics, friends can either encourage each other to view school as a positive experience or encourage each other to view school as a negative experience. Likewise, social constructivist theories of learning suggest that discussions or dialogues, which occur during peer collaboration, can lead to changes in beliefs, attitudes, and behaviors (Brunner, 1990; Piaget, 1932/1965; Vygotsky, 1978).

An experimental study by Berndt et al. (1990) of eighth grade friendship pairs provides evidence for discussion being a mechanism by which peers influence one another. The researchers randomly assigned pairs of best friends to a treatment group or a control group. In the treatment group, best friend pairs discussed a motivation dilemma involving two possible courses of action. In the control group, best friend pairs discussed a topic unrelated to the motivation dilemma. All participants individually responded to the motivation dilemma before and after the treatment. Individual responses of best friends who discussed the dilemma became more similar from pre-test to post-test, where there were no changes in the control group between the pre- and post-test.

Another mechanism through which peers may influence one another's behavior is through observational learning, where observers pattern their behavior, attitudes, and/or beliefs after a model or models (Davies & Kandel, 1981; Kandel & Andrews, 1987; Schunk & Zimmerman, 1996). Berndt and Keefe (1995) proposed that peer influence could occur through identification with an admired peer from whom one internalizes a core set of values and belief. It appears that this mechanism has received limited attention in the friendship or peer group literature.

The second pathway is situated within theories of interpersonal development. Sullivan (1951) argued that true friendship is defined by intimacy and that close relationships result from a developing awareness of what is important to others. Youniss (1980) stressed the importance of the relationship that develops as peers begin to acknowledge individual differences. In high-quality interpersonal relationships peers negotiate an equitable relationship through recognizing the needs of others and adjusting their behavior to meet those needs. As a result, friends in higher quality relationships have more influence on each other than friends in poorer quality relationships (Berndt, Hawkins, & Jiao, 1999; Berndt et al., 1990; Hallinan, 1983; Hallinan & Williams, 1990).

Based on Berndt's (1999) conceptualization of peer influence, the current study includes independent variables assessing perceived characteristics of classmates, perceived quality of social support provided by classmates, perceived characteristics of a best friend, and perceived quality of social support provided by a best friend. In the following section I will discuss studies that investigated relationships among the characteristics of classmates, the perceived quality of

social support provided by classmates, and adolescents' behaviors, beliefs, attitudes, and academic achievement. This is followed by a review of studies that investigated relationships among the characteristics of best friends, the quality of social support provided by best friends, and adolescents behaviors, beliefs, attitudes, and academic achievement.

Related Research

Classmates' influence on adolescents' behaviors, beliefs, attitudes, and academic achievement. Measures of classroom climate have generally included scales asking students about the behavior of their classmates (e. g. Fraser & Fisher, 1982; Tricket & Moos, 1973; Wheldall, Beaman, & Mok, 1999). Using the My Class Inventory, Fraser & Fisher (1982) found that the perceived characteristics of seventh grade science classmates were related to students' scores on a multiple-choice test over previously studied material and to self-reported interest in science.

The Classroom Environment Scale (CES) (Tricket & Moos, 1973; Moos & Tricket, 1974) has been used to investigate the relationship of perceived classmates' behavior with achievement and achievement-related outcomes. The involvement sub-scale of the CES, which measures the perceived participation of classmates in learning activities was related to high school students' achievement and attendance in a study by Moos and Moos (1977). In the study, students that perceived their classmates to be active participants during class had higher end-of-semester grades and fewer absences than students that perceived their classmates to be uninvolved during learning activities. In a study by Moos (1978), junior high and high school students reported being more satisfied with

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the class and expressed greater interest in the class when they perceived classmates to be more involved in classroom activities. In comparison, Manor (1987), in a study of high school students, failed to find an association between involvement and student achievement on standardized exams and on drop-out rate.

Kinderman (1993) and Sage and Kinderman (1999) investigated the socialization process occurring within natural peer networks found in fifth and sixth grade classrooms. They assessed student involvement, or engagement, in classroom activities using teacher and self-reports. Sage and Kinderman (1999) found that individual student engagement was positively related to the engagement level of other members in their classroom peer network. In sharp contrast, there was a strong negative correlation between individual student engagement and the average engagement of the other peer networks in the classroom. Kinderman (1993) noticed that after students selected into a peer network their level of engagement in classroom activities became more similar to the levels of engagement of the other group members.

Interpersonal support provided by peers at school (belongingness) has frequently been conceptualized as a feature of the overall school, not as a feature of peers at the classroom level. School belonging, or perceiving one self to be a valued member of the school community, was positively related to students' achievement goals and social goals in a study by Dowson and McInerney (1998a). In a conceptual model tested by Roeser, Midgley, & Urdan (1996), belongingness was a positive predictor of eighth graders' overall self-efficacy and grade point average (GPA). Battistich, Solomon, Kim, Watson, & Schaps (1995) found a positive relationship between school belonging and self-efficacy.

Battistich et al. (1997) and Solomon, Watson, Battistich, Schaps, and Delucchi (1996) reported a positive relationship between supportive school environments and students' intrinsic motivation to learn. In a study of students in grades seven through nine, Goodenow and Grady (1993) found school belonging to be positively correlated with expectancy of success in school, valuing of schoolwork, and effort. Goodenow (1993b) found school belongingness or membership to be positively correlated with teacher-rated effort by students, student self-reports of expectancy of success at school, valuing of school work, and a student's average GPA.

Other studies have used measures of perceived peer support when investigating interpersonal relationships among classmates. In these studies researchers report a positive relationship between peer support provided by classmates and motivation to attend school (Torsheim, Wold, & Samdal, 2000), interest in school (Wentzel, 1998), interest, attention, and effort during class (Wentzel, 1998), social goals (Wentzel, 1994, 1998), expectancy of success (Goodenow, 1993a), achievement (Wentzel, 1998), peer acceptance (Wentel, 1994; Wentzel & McNamara, 1999), positive goal and resource interdependence (Johnson & Johnson, 1983; Johnson, Johnson, Buckman, & Richards, 1985), and emotional distress (negative) (Wentzel & McNamara, 1999).

Investigations of middle school students provide evidence supporting a positive relationship between the perceived peer support provided by classmates and adolescents' motivation in the classroom. Perceived peer support explained unique variance in middle school students' pursuit of prosocial goals and responsibility goals in a study conducted by Wentzel (1994). In a similar study, perceived peer support explained unique variance in prosocial goal. While

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perceived peer support was correlated with responsibility goal it did not explain unique variance when entered into a regression model with perceived teacher support (Wentzel, 1998). With regards to achievement goals, perceived peer support was not correlated with students' self-reports of mastery goal orientation and performance goal orientation (Wentzel, 1994, 1998).

In a study by Goodenow (1993a) having supportive relations with classmates was positively related to expectancy of success in school academics across grades sixth, seventh, and eighth. To a lesser degree positive relationships were found between perceived peer support and valuing of schoolwork. Peer support explained variance in seventh graders' valuing of academic tasks. Peer support was not found to be a direct predictor of effort or achievement. However, expectancy of success was positively related to effort and achievement, suggesting that peer support could have an indirect effect on effort and achievement through its relationship with expectancy of success.

Best friend's influence on adolescents' behaviors, beliefs, attitudes, and academic achievement. In the friendship literature a large number of empirical studies investigating friendships report that adolescent behaviors are related to the actions and characteristics of their friends. Peer socialization effects have been reported for use of cigarettes (Fisher & Buaman, 1988; Urberg, 1992), illegal drug use (Kandel & Andrews, 1987; Mounts & Steinberg, 1995), sexual behavior (Billy & Udry, 1985), classroom behavior (Berndt & Keefe, 1995), self-esteem (Berndt et al., 1999), academic aspirations (Davies & Kandel, 1981; Epstein, 1983; Hallinan & Williams, 1990; Ide et al., 1981), achievement goals (Urdan, 1997) and academic achievement (Cause, 1986; Epstein, 1983; Ide et al., 1981; Mounts & Steinberg, 1995).

With regards to social support, studies suggest that a quality relationship (intimacy, companionship, trust, and support) with a best friend is related to improved social emotional adjustment (Berndt et al., 1999; Buhrmester, 1990; Parker & Asher, 1993), self-esteem (Keefe & Berndt, 1996; Mannarino, 1980), and classroom behavior (Berndt & Keefe, 1995).

Berndt and Keefe (1995) used hierarchical linear regression to investigate the degree to which seventh and eighth graders' perception of their best friend's behavior during class and adolescents' perception of the quality of their interpersonal relations with their best friend predicted their own future behavior. Students responded to items asking about levels of disruptive behaviors and levels of involvement in classroom activities (involvement). Surveys were administered during class in the fall and again in the spring.

For both disruptive behaviors and involvement, perceptions of best friend's behavior were unique predictors of a student's future behavior. Students became more disruptive over the school year when they perceived their best friend as being disruptive in the fall. Students became more involved over the school year when they perceived their best friend as being involved in the fall. Adolescents' perception of the quality of their interpersonal relations with their best friend contributed to levels of school involvement. Friendships that were perceived as having higher quality interactions at the beginning of the school year helped explain increases in students' school involvement reported near the end of the school year.

A study by Berndt et al. (1999) considered the possibility that interactions between friendship quality and best friends' characteristics might account for variance in students' behavior at school. They report that behavior problems

increased during the school year for students with higher quality relationships with a best friend who had behavioral problems. Conversely, behavioral problems decreased during the school year for students with lower quality relationships with a best friend who had behavioral problems. A second interaction found that shyness increased during the school year for students with a low quality friendship with a best friend who was shy. However, shyness did not increase during the school year for students with a high quality friendship even when the best friend was shy.

To recap, research shows that the academic-related characteristics of best friends, the social support provided by best friends, the academic-related characteristics of classmates, and the social support provided by classmates is related to adolescents' behavior, beliefs, attitudes, and academic achievement. The current study adds to the literature by investigating the contribution of these variables to explaining students' achievement and self-reported achievement goals, social goals, and perceived ability in science class.

In line with studies conducted by Harter (1987) and Wentzel and Caldwell, 1997, I expect perceptions of classmates to explain greater portions of variance in achievement and self-reported motivation in science class than perceptions of a best friend. However, given the strong empirical evidence that best friends have more influence over each other than other peer contexts it seems likely that perceptions of a best friend may moderate classmates' relationship with achievement and self-reported motivation in science. I have not found studies investigating a similar relationship.

Additionally, in the current study I investigate interactions between the academic-related characteristics of a best friend and the social support provided

by a best friend on students' achievement and motivation in science class. Research by Berndt et al., (1999) suggests the relationship between perceived best friend's academic-related characteristics and self-reports of motivation may not be the same at all levels of perceived best friend social support. I would expect a similar interaction effect between the classmates' academic-related characteristics and classmates' perceived social support on students' achievement and self-reported motivation in science class.

Next I discuss the dependent variables included in this study. I begin with achievement goals followed by social goals and perceived ability. Achievement is discussed in terms of its relationship with achievement goals, social goals, and perceived ability.

Achievement goals. The study of the achievement goals pursued by students in classroom settings is important because of their relationship with student learning. Researchers report positive associations between learning goals and end-of-course grades for college students (Wolters, 1998), end-of-semester grades for high school students (DeBacker & Nelson, 1999; Miller, Greene, Montalvo, Ravindran, & Nichols, 1996), and-end-of year grades for fifth and sixth graders (Meece & Holt, 1993). Achievement goals have also been shown to be associated with achievement-related variables such as persistence, self-regulation, effort, and cognitive processing (Anderman & Young, 1994; DeBacker & Nelson, 1999; Miller et al., 1996; Meece, Blumenfeld, & Hoyle, 1988; Nolen & Haladyna, 1990).

Two goal orientations associated with the evaluation of academic competence have received extensive study in the motivation literature. Students with learning goals, also referred to as mastery (Ames & Archer, 1988) or task

goals (Nicholls, 1984), evaluate competence through self-referenced perceptions of growth or improvement. When engaged in an academic task students who pursue learning goals are concerned with mastering knowledge and bettering their skills. Students with performance goals, or ego goals (Nicholls, 1984), determine competence in relation to how well one is doing compared to others. When working on an academic task they are focused on outperforming others or avoiding poor performance (Ames, 1992; Dweck, 1986; Dweck & Leggit, 1988; Elliot & Dweck, 1988; Nicholls, 1984).

Attributional beliefs regarding ability and effort are central to the concept of achievement goals (Ames, 1992; Nicholls, 1984). Research has linked learning goal with an attributional belief that effort leads to academic success (Ames & Archer, 1988; Duda & Nicholls, 1992; Nicholls, Cobb, Wood, Yackel, & Patashnick, 1990; Thorkildsen & Nicholls, 1998). For a student with learning goals, reasoning about success or failure at a task is influenced by the effort they believe they put into a task. Pride and satisfaction is associated with achieving through effort, while guilt and embarrassment is associated with failure due to lack of effort (Jagacinski & Nicholls, 1984).

In contrast, students who hold performance goals attribute success or failure to a fixed level of ability (Diener & Dweck, 1978; Ames & Archer, 1988). Because ability is viewed as fixed, effort is viewed as an indicator of one's relative standing, not as a strategy for improving understanding. In order to be successful one's performance must equal that of others while expending the same or less effort in comparison to others (Ames, 1992; Nicholls, 1984). So being as successful as others on a task, while expending less effort, leads to affective responses of pride and satisfaction, whereas using more effort than

others is seen as failure and associated with feelings of guilt and embarrassment (Jagacinski & Nicholls, 1984).

Experimental studies where goal orientations and perceived ability were induced found a moderating effect for perceived ability on student behavior in performance goal settings (e.g. Elliot & Dweck, 1988; Nicholls, 1984). However, naturalistic studies where students self-report their goals and cognitive engagements during classroom learning have not always found moderating effects for perceived ability. Miller, Behrens, Greene, & Newman. (1993) and Kaplan and Midgley (1997) both used difference scores to identify students as either learning goal dominant or performance goal dominant and median split scores to form high and low perceived ability groups which were used to test for group difference in cognitive engagement. Additionally, Kaplan and Midgley (1997) performed regression analyses where goal orientation and perceived ability were entered as interaction terms. Neither study found much evidence to support the role of perceived ability as a moderator between performance goal and meaningful cognitive engagement.

Elliot and Church (1997) and Harackiewicz, Barron, Carter, Letho, and Elliot (1997) included two-way interactions between perceived ability and achievement goals in their path analysis to test for moderating effects of perceived ability. In neither study was perceived ability found to moderate the relationship between learning goals and achievement or between performance goals and achievement.

To explain differences in the behavior of students who pursue performance goals, recent research has distinguished between approach and avoidance components of performance goals (e.g. Elliot & Church, 1997;

Middleton & Midgley, 1997; Skaalvik, 1997). Like students with learning goals, students with performance-approach goals are concerned with task mastery and gaining competence. Unlike students with learning goals, students who pursue performance-approach goals are concerned with demonstrating superior ability in reference to others and gaining favorable judgements for it. Students with performance-avoidance goals attempt to avoid unfavorable judgements about their ability in reference to others, which heightens the necessity to avoid situations where one might demonstrate lack of competence.

In a study of college students, performance-avoidance goals were negatively related to intrinsic motivation while performance-approach goals did not have a detrimental effect on intrinsic motivation (Elliot & Church, 1997). Skaalvik (1997) obtained similar results in a study of early adolescents. Performance-avoidance goals were related to increased anxiety during class and were negatively related to self-efficacy and intrinsic motivation. In contrast, performance-approach goals were positively related to self-efficacy, and intrinsic motivation.

As for achievement, positive relationships were reported between performance-approach goals and exam performance (Elliot & McGregor, 1999), and performance–approach goals and end-of-course grades (Elliot & Church, 1997) for college students. Skaalvik (1997) found the performance of middle school students on a comprehensive math exam to be positively associated with performance-approach goals and negatively associated with performance-avoidance goals. The current study uses the approach and avoidance conceptualization of performance goals.

Besides academic goals the results of a growing number of research studies suggest that social goals are related to students achievement and success at school (Dowson & McInerney, 1998b; Nelson, 2000; Nelson & DeBacker, 2001; Patrick, Hicks, & Ryan, 1997; Ryan, Hicks, & Midgley, 1997; Wentzel, 1989, 1991, 1993, 1998). In the next section I begin by discussing differing conceptualizations of social goals. This is followed by a review of research relevant to the social goals included in the current study. These are social responsibility goals of doing class work because its what you are expected to do at school, social affiliation goals of doing class work because it is enjoyable working with others, and social approval goals of not doing school work to fit in with other students in class.

Social goals. Motivation researchers have studied a variety of social goals pursued by students in school settings. These include social responsibility goals (Wentzel 1994, 1997, 1998), pro-social goals (Wentzel 1994, 1997, 1998), social affiliation goals (Dowson & McInerney, 1998b), intimacy goals (Patrick et al., 1997), social relationship goals (Anderman & Anderman, 1999), social approval goals (Dowson and McInerney, 1998b), social status goals (Anderman & Anderman, 1999; Dowson and McInerney, 1998b; Ryan et al., 1997), social conformity goals (Dowson & McInerney, 1998b), goals of pleasing the teacher (DeBacker & Nelson, 2000; Miller et al., 1996), goals of pleasing the family (Miller et al., 1996), leadership goals (Nelson, 2000; Nelson & DeBacker, 2001), and community-building goals (Nelson, 2000; Nelson & DeBacker, 2001).

In the motivation literature there are differing conceptualizations of social goals. Some motivation researchers conceptualize social goals as types of social behaviors which students attempt to engage in during school (e.g., "I try to make friends") (Wentzel, 1996; Ford, 1996). Within the achievement goal

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literature some researchers have defined social goals as reasons for engaging in social activities (e.g., "I want to be part of things that other kids are doing at school") (Anderman & Anderman, 1999), while others have operationalized social goals in terms of social purposes for engaging in academic activities (e.g., "I want to do well at school so that I can feel close to my group of friends") (Dowson & McInerney, 1998b; Urdan & Maehr, 1995).

In the current study I conceptualize social goals in terms of social reasons for engaging in academically relevant activities. This was done in part so social goals would be consistent with the conceptualization of achievement goals - as reasons for doing schoolwork. A study by Wentzel (1994) suggests that the pursuit of social goals for academic reasons plays a more prominent role in classrooms than the pursuit of social goals for social reasons.

In the Wentzel (1994) study, the social responsibility scale was comprised of two sub-scales. The academic social responsibility sub-scale referred to following classroom rules whereas the peer social responsibility sub-scale referred to being responsible towards peers. Likewise, the pro-social scale was comprised of two sub-scales. The academic prosocial sub-scale referred to assisting students with class work and the peer prosocial sub-scale referred to helping students who have personal problems.

Academic pro-social goals were a positive predictor of peer acceptance while academic social responsibility goals were a negative predictor of peer acceptance. In contrast, academic social responsibility goals were positive predictors of teacher acceptance. It is not surprising that middle school students report liking peers who provide help with schoolwork and disliking peers who overtly try to follow classroom rules, or that teachers report liking students who

follow classroom rules. What is notable is that the peer social responsibility and peer prosocial sub-scales did not contribute to explaining peer or teacher acceptance.

Studies of adolescents provide evidence of a positive relationship between social responsibility goals of wanting to achieve in school because that's what you are supposed to do and student learning. Dowson and McInerney (1998a, 1998b) reported that social responsibility goals were positively associated with cognitive engagement. In a study by Anderman and Anderman (1999), social responsibility goals were a positive predictor of students' pursuit of learning goals but not of students' pursuit of performance-approach goals. Patrick et al. (1997) reported that social responsibility goals were a positive predictor of students' academic self-efficacy. Wentzel (1989, 1991, 1993, 1998) consistently found a positive relationship between the (GPA) of early adolescents and their self-reports of social responsibility goals.

Findings regarding the relationship of social affiliation goals with motivation and student learning are mixed. In a study by Dowson and McInerney (1998b) social affiliation goals to do well in school in order to build a sense of group belongingness or to maintain interpersonal relationships were not associated with students' cognitive engagement or achievement in math or science. Wentzel (1989) reported a negative relationship between achievement and social affiliation goals such as making or keeping friends. Anderman and Anderman (1999) reported that social affiliation goals, referred to as relationship goals, were associated with learning goals, performance-approach goals, and GPA. Social affiliation goals explained unique variance in only performance-

approach goals when included in a regression analysis with belongingness, responsibility goals, and status goals.

In studies by Patrick et al. (1997) and Ryan et al. (1997) social affiliation goals to get to know school friends well were positively associated with academic-related variables. Patrick et al. (1997) reported a small positive correlation between social affiliation goals, called intimacy goals, and academic self-efficacy. A study by Ryan et al. (1997) investigating students' willingness to ask for help from classmates suggests that peer affiliation goals may be beneficial in classroom activities where students interact with one another. Ryan et al. (1997) found that students who reported higher social affiliation goals were more likely to ask for help with schoolwork when help was needed.

For social approval goals the value placed on academics by the reference group is important when considering the impact that seeking approval, fitting in, or going along with a others has on student learning (Urdan & Maehr, 1996). Studies have included generalized others (Dowson and McInerney, 1998a; Wentzel, 1989), teachers (Miller et al., 1996; Montalvo, 1997), and families (Dowson and McInerney (1998b) as groups that students seek to receive approval from for doing well at school.

Achievement goal studies investigating peers as the reference for social approval have found these goals to have a detrimental impact on the achievement and achievement-related outcomes of early adolescents. Ryan et al. (1997) reported that goals to gain approval by belonging to the "popular" group at school, referred to as social status goals, were negatively related to students' GPA and to seeking help from others during class. Furthermore, students who

pursued social status goals were more likely to perceive asking for help as a threat to their self-worth. Anderman and Anderman (1999) found that wanting to be part of the "popular" group was related to performance goals but not to learning goals.

Urdan and Maher (1995) discussed the possibility that students might hold social approval goals of not doing schoolwork in order to gain approval or fit in with peers who devalue academic achievement. It seems likely that in order to receive approval from some peers students may not work to their full potential at school. Studies have not empirically considered if students pursue social approval goals in the classroom to not do class work in order to fit in with other students in the class. In the current study I refer to social approval goals to not do school work in order to fit in with others in the class as approval goals.

Perceived ability. Competency beliefs, concerned with measuring an individuals' subjective judgment of his/her ability to successfully accomplish or understand a task, have been variously conceptualized as self-efficacy (Bandura, 1986), perceived competence (Harter, 1982), and perceived ability (Ames & Archer, 1988; Nicholls, Patashnick, & Nolen, 1985). Inherent in the operationalization of these constructs is the importance of context and task. Like achievement goals, judgments about one's ability are specific to a given context or task. Bandura (1986) argued that because judgements of self-efficacy are task specific, measures must directly address the performance task and must be measured closely in time to when the performance occurred.

Bandura (1986) identified previous success or failure at a task as a major determinant of self-efficacy. Students who previously encountered success on a task the same or similar to the current one are likely to have high perceived

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ability, meaning they are confident of their ability to complete the task at hand. Conversely, students who previously encountered failure on a task the same or similar to the current one are likely to have low perceived ability, meaning they are unsure of their ability to be successful at the task. Additionally, Bandura (1977) proposed that self-efficacy was a major determinate of students' willingness to expend effort and to persist when confronting obstacles.

Theory suggests a reciprocal relationship between achievement and self-efficacy. So a strong performance on an achievement outcome can have a positive impact on self-efficacy, while a poor performance can have a detrimental impact on self-efficacy. Likewise, higher self-efficacy is likely to lead to better achievement performances, while lower self-efficacy is likely to lead to poorer achievement performances (Pajares, 1996).

In general, goal theory has utilized measures of perceived ability that attempt to capture students' current beliefs about their ability in a specific domain or on a particular type of task. Studies using a goal theory perspective find that students with high perceived ability were more meaningfully engaged during a task (Greene & Miller, 1996; Kaplan & Midgley, 1997; Miller et al., 1993), utilized deep processing strategies to a greater degree (Anderman & Young, 1994; Miller et al., 1996), exerted more effort (DeBacker & Nelson, 1999; Jagacinski & Nicholls, 1984; Miller et al., 1996), and were more likely to remain at a task when difficult (DeBacker & Nelson, 1999; Miller et al., 1996) than students with low perceived ability.

Positive relationships have been reported between perceived ability, and end-of-course grades for college students (Harackiewicz et al., 1997; Elliot & Church, 1997; Greene & Miller, 1996), end-of-semester grades for high school

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students (DeBacker & Nelson, 1999; Miller et al., 1996), and the standardized achievement scores of fifth and sixth graders (Meece et al. 1988). A measure of perceived ability is included in this study because of its strong relationship with student learning.

The Current Study

Because relationships with best friends are more personal and intimate than relationships with classroom peers it seems reasonable that there would be differences in the influence coming from these two contexts. The close relationship between best friends provides opportunity for individuals to share and discuss values and beliefs that may become internalized through the interactions. In contrast, classroom peer relationships, which are more public, may be influential in enforcing or modeling norms for public behavior (Berndt & Savin-Williams, 1993; Brown, 1990; Kindermann et al. , 1996).

I have used Berndt's (1999) conceptual framework where peers influence one another through two distinct pathways. One pathway involves influence occurring through interactions with and observations of peers with specific characteristics. The other pathway involves influence occurring through the quality of peers' relationships. Adolescents in high quality relationships are likely to have more influence over their peers than adolescents in low quality relationships (Berndt et al., 1990; Hallinan, 1983; Hallinan & Williams, 1990).

The current study investigates the relationship of perceived academic-related characteristics of classmates, perceived social support of classmates, perceived academic-related characteristics of a best friend, perceived social support of a best friend, with achievement and self-reports of learning goals,

performance-approach goals, performance-avoidance goals, responsibility goals, affiliation goals, social solidarity goals, and perceived ability. Questions to be investigated in this study are:

1. Do the perceived academic-related behaviors of classmates account for significant amounts of variance in achievement goals, social goals, perceived ability, and achievement of early adolescent students in science classrooms?

2. Does the perceived social support provided by classmates account for significant amounts of variance in achievement goals, social goals, perceived ability, and achievement of early adolescent students in science classrooms?

3. Do the perceived academic-related behaviors of a best friend account for significant amounts of variance in achievement goals, social goals, perceived ability, and achievement of early adolescent students in science classrooms?

4. Does the perceived social support provided by a best friend account for significant amounts of variance in achievement goals, social goals, perceived ability, and achievement of early adolescent students in science classrooms?

5. Do the perceived academic-related behaviors of a best friend and the perceived social support provided by a best friend, moderate the relationship of perceived academic-related behavior of classmates and social support provided by classmates with achievement goals, social goals, perceived ability, and achievement of adolescents in science classrooms?

6. Do interactions between perceived academic-related behaviors of classmates and perceived social support provided by classmates account for significant amounts of variance in achievement goals, social goals, perceived ability, and achievement of early adolescent students in science classrooms?

7. Do interactions between perceived academic-related behaviors of a best friend and perceived social support provided by a best friend account for significant amounts of variance in achievement goals, social goals, perceived ability, and achievement of early adolescent students in science classrooms?

8. Do perceived ability, achievement goals, and social goals account for significant amounts of variance in the achievement of early adolescent students in science classrooms?

Because of limited previous research and the exploratory nature of this study specific predictions for the questions under investigation in the current study were not made. It was expected that perceived best friend and perceived classmates' social support would be positively related to students' self-reported motivation to learn. As well, it was expected that perceived best friend and perceived classmates' positive academic-related characteristics would be positively related to students' self-reported motivation to learn. Perceived best friend's negative academic-related characteristics and perceived classmates' negative academic-related characteristics should be negatively related to self-reported motivational variables that support learning.

It was thought that under some situations best friend variables would moderate the relationship between classmate variables and student's self-reports of motivation. For example, in classrooms where classmates are negative about school and do not participate in classroom activities it would be expected that this would have a negative impact on a student's motivation

to learn. However, having a best friend that values school may result in the student's motivation not being as negative as it would otherwise.

Work by Berndt and colleagues suggested that social support may mediate the relationship between academic-related characteristics and student motivation. It was expected that high supportive relationships would result in stronger relationships between perceived academic-related characteristics and students' self-reports of motivation than low supportive relationships.

As for achievement, it was believed that perceived best friend social support and perceived classmates' social support would be positively related to achievement. A positive relationship was expected for positive academic-related characteristics while a negative relationship was expected between negative academic-related characteristics and achievement. Finally, it was expected that motivation variables such as perceived ability, learning goal, and responsibility goal would be positively related to achievement.

Method

Design

  This study was correlational, examining relationships among perceived classmates' academic-related behavior, perceived social support provided by classmates, perceived best friend's academic-related behavior, perceived social support provided by a best friend, achievement goals, social goals, perceived ability, and achievement.

Participants

  The participants (N= 253) were drawn from sixth, seventh, and ninth grade science classrooms from a large suburban school district in the mid-south. The school district is located in a major metropolitan area and the average income and education of parents in the district is above the state average. Students regularly score above the state average on standardized tests and attend college at a rate considerably higher than the state average.

  Sixth and seventh graders attended the same middle school (6th – 8th grade). All ninth graders attended the same high school (9th - 12th). Participants came from 13 different science classes taught by four different teachers. The sample was 49% male and 51% female; 19% sixth graders, 38% seventh graders, and 43% ninth graders; 2% Arab, 4 % Asian, 5% Native American, 9% Hispanic, 10% multi-ethnic, 19% African American, and 51% Caucasian. As for age, 7% of the participants were 11 years of age, 24% of the participants were 12 years of age, 24% of the participants were 13 years of age, 12% of the participants were 14 years of age, 21% of the participants were 15 years of age, and 12 % of the

participants were 16 years of age. The median age of the participants was 14 years.

Measures

The instrument used in the current study was a three-part self-report questionnaire employing a five-point Likert scale with one end labeled "strongly disagree" and the other end labeled "strongly agree." Part one asked the participants to report perceptions regarding a best friend. Participants responded to items asking about the academic-related behaviors of their best friend (best friend's negative orientation toward learning, best friend's academic valuing) and about the social support provided by their best friend (best friend's social support). Part two asked participants to self-report their motivation during science class. Participants responded to items about their achievement goals (learning goals, performance-approach goals, performance-avoidance goals), social goals (social responsibility goals, social affiliation goals, social approval goals), and perceived ability. Part three asked participants to report perceptions regarding their science classmates' academic-related behavior during science class (classmates' negative orientation toward learning, classmates' involvement) and the social support provided by classmates (classmates' social support). Each of these will be described in more detail in the upcoming sections.

Perceived classmates' academic-related characteristics. Two scales, classmates' involvement and classmates' negative orientation toward learning, assessed classmates' academic behavior during science class. The classmates' involvement scale (eight items), adapted from the Classroom Environment Scale (CES) (Moos, 1979), asked students to report their perception regarding classmates'

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participation and attentiveness during class activities. Two items used in the CES were not included in this study. One of the dropped items asked about enjoyment and didn't directly assess participation and attentiveness. The other dropped item referred to a class activity (doing extra work) in which all students would not be expected to participate. One item was changed from giving presentations to participating in lab activities, reflecting a more appropriate activity for a science classroom, and two items containing multiple activities were changed to only a single activity. The major adaptation involved placing the scale items on a continuous scale instead of a dichotomous true-false scale. Placing the involvement sub-scale of the CES on a continuous scale was used successfully by Berndt and Keefe (1995) and Berndt and Miller (1990) with adolescents.

Classmates' negative orientation toward learning (five items) assessed students' perception of the degree to which classmates actively discourage engaging in academic behaviors. The scale was adapted from Murdock (1999) with an additional item created by the author. Murdock's (1999) items were modified from a global response about friends (my good friends) to a response targeting classmates (students in this class).

Murdock (1999) reported that for middle school students items loaded on a single factor ranging from .66 to .42 in magnitude. In addition, internal consistency was acceptable ($\propto$ = .73). A negative correlation with school engagement (r = -.14, p < .01) provides additional evidence for the construct validity of the scale with middle school students (Murdock, 1999).

Perceived classmates' social support. A single scale, classmates' social support, measured the perceived quality of peer relationships during science

class. Items were adapted from the Psychological Sense of School Membership Scale (PSSM) (Goodenow, 1993b) which measures adolescent perceived belonging and psychological membership in the school environment. The scale has consistently shown good internal consistency (α = .77 to .88) when used with adolescents in urban and suburban settings. To provide evidence for construct validity, teachers were asked to rate students as low, medium, or high in social status. As predicted, all three groups were found to be significantly different from each other with higher social status being related to higher scores on the PSSM (Goodenow, 1993b).

For the current study items were adapted to reflect a sense of membership with respect to classmates instead of school in general. This was accomplished by rewriting 4 items that used a generalized "people" and 4 items that were written for teachers to state "other students in the class". Four items were dropped from the original scale, three items because they could not be meaningfully rewritten using the above adaptation and one item due to redundancy.

Perceived best friend's academic-related characteristics. Two scales, best friend's academic valuing and best friend's negative orientation toward learning, were used to measure best friend's academic characteristics. The best friend's academic valuing scale (seven items) was adapted from the valuing sub-scale of the Identification with School Questionnaire (Voelkl, 1996). With eighth graders Voelkl (1996) found that items comprising the value sub-scale loaded together on the expected factor, with factor loadings ranging from .28 to .74. The internal consistency for the scale was acceptable (α = .73). For the current study items were written to measure perceptions of the value a best friend places on school.

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Best friend's negative orientation toward learning (five items) assessed students' perceptions of the degree to which their best friend actively discourages engaging in academic behaviors. This scale is a parallel version of the classmates' negative orientations scale. In this case items were modified to illicit a response regarding a best friend (my best friend).

Perceived best friend's social support. Three sub-scales, help, closeness, and security from the Friendship Qualities Scale (Bukowski et al., 1994), were used to assess students' perception of the social support they receive from their best friend. The help sub-scale includes items indicating mutual help and protection from victimization. The closeness sub-scale addresses strength of the friendship bond and the level of affection expressed between friends. Items included in the security sub-scale focus on having friends you can trust and that the friendship is strong enough to withstand arguments. Bukowski et al. (1994), using two separate samples of fifth and sixth graders, reported acceptable reliabilities for help ($\propto$ = .73/.80), closeness ($\propto$ = .77/.86), and security ($\propto$ = .71/.74).

Bukowski et al. (1994) assessed validity by comparing responses between reciprocated friendships and non-reciprocated friendships, and between stable and non-stable friendships. As theory would predict, reciprocated friendships showed significantly higher levels on the security, help, and closeness. Similarly, stable friendships scored higher than unstable friendships for security, help, and closeness.

For the current study the three sub-scales were combined into a single sub-scale. A confirmatory factor analysis conducted by Bukowski et al. (1994) suggests that these sub-scales are closely related (but not redundant) to each other and might be combined to get an overall assessment of the emotional

quality of a friendship. Other researchers using similar instruments have shown these types of items to load together on a single factor when used with adolescent samples (Berndt & Keefe, 1995; Keefe & Berndt, 1996, Furman & Buhrmester, 1985).

Achievement goals. The current study included measures of learning goals, performance-approach goals, and performance-avoidance goals. DeBacker and Nelson (1999) previously used the five-item learning goal scale in a study of high school science students. They reported good internal consistency ($\propto$ = .87) for the scale and consistent with theory the learning goal scale was positively related to measures of persistence and effort.

Performance-approach and performance-avoidance goals included items previously used by DeBacker and Nelson (1999) and additional items developed for the current study. The performance-approach scale consisted of five items addressing doing schoolwork to demonstrate superior competence, and the five-item performance-avoidance scale addressed doing schoolwork to avoid looking incompetent.

Social goals. Three scales, social responsibility goals, social affiliation goals, and social approval goals were used to assess social reasons for engaging in academic work. Social responsibility goals consisted of five items addressing doing schoolwork in order to comply with classroom rules and expectations. The scale included three items based on Patrick et al. (1997) and two items created by the author. The Patrick et al. (1997) scale consist of five items. Three items were rewritten to begin with "I do the work in this class because." The other two items, "I like to keep quiet when other kids are trying to study" and "Its important to me to keep working even when other kids are goofing off"

were dropped and replaced by the author's items because they could not be rewritten to reflect a reason for doing school work.

The author developed items for the social affiliation goal scale and the social approval goal scale. The social affiliation goal scale contained five items asking about doing schoolwork with others because it provides a sense of belongingness and enjoyment. The social approval scale consisted of four items that addressed not doing as well as one could in school in order to fit in with other students in the class.

Perceived ability. The eight-item perceived ability scale included four items that asked students to rate competence in science in reference to other classmates and four items that asked students to rate competence based on mastering course material in science class. In a study of high school math students by Miller et al. (1996) perceived ability items loaded on the expected factor. Loadings were strong ranging from .81 to .48 and the scale demonstrated very good internal consistency ($\propto$ = .93).

Achievement. Ninth graders' scores on the final exam and their end-of-semester grades for the spring semester were used as the measure of achievement for ninth graders. The semester exams were created by the instructors and consisted of objective questions asking about the content taught over the semester. Achievement data was not collected from sixth and seventh grade teachers for two reasons. First, all sixth and seventh grade students did not take a teacher constructed semester exam. Second, due to teacher grading practices it was not possible to obtain semester achievement data that separated understanding of science content from group understanding, effort, or persistence.

Procedure

Based on the recommendation of the district science coordinator, I contacted sixth, seventh, eighth, and ninth grade science teachers that the coordinator believed used a large number of small group learning activities. Through discussions with the teachers and personal observation I identified those that regularly used instructional activities that required students to interact with one another. This included lab activities where students shared resources and ideas and discussion groups where students presented data and defended ideas. Four teachers - a sixth grade, a seventh grade, and two ninth grade - agreed to participate in the study. A letter of consent was obtained from the school district, from the school principals, and from each of the teachers.

All students from four sections of sixth grade general science, four sections of seventh grade general science, and five sections of ninth grade physical science were invited to participate. Parental as well as student consent was obtained. Letters explaining the project and requesting parental consent were sent home with students one week prior to the date scheduled for administration of the questionnaire. I distributed and collected parental consent forms with assistance from the teachers. Personal consent forms for students were distributed during class. I read through the consent form with the students and addressed their questions. Only students who returned a signed parental consent form and gave personal consent were permitted to complete the questionnaire. A copy of the questionnaire is located in Appendix B.

The questionnaire was administered in a 40-minute session during students' regularly scheduled science class during the spring semester. Students

were told that their answers were confidential and that they did not have to answer any of the questions if they chose not to. Teachers remained in the classroom and assisted with monitoring while students completed the questionnaire. Instructions were read aloud to the class followed by students responding individually to each item using a five point Likert scale. I then collect the questionnaires and answered questions asked by the students.

Students responded first to items about their best friend, followed by items about their own motivation during science class, and then to items regarding their science classmates. To guard against responses of generalized reports of relationships with friends, students were asked to identify the single best friend with whom they currently spent the most time. Students wrote the best friend's initials on the top of the survey and responded to the items with that best friend in mind. Students provided demographic data at the end of the survey.

Analysis

Construct validity of each scale in this study was investigated using principle-axis factor analysis and through examining zero-order correlations. The internal consistency of the items in each scale was assessed by Cronbach's alpha.

Pearson correlation coefficients were used to initially assess relationships among variables. Hierarchical multiple regression was used to further investigate relationships among the variables in this study. Squared multiple correlations and change in R squared statistics were used to determine the variance accounted for in the criterion by variables in the equation. Standardized

beta weights and semi-partial correlations were used to assess the unique contribution of predictor variables to explain variance in the criterion variable.

Relationship of classmate variables and best friend's variables to classroom motivation. A set of hierarchical regressions was used to test if the perception of classmate variables and the perception of best friend explained variance in achievement and self-reported achievement goals, social goals, perceived ability, and achievement. Following Baron & Kenny's (1986) procedure for testing moderator effects classmate variables were entered as a group in step one and best friend variables (moderator) were entered as a group in step two of the model. Best friend variables were selected as the moderator because best friends have greater influence over each other than other peer contexts and therefore it seems likely that best friend variables could impact the relationship between classmate variables and classroom motivation variables.

The interaction terms of (1) classmates' negative orientation and best friend's negative orientation, (2) classmates' negative orientation and best friend's academic valuing, (3) classmates' negative orientation and best friend's social support, (4) classmates' involvement and best friend's negative orientation, (5) classmates' involvement and best friend's academic valuing, (6) classmates' involvement and best friend's social support, (7) classmates' social support and best friend's negative orientation, (8) classmates' social support and best friend's academic valuing, (9) classmates' social support and best friend's social support were entered in the third step of the model (see Figure 1).

Change in R squared was used to determine if as a group classmate variables, best friend variables, and interaction terms explained variance in the outcome variables. Standardized beta weights and squared semi-partial

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correlations were used to assess the unique contribution of variables to achievement, and self-reported achievement goals, social goals, and perceived ability.
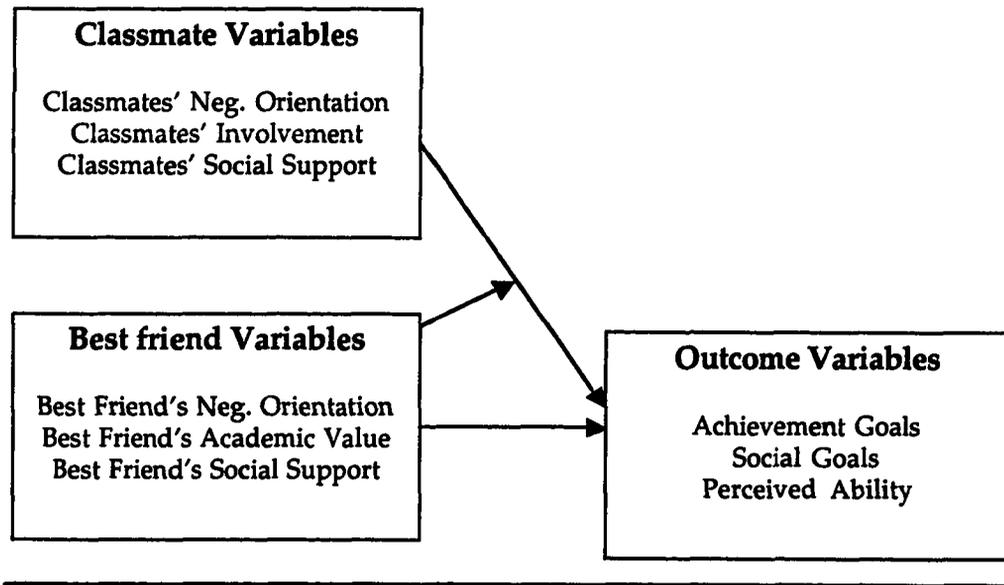
Figure 1. Regression model used to test the relationship of classmate variables and best friend variables with classroom motivation

Interaction effects between achievement-related characteristics variables and social support variables. A series of hierarchical regressions were run to investigate the contribution of interaction terms between academic-related characteristics of peers and peers social support to explaining achievement goals, social goals, and perceived ability (see Figure 2).
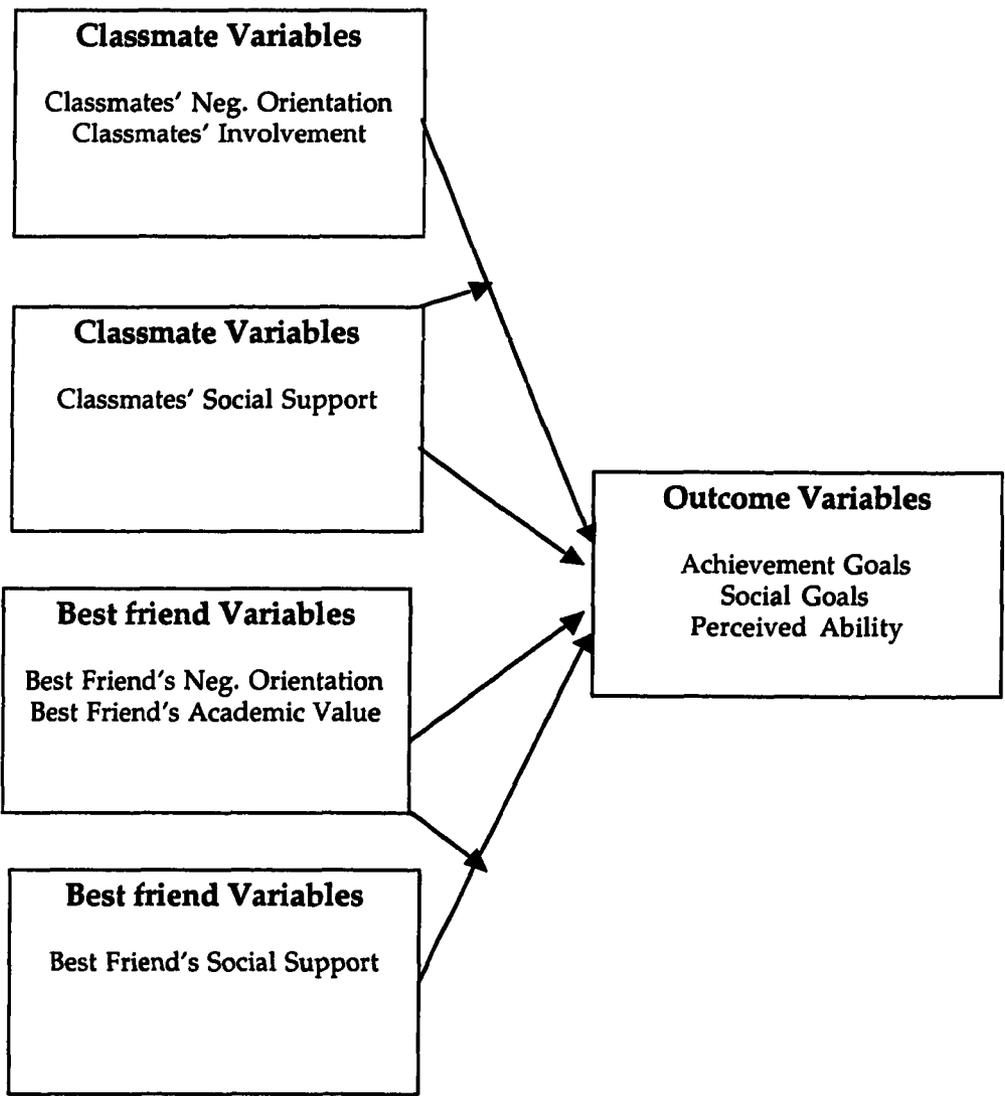
Figure 2. Regression for interactions between achievement-related behavior and social support variable

Perception of classmate variables was entered in the first step and perception of best friend variables entered in the second step. Interaction terms between (1) classmates' negative orientation and classmate's social support, (2) classmates' involvement and classmates' social support, (3) best friend's negative

orientation and best friend's social support, and (4) best friends' academic valuing and best friend's social support were entered in the third step. Change in R squared was used to determine if interaction terms explain additional variance in self-reported achievement goals, social goals, and perceived ability above the main effects. Standardized beta weights and squared semi-partial correlations were used to assess the unique contribution of the interactions to explaining student motivation in science class.

Relationships with achievement. Only data from ninth graders were used in analyses involving achievement variables. Achievement data was not collected from sixth and seventh grade teachers for two reasons. First, all sixth and seventh grade students did not take a teacher constructed semester exam. Second, due to teacher grading practices it was not possible to obtain semester achievement data that separated understanding of science content from group understanding, effort, or persistence. Zero-order correlations as well as regression analyses were used to evaluate the relationship of achievement with classmate variables, best friend variables, goal variables, and perceived ability with students' scores on the semester final and end-of-semester grade. With regards to the regression analyses the main effects (classmate variables and best friend variables) were investigated but the interaction models were not tested due to the low number of cases (n = 82). An additional regression analysis was run to evaluate the contribution of achievement goals, social goals, and perceived ability to explaining student achievement. Achievement goals, social goals, and perceived ability were entered simultaneously into the regression model.

Squared multiple correlations were used to determine the variance in achievement accounted for by best friend variables, classmate variables, achievement goals, social goals, and perceived ability. Standardized beta weights and squared semi-partial correlations were used to assess the unique contribution of the predictor variables in explaining variance in achievement.

Scale Properties

Classmate variables. A two-factor structure with varimax rotation provided factor loadings most consistent with expectations (see Table 1). The solution accounted for 33% of the total variance. Classmates' social support items loaded on the one factor while the classmates' involvement items and classmates' negative orientation items loaded together on another factor representative of observable classmate behavior. Because classmates' academic valuing and classmates' negative orientation scales contain items describing academic behaviors it was not surprising that these scales loaded on the same factor. Separate classmates' negative orientation and academic valuing scales were retained in the current study. The classmate's negative orientation measures negative academic-related characteristics while the classmates' involvement scale measures positive academic-related characteristics. Table 1 shows that classmates' negative orientation items are opposite in sign to classmates' involvement items. Furthermore, the correlation between the two scales is small in magnitude ($r = -.16$) suggesting that the scales are not redundant.

Two classmates' social support items (64 and 51) loaded on the achievement-related behavior factor and were removed from the analysis. Three other classmates' social support items (41, 48, and 53) were dropped due to high cross loading. All five of the dropped classmates' social support items were reversed coded. Three classmates' involvement items (55, 57, and 61) failed to load on either factor with a magnitude greater than .27 and were removed from

the analysis. These items were the only non-reverse coded items in the classmates' involvement scale.

Table 1

Factor Loadings for Classmate Variables

Item	Factor 1	Factor 2
CSS50	.771	
CSS44	.727	
CSS62	.682	
CSS42	.657	
CSS59	.605	
CSS56	.508	
CSS46	.501	
CSS54	.395	
CSS39	.363	
CNO40		.632
CNO60		.625
CNO49		.606
CNO63		.603
CNO45		.585
CI38		-.577
CI43		-.541
CI47		-.488
CI58		-.486
CI52		-.423

Note. CSS = Classmate's Social Support; CI = Classmates' Involvement;

CNO = Classmates' Negative Orientation.

n = 241.

The resulting three scales demonstrated acceptable internal consistency. Cronbach's alpha was .80 for classmate's negative orientation (5 items), .70 for classmates' involvement (5 items), and .82 for classmates' social support (9 items). A single case with a value in excess of 3 standard deviations above the mean was removed to improve the skew and kurtosis of the classmates' negative orientation scale.

Best friend variables. A two-factor structure with varimax rotation provided factor loadings most consistent with expectations (see Table 2). The solution accounted for 31% of the total variance. The best friend's social support items loaded on one factor while best friend's academic valuing and best friend's negative orientation loaded together on the other factor.

As with classmates' negative orientation and classmates' involvement, best friend's academic-related characteristics and best friend's academic valuing represent positive and negative achievement-related behaviors. Furthermore, the correlation between the two scales is small in magnitude ($r = -.31$) suggesting that the scales are not redundant.

All three scales demonstrated acceptable internal consistency. Cronbach's alpha were .64 for best friend's negative orientation (5 items), .81 for best friend's academic valuing (7 items), and .90 for best friend's social support (15 items).

To improve the distribution of scores of the best friend's negative orientation scale and the best friend's social support scale cases with scores exceeding three standard deviations from the mean were removed. For best friend's negative orientation scale, four cases with a value in excess of three standard deviations above the mean were removed from the analysis improving the skew and kurtosis of the scale. For the best friend's social support scale, three cases with a value in excess of three standard deviations below the mean were removed from the analysis improving the skew and kurtosis of the scale.

Table 2

Factor Loadings for Best Friend Variables

Item	Factor 1	Factor 2
BFSS17	.720	
BFSS15	.709	
BFSS27	.649	
BFSS6	.617	
BFSS10	.616	
BFSS13	.605	
BFSS22	.600	
BFSS19	.599	
BFSS2	.595	
BFSS11	.592	
BFSS8	.571	
BFSS23	.573	
BFSS4	.530	
BFSS25	.479	
BFSS20	.394	
BFNO12		-.756
BFAV14		.699
BFAV26		.643
BFAV9		.630
BFAV18		.574
BFAV7		.502
BFNO21		-.494
BFAV3		.392
BFNO5		-.382
BFAV24		.362
BFNO16		-.301
BFNO1		-.246

Note. BFSS = Best Friend's Social Support; BFAV = Best Friend's Academic Valuing;

BFNO = Best Friend's Negative Orientation.

n = 241.

Achievement Goals. To assess the factor structure of the achievement goals

items a principle-axis factor analysis with oblimin rotation was conducted on the

whole sample (see Table 3). Two items (21 and 33) did not load on the expected

factor and were removed resulting in an overall improved factor structure. Item

21 was written as a performance-avoidance goal but loaded on the performance-

approach factor. A review of item 33 noted that the item was improperly written and more closely resembled a learning goal item than a performance-approach goal item.

Table 3

Factor Loadings for Achievement Goals

Item	Factor 1	Factor 2	Factor 3
P_APP27	.798		
P_APP18	.554		
P_APP12	.537		
P_APP2	.494		
P_AVD9		.811	
P_AVD6		.790	
P_AVD30		.460	
P_AVD36		.452	
LRN8			.862
LRN14			.852
LRN34			.838
LRN26			.824
LRN1			.766

Note. LRN = Learning Goal; P_APP = Performance-Approach Goal; P_AVD = Performance-Avoidance Goal.

n = 244.

The remaining items loaded on the intended factor with loadings in excess of .45. As expected there was a moderate correlation between the factor on which performance-approach items loaded and the learning goal factor (r = .41) as well as between the performance-approach factor and the performance-avoidance factor (r = .62). The learning goal factor and performance-avoidance factor were not correlated (r = .08). The solution explained 59% of the total variance.

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Internal consistency was assessed using Cronbach's alpha. Based on this statistic all three scales exhibited acceptable internal consistency. Values for each scale were .92 for learning goals (5 items), .78 for performance-approach goals (4 items), and .81 for performance-avoidance goals (4 items).

Social goals. A principle-axis factor analysis with varimax rotation provided the cleanest factor structure for the social goal items (see Table 4). Two items (24 and 29) did not load on the expected factor and were removed. A review of the items found that a word was left out of the responsibility item (24). The affiliation item (29) was unlike the other affiliation items in that it was written with a negative valence instead of a positive valence. The remaining items loaded on the expected factor with loadings in excess of .55. The solution explained 49% of the total variance.

Internal consistency was assessed using Cronbach's alpha and based on this statistic all three scales exhibited acceptable internal consistency. Values for each scale were .72 for approval goals (4 items), .75 for affiliation goals (4 items), and .86 for responsibility goals (4 items). To improve the distribution of scores of the approval goal scale cases with scores exceeding three standard deviations from the mean were removed. For approval goals four cases with a value in excess of standard deviations above the mean were removed to improve the skew and kurtosis of the scale. For responsibility goals two cases with a value in excess of 3 standard deviations below the mean were removed to improving the skew and kurtosis of the scale.

Table 4

Factor Loadings for Social Goals

Item	Factor 1	Factor 2	Factor 3
RSP20	.805		
RSP11	.759		
RSP4	.697		
RSP32	.653		
APRV25		.745	
APRV5		.698	
APRV15		.559	
APRV37		.547	
AFF13			.689
AFF17			.647
AFF22			.643
AFF7			.619

Note. RSP = Responsibility Goal; APRV = Approval Goal; AFF = Affiliation Goal.

n = 251.

Perceived ability. One item (10) was removed because of severe skewness (-2.0), kurtosis (3.6), and the possibility of a ceiling effect. (M = 4.5, SD = .86). Removal of the item improved the overall distribution of scores for the perceived ability scale. The remaining seven items consisted of three items that asked students to rate competence based on mastering course material and four items that asked students to rate competence in science in reference to other classmates. Internal consistency for the scale was acceptable (α = .81).

Scale means, standard deviations, number of items, and Chronbach's alpha for all variables are located in Table 5.

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Table 5

Number of Items, Means, Standard Deviations, and Internal Consistency Coefficients for Scales

Scale	# of items	M (SD)	Cronbach's alpha
Perceived Ability	7	3.49 (.83)	.81
Learning Goal	5	3.82 (1.04)	.92
Performance-approach Goal	4	3.02 (1.05)	.78
Performance-avoidance Goal	4	2.47 (1.10)	.81
Affiliation Goal	4	3.39 (.98)	.75
Approval Goal	4	1.70 (.74)	.74
Responsibility Goal	4	3.99 (.90)	.85
Best Friend's Negative Orientation	5	1.54 (.57)	.64
Best Friend's Academic Valuing	7	3.98 (.73)	.80
Best Friend's Social Support	15	4.29 (.58)	.90
Classmates' Negative Orientation	5	2.00 (.82)	.80
Classmates' Involvement	5	2.79 (.86)	.70
Classmates' Social Support	9	3.76 (.73)	.82

Correlations

Zero-order correlations among perceptions of best friend variables, perceptions of classmate variables, achievement goals, social goals, and

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perceived ability are reported in Table 6. Correlations among the goal variables exhibited a predictable pattern of relationships. Learning goal was positively correlated to performance-approach goal, affiliation goal, and responsibility goal. There was no relationship between learning goal and performance-avoidance goal and learning goal was negatively related to approval goal. Performance-approach goal and performance-avoidance goals were moderately correlated (positive). Performance-approach goal was also positively related to affiliation goal, approval goal, and responsibility goal. Performance-avoidance goal was positively related to affiliation goal and approval goal but not to responsibility goal. Among the three social goals, affiliation goal was weakly related to approval goal and responsibility goal (both positive). Approval goal and responsibility goal was negatively correlated.

Relationships between perceived ability and goal variables were consistent with expectations. Perceived ability was positively related to learning goal, performance-approach goal, affiliation goal, and responsibility goal while being negatively related to approval goal. Perceived ability and performance-avoidance goal were not correlated.

Among the perception of classmate variables, classmate's negative orientation toward learning was weakly related to classmates' social support and moderately associated with classmates' involvement (negative). There was no correlation between classmates' social support and classmates' involvement. For the perception of best friend variables, best friend's negative orientation toward learning was moderately correlated with best friend's social support and best friend's academic valuing (negative). There was a positive association between best friend's social support and best friend's academic valuing.

Table 6

Zero-order Correlations among Classmate, Best Friend, and Motivation Variables

	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Perceived ability	--------	.487	.435	.133	.245	-.172	.439	-.002	.346	.098	-.225	-.003	.205
2. Learning goal	.487	--------	.325	.083	.294	-.203	.580	-.061	.306	.175	-.311	.134	.370
3. Performance-approach goal	.435	.325	--------	.617	.479	.182	.350	.138	.272	-.070	-.072	.011	.150
4. Performance-avoidance goal	.133	.083	.617	--------	.361	.374	.117	.183	.024	-.070	.031	-.106	.084
5. Affiliation goal	.245	.294	.479	.361	--------	.154	.209	.055	.422	-.041	-.172	.161	.153
6. Approval goal	-.172	-.203	.182	.374	.154	--------	-.231	.386	-.166	-.180	.306	-.353	.211
7. Responsibility goal	.439	.580	.350	.117	.209	-.231	--------	-.031	.277	.021	-.250	.293	.367
8. Class neg. orientation	-.002	-.061	.138	.183	.055	.286	-.031	--------	.156	-.492	.305	-.125	.123
9. Class social support	.346	.306	.272	.024	.422	-.166	.277	-.156	--------	-.023	-.240	.262	.131
10. Class Involvement	.098	.175	-.070	-.070	-.041	-.180	.021	-.492	-.023	--------	-.128	-.022	.086
11. Friend neg. orientation	-.225	-.311	-.072	.031	-.172	.306	-.250	.305	-.240	-.128	--------	-.306	-.585
12. Friend social support	-.003	.134	-.011	-.106	.161	-.353	.293	-.125	.262	-.022	-.306	--------	.340
13. Friend academic valuing	.205	.370	.150	.084	.153	-.211	.367	-.123	.131	.086	-.585	.340	--------

Note. Coefficients in bold are significant at $p < .05$.

There were also correlations between perception of classmate variables and perception of best friend variables. Best friend's negative orientation was positively related to classmates' negative orientation while being negatively related to classmates' social support. Classmates' social support was positively associated with best friend's social support.

Of particular interest in the current study were the relationships between students' perception of their peers and motivation for doing schoolwork during science class. Perceived ability and learning goal were positively related to classmates' social support and classmates' academic valuing and negatively related to best friend's negative orientation. In addition, learning goal was weakly correlated to classmates' involvement (positive). Performance-approach goal and performance-avoidance goal was positively correlated with classmates' negative orientation. Performance-approach goal was also positively related to classmates' social support and classmates' academic valuing.

As for social reasons for doing schoolwork, approval goal was related to all classmate and friendship variables. Approval goal was positively correlated to classmates' negative orientation and best friend's negative orientation. Approval goal was negatively related to classmates' social support, best friend's social support, classmates' involvement, and best friend's academic valuing. Affiliation goal was weakly associated with best friend's social support and best friend's academic valuing while being moderately correlated with classmates' social support (positive). There was a weak negative association between affiliation goal and best friend's negative orientation. Responsibility goal was positively correlated to classmates' social support, best friend's social support,

and best friend's academic valuing and was negatively related to best friend's negative orientations.

Regression Analyses

Main effects for classmate and best friend variables. Achievement goals, social goals, and perceived ability were regressed on classmate variables and best friend variables. Squared multiple correlations, beta weights, and squared semi-partial correlations for classmate variables and best friend variables are reported in Table 7. In Table 7, Model 1 shows main effects for classmate variables when entered in the first step of the model. Model 2 shows main effects for classmate variables and best friend variables following the entry of best friend variables on step two of the analysis. Findings regarding the total variance accounted for by classmate variables on each motivation variable are presented following the Step 1 statistics. Findings regarding the additional variance accounted for by best friend variables are presented following Step 2 statistics. Findings of the unique variance explained in student motivation by classmate variables and best friend variables are then presented.

Classmate variables accounted for significant proportions of variance in perceived ability [ΔF (3, 219) = 11.61, p < .000], learning goal [ΔF (3, 217) = 13.85, p = .000], performance-approach goal [ΔF (3, 219) = 9.56, p = .000], performance-avoidance goal [ΔF (3, 225) = 4.70 p = .007], approval goal [ΔF (3, 217) = 8.14, p = .000], affiliation goal [ΔF (3, 222) = 16.90, p = .000], and responsibility goal [ΔF (3, 217) = 9.59, p =.000].

Best friend variables explained additional variance in [ΔF (3, 216) = 3.97, p = .009],

Table 7

Motivation Variables Regressed on Classmate and Best Friend Variables

	PA[a]			LG[b]		
	Model 1	Model 2		Model 1	Model 2	
	ß	ß	sr^2	ß	ß	sr^2
Classmates'						
Neg. orientation	.12	.16*†	.02	.14	.18**†	.03
Involvement	.16*	.15*	.02	.27***	.25***	.06
Social support	.37***	.36***	.12	.36***	.30***	.10
R^2 Step 1			.14***			.16***
Friend's						
Neg. orientation		-.16*	.02		-.14	
Academic valuing		.08			.27***	.06
Social support		-.15*†	.02		-.03	
R^2 Step 2			.05**			.12***
Total R^2			.18***			.28***

Note. PA = Perceived Ability; LG = Learning Goal.

† suppressor effect. Results in a beta weight with a sign opposite the simple correlation.

[a]n = 223. [b]n = 221. [c]n = 229. [d]n = 226.

* indicates $p < .05$. ** indicates $p < .01$. *** indicates $p < .001$.

Table 7 (continued)

Motivation Variables Regressed on Classmate and Best Friend Variables

	P-apprchG[a]			P-avdG[c]		
	Model 1	Model 2		Model 1	Model 2	
	ß	ß	sr^2	ß	ß	sr^2
Classmates' Neg. orientation	.24**	.24**	.06	.24**	.22**	.05
Involvement	.06	.04		.02	.00	
Social support	.30***	.30***	.09	.05	.06	
R^2 Step 1			.12***			.05**
Friend's Neg. orientation		-.03		.00	.00	
Academic valuing		.05			.15	
Social support		-.12			-.01	
R^2 Step 2			.03			.02
Total R^2			.14***			.07**

Note. PapprchG = Performance-Approach Goal; P-avdG = Performance-Avoidance.

[a]n = 223. [b]n = 221. [c]n = 229. [d]n = 226.

* indicates $p < .05$. ** indicates $p < .01$. *** indicates $p < .001$.

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Table 7 (continued)

Motivation Variables Regressed on Classmate and Best Friend Variables

	AffG[d]			ApprvG[b]		
	Model 1	Model 2		Model 1	Model 2	
	ß	ß	sr^2	ß	ß	sr^2
Classmates' Neg. orientation	.13	.16*†	.03	.24**	.16*	.03
Involvement	.03	.03		-.07	-.10	
Social support	.43***	.41***	.17	-.12	-.02	
R^2 Step 1			.19***			.10***
Friend's Neg. orientation		-.09			.17*	.03
Academic valuing		.08			.04	
Social support		-.01			-.31***	.10
R^2 Step 2			.02			.12***
Total R^2			.21***			.23***

Note. AffG = Affiliation Goal; ApprvG = Approval Goal.

† suppressor effect. Results in a beta weight with a sign opposite the simple correlation.

[a]n = 223. [b]n = 221. [c]n = 229. [d]n = 226.

* indicates $p < .05$. ** indicates $p < .01$,.*** indicates $p < .001$.

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Table 7 (continued)

Motivation Variables Regressed on Classmate and Best Friend Variables

	RespG[b]		
	Model 1	Model 2	
	β	β	sr^2
Classmates' Neg. orientation	.12	.15*†	.02
Involvement	.09	.09	
Social support	.34***	.27***	.07
R^2 Step 1			.12***
Friend's Neg. orientation		.00	
Academic valuing		.25**	.06
Social support		.19**	.04
R^2 Step 2			.12***
Total R^2			.23***

Note. RespG = Responsibility Goal.

† suppressor effect. Results in a beta weight with a sign opposite the simple correlation.

[a]n = 223. [b]n = 221. [c]n = 229. [d]n = 226.

* indicates $p < .05$. ** indicates $p < .01$. *** indicates $p < .001$.

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learning goal [ΔF (3, 214) = 12.05, p = .000], approval goal [ΔF (3, 214) = 11.41, p = .000], and responsibility goal [ΔF (3, 214) = 10.92, p = .000], but not for affiliation goal [ΔF (3, 219) = 1.86, p = .14], performance-approach goal [ΔF (3, 216) = 2.41, p = .07], and performance-avoidance goal [ΔF (3, 222) = 1.51, p = .21]

Both perception of classmates and perceptions of best friend variables explained unique variance in self-reported perceived ability, learning goal, approval goal, and responsibility goal. Classmates' negative orientation, classmates' involvement, classmates' social support, best friend's negative orientation, and best friend's social support explained unique variance in perceived ability. Classmates' negative orientation, classmates' involvement, classmates' social support, and best friend's academic valuing explained unique variance in learning goal. Classmates' negative orientation, best friend's negative orientation, and best friend's social support explained unique variance in approval goal. Classmates' negative orientation, classmates' social support, best friend's academic best friend's social support, and valuing explained unique variance in responsibility goal.

Only perceptions of classmate variables explained unique variance in self-reported performance-approach goal, performance-avoidance goal, and affiliation goal. Classmates' negative orientation and classmates' social support explained unique variance in performance-approach goal and affiliation goal. Classmates' negative orientation explained unique variance in performance-avoidance goal.

Interactions between classmate and best friend variables. To investigate relationships between classmate variables and best friend variables nine interaction terms were created between the classmate variables and the best

friend variables. As a group interactions between perceived academic-related characteristics and perceived social support accounted for variance in approval goal [ΔF (9, 204) = 2.92, p = .003], but not for perceived ability [ΔF (9, 206) = 1.25, p = .26], learning goal [ΔF (9, 205) = 1.47, p = .16], performance-approach goal [ΔF (9, 207) = 1.44, p = .17], performance-avoidance goal [ΔF (9, 208) = 1.13, p = .34], affiliation goal [ΔF (9, 210) = .59, p = .81], or responsibility goal [ΔF (9, 206) = .69, p = .72]. Squared multiple correlations and standardized beta weights are reported in Table 8.

The graphs used to clarify the interactions were produced following procedures described by Jaccard, Turrisi, and Wan (1990). Regression lines were plotted for two levels of the moderator (best friend variable). The "low" regression line was two standard deviations below the mean and the "high" regression line was two standard deviations above the mean.

The interaction between classmates' negative orientation toward learning and best friend's negative orientation explained unique variance in performance-avoidance goal (sr^2 = .03) (see Figure 3). At lower levels of perceived classmates' negative orientation, students who perceived that their best friend had a low negative orientation towards school reported higher scores on performance-avoidance goal than students who perceived that their best friend had a high negative orientation towards school.

Table 8

Variance Explained by Interactions between Classmate Variables and Best Friend Variables on Classroom Motivation

	PA[a]	LG[b]	P-apprchG[c]	P-avdG[d]	AffG[e]	ApprvG[f]	RespG[b]
Classmate Variables R^2 Step 1	.14***	.16***	.12***	.05*	.19***	.10***	.12***
Best Friend Variables R^2 Step 2	.05**	.12***	.03	.02	.02	.14***	.12***
Class neg. orientation x BF neg. orientation	.48	.42	.90*	.99*	.46	.44	-.11
Class neg. orientation x BF academic valuing	-.09	.20	.61	.78	.15	.47	-.60
Class neg. orientation x BF social support	1.31*	1.10	1.24*	.90	.61	-.60	.10
Class social support x BF neg. orientation	-.50	-.67	.10	.15	.25	.66	-.37
Class social support x BF academic valuing	.46	.34	1.10	.20	-.22	-.29	.07

Note. PA = Perceived Ability; LG = Learning Goal; PapprchG = Performance-Approach Goal; P-avdG = Performance-Avoidance Goal;

AffG = Affiliation Goal; ApprvG = Approval Goal; RespG = Responsibility Goal.

[a]n = 222. [b]n = 221. [c]n = 223. [d]n = 224. [e]n = 226. n[f] = 220.

* indicates $p < .05$,.** indicates $p < .01$. *** indicates $p < .001$.

Table 8 (continued)

Variance Explained by Interactions between Classmate Variables and Best Friend Variables on Classroom Motivation

	PA[a]	LG[b]	P-apprchG[c]	P-avdG[d]	AffG[e]	ApprvG[f]	RespG[b]
Class social support x							
BF social support	-.87	-.44	-1.09	-1.39	.47	-.15	-1.38
Class involvement x							
BF neg. orientation	-.22	-.24	.53	.44	.53	.98**	-.22
Class involvement x							
BF academic valuing	-.52	.07	.86	.44	.41	1.68**	-.41
Class involvement x							
BF social support	-.46	.22	.21	.51	.72	1.24*	.16
R^2 Step 3	.04	.04	.05	.04	.02	.09**	.02
Total R^2	.23***	.33***	.20***	.11*	.23***	.33***	.25***

Note. PA = Perceived Ability; LG = Learning Goal; PapprchG = Performance-Approach Goal; P-avdG = Performance-Avoidance Goal;

AffG = Affiliation Goal; ApprvG = Approval Goal; RespG = Responsibility Goal.

[a]n = 222. [b]n = 221. [c]n = 223. [d]n = 224. [e]n = 226. n[f] = 220.

* indicates $p < .05$,.** indicates $p < .01$. *** indicates $p < .001$.
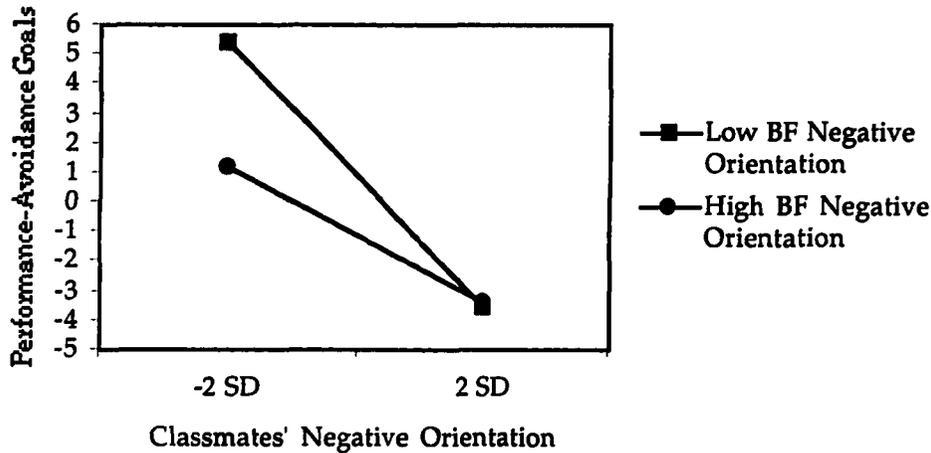
Figure 3. Interaction between classmates' negative orientation and best friend's negative orientation on performance-avoidance goal.

The interaction between classmates' negative orientation and best friends social support explained unique variance in perceived ability $(sr^2 = .02)$ (see Figure 4). At higher levels of perceived classmates' negative orientation, students who perceived their best friend to provide high quality social support reported higher

scores on perceived ability than students who perceived that their best friend provided lower quality social support .

The two previous interactions also accounted for unique variance in performance-approach goal $(sr^2 = .02$ for both interactions). At lower levels of

perceived classmates' negative orientation, students who perceived their best

friend as having a low negative orientation towards school reported higher
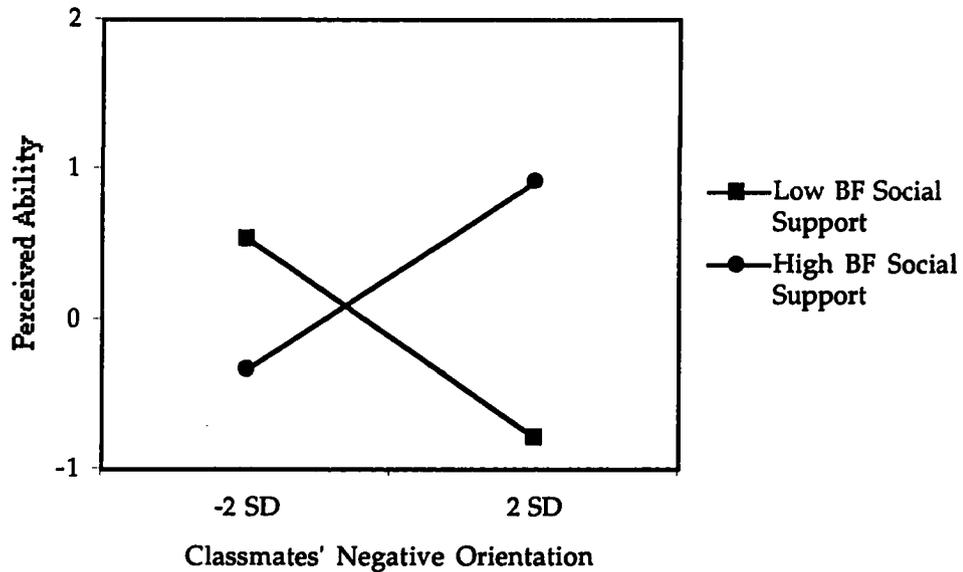
Figure 4. Interaction between classmates' negative orientation and best friend's social support on perceived ability.

scores on performance-approach goal than students who perceived that their

best friend a high negative orientation toward school (see Figure 5). At higher

levels of perceived classmates' negative orientation, students who perceived that

their best friend provided high quality social support reported higher negative

orientation on performance-approach goal scores on performance-approach

goal than students who perceived that their best friend provided low quality

social support (see Figure 6).
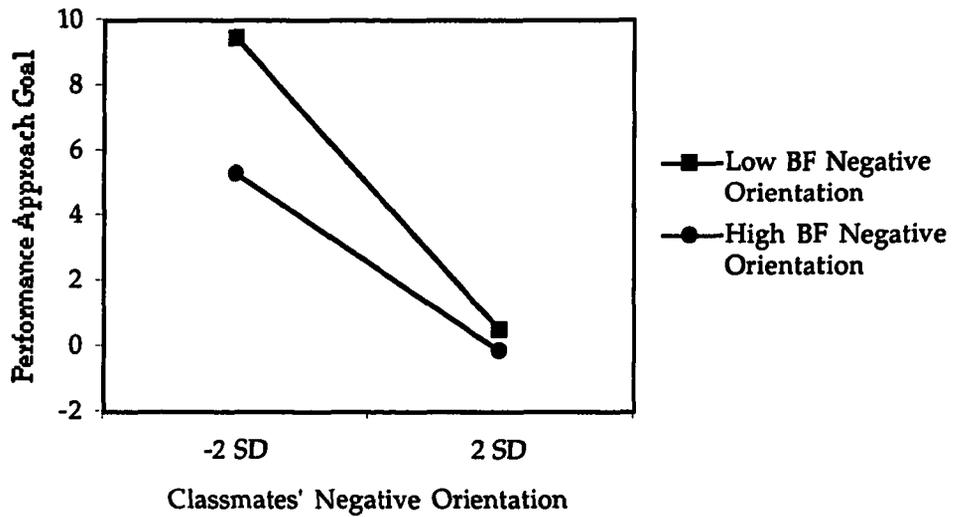
Figure 5. Interaction between classmates' negative orientation and best friend's negative

orientation on performance-approach goal
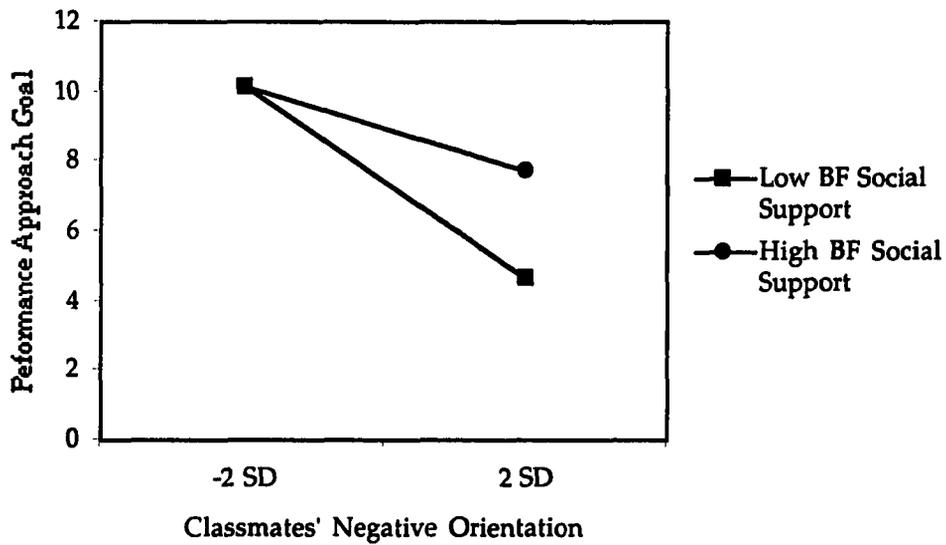
Figure 6. Interaction between classmates' negative orientation and best friend's social support

on performance-approach goal.

Interactions between classmates' involvement and best friend's negative orientations (sr^2 = .04), classmates' involvement and best friend's academic valuing (sr^2 = .04), and classmates' involvement and best friend's social support (sr^2 = .02) explained unique variance in approval goals to not do school work in order to fit in with others in the class. At lower levels of perceived classmates' involvement, students who perceived that their best friend had a high negative orientation toward schoolwork reported higher scores on approval goal than students who perceived that their best friend had a low negative orientation toward schoolwork (see Figure 7).
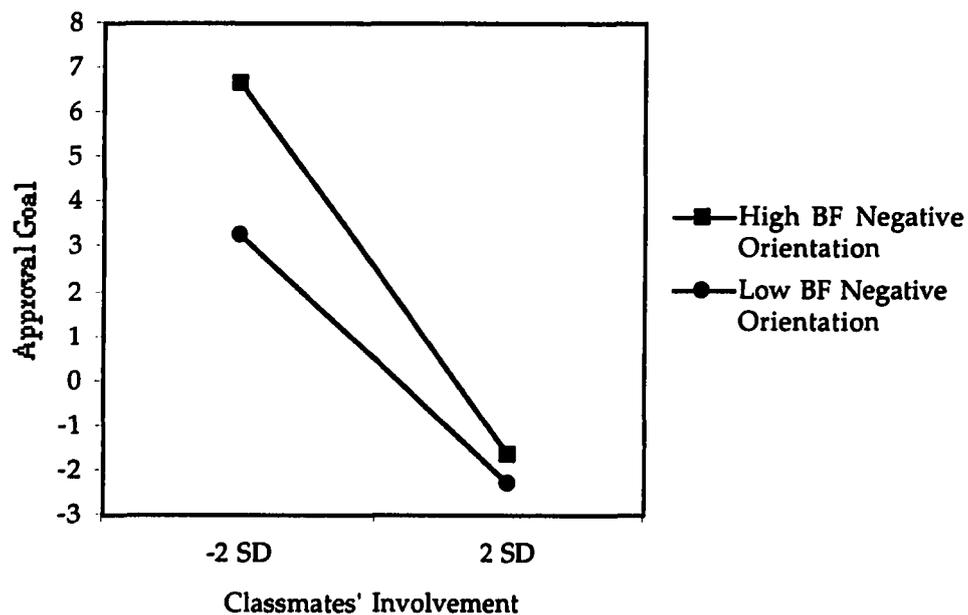
Figure 7. Interaction between classmates' involvement and best friend's negative orientation on approval goal.

At lower levels of perceived classmates' involvement, students who perceived that their best friend placed a high value on academics reported lower scores on approval goal than students who perceived that their best friend placed a low value on academics (see Figure 8). Similarly, at lower levels of perceived classmates' involvement students who perceived that their best friend provided high quality social support reported lower scores on approval goal than students who perceived that their best friend provided low quality social support (see Figure 9).
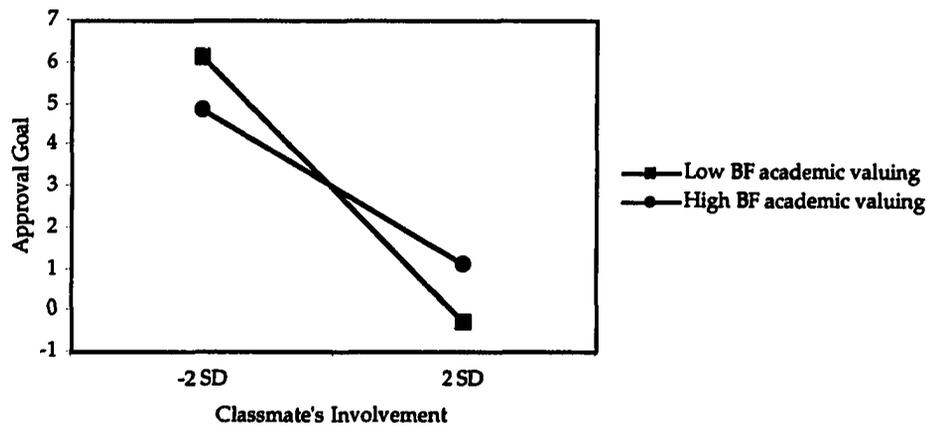
Figure 8. Interaction between classmates' involvement and best friend's academic valuing on approval goal.
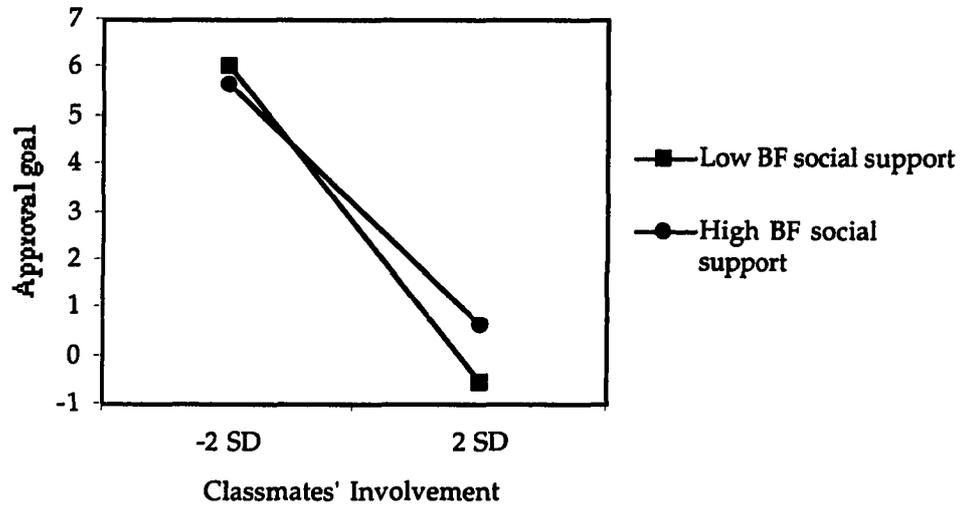
Figure 9. Interaction between classmates' involvement and best friend's social support on

approval goal

Interactions between academic-related characteristics and social support variables. To investigate interactions between perceived academic-related characteristic variables and perceived social support variables, interaction terms were created for (1) best friend's negative orientation and best friend's social support, (2) best friend's academic valuing and best friend's social support, (3) classmates' negative orientation and classmates' social support, and (4) classmates' involvement and classmates' social support. Perceived classmate variables were entered in the first step, perceived best friend variables were entered in the second step, and the four interaction terms were entered in the last step of the regression model. Squared multiple correlations and standardized beta weights for the interaction terms are reported in Table 9.

Interactions between perceived academic-related characteristics and perceived social support accounted for variance in perceived ability [ΔF (4, 211) = 3.25, p = .01]. The interaction between classmates' negative orientation toward learning and classmates social support explained unique variance in perceived ability (sr^2 = .03). The negative relationship between classmate negative orientation and perceived ability becomes more pronounced at lower levels of classmates' social support (see Figure 10). Interactions between perceived academic-related characteristics and perceived social support did not account for variance in learning goal [ΔF (4, 210) = .02, p = .31],

Table 9

Variance Explained by Interactions between Achievement-related Characteristics and Social Support on Motivation

	PA[a]	LG[b]	P-apprchG[c]	P-avdG[d]	AffG[e]	ApprvG[b]	RespG[b]
Classmate Variables							
R^2 Step 1	.14***	.16***	.12***	.05**	.19***	.10***	.12***
Best Friend Variables							
R^2 Step 2	.05**	.12***	.03	.02	.02	.12***	.12***
Friend neg. orientation x Friendship quality	.78	-.17	-.25	-.02	-.07	-.23	-.18
Academic valuing x Friendship quality	-.26	-1.18	-1.33	-.30	.41	-.34	-.40
Class neg. orientation x Membership	-1.05**	-.51	.11	.11	.20	-.21	-.09
Involvement x Membership	-.04	-.19	.27	.22	-.17	-.56	.23
R^2 Step 3	.05*	.02	.01	.00	.01	.01	.00
Total R^2	.23***	.30***	.16***	.07	.21***	.23***	.24***

Note. PA = Perceived Ability; LG = Learning Goal; PapprchG = Performance-Approach Goal; P-avdG = Performance-Avoidance Goal;

AffG = Affiliation Goal; ApprvG = Approval Goal; RespG = Responsibility Goal.

[a]n = 222. [b]n = 221. [c]n = 223. [d]n = 224. [e]n = 226.

* indicates $p < .05$,.** indicates $p < .01$. *** indicates $p < .001$.
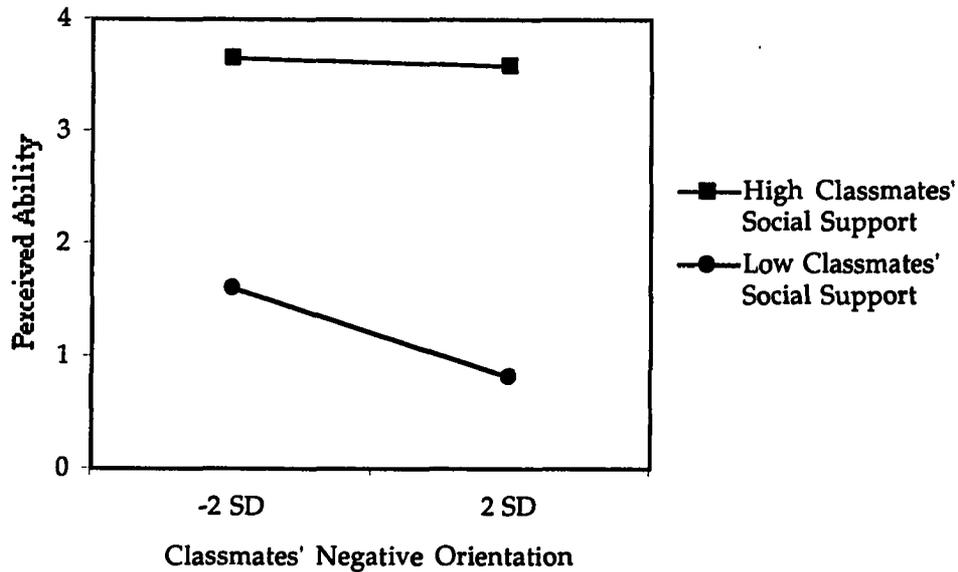
*Figure 10.* Interaction between classmates' negative orientation and classmates' social support on perceived ability.

performance-approach goal [ΔF (4, 212) = .81, p = .52], performance-avoidance goal [ΔF (4, 213) = .09, p = .99], affiliation goal [ΔF (4, 215) = .35, p = .85], approval goal [ΔF (4, 210) = .49, p = .74], and responsibility goal [ΔF (4, 210) = .27, p = .90

Achievement

The relationship of achievement with perceived best friend variables, perceived classmate variables, and self-reported classroom motivation was investigated through zero-order correlations and regression analysis. The zero-order correlations reported in Table 10 reveal that perceived best friend and perceived classmate variables were not related to ninth graders scores on a semester exam and their end-of-semester grade. Several motivation variables were correlated

Table 10

Correlations with Ninth Grade Achievement Variables

	Semester Exam	Semester Grade
Perceived ability	**.496**	**.575**
Learning goal	.150	.157
Performance-approach goal	.140	.207
Performance-avoidance goal	-.015	-.070
Affiliation goal	-.112	-.126
Approval goal	-.215	**-.327**
Responsibility goal	**.241**	**.369**
Classmates' neg. orientation	.067	.032
Classmates' social support	.027	.105
Classmates' involvement	-.180	-.183
Friend's neg. orientation	-.076	-.042
Friend's social support	-.086	-.032
Friend's academic valuing	.004	.052
Semester Exam		**.859**

Note. Coefficients in bold are significant at $p < .05$.

with achievement. Self-reported perceived ability and responsibility goal were positively related students' scores on a semester exam and their end-of-semester grades. In addition, self-reported approval goal was negatively related to end-of-semester grade.

As for the regression analyses, perceived classmate variables and perceived best friend variables did not explained significant variance in ninth graders semester exam scores [F (6, 75) = .76, p = .60] and ninth graders end-of-semester grades [F (6, 75) = .65, p = .69]. However, self-reported motivation variables did account for variance in ninth graders semester exam scores [F (7, 78) = 4.40, p = .000] and ninth graders end-of-semester grades [F (7, 77) = .8.12, p = .000].

Self-reported perceived ability was the only variable that explained unique variance in ninth graders' semester exam scores. Three variables accounted for unique variance in ninth graders end-of-semester grades. Self-reported perceived ability, performance-approach goal, and approval goal explained unique variance in end-of-semester grades. Squared multiple correlations, beta weights, and squared semi-partial correlations are reported in Table 11.

Table 11

Ninth graders' achievement regressed on motivation variables

	Semester Exam		Semester Grade	
	ß	sr^2	ß	sr^2
Learning Goal	.03		-.06	
Performance–approach Goal	.10		.24*	.03
Performance-avoidance Goal	.10		-.01	
Responsibility Goal	-.01		.08	
Approval Goal	-.15		-.29**	.06
Affiliation Goal	-.15		-.18	
Perceived Ability	.46***	.15	.44***	.14
Total R^2		.28***		.43***

Note. * indicates $p < .05$. ** indicates $p < .01$. *** indicates $p < .001$.

Discussion

The findings of the current study highlight the importance of peer social contexts in explaining students' motivation to achieve in science. The present study indicates that early adolescents' perceptions of their classmates and of their best friend are related to their perceived ability, achievement goals, and social reasons for doing or not doing class work (social goals) during science class. These findings are in line with other studies that have investigated relationships between friends and achievement motivation (e.g. Berndt & Keefe, 1995; Pintrich, 1997) and between the classroom social environment and motivation (e.g. Goodenow, 1993a; Kinderman, 1993; Ryan & Patrick, 2001).

Adolescents' perception of their classmates was found to explain variance in all the self-reported goal variables and in self-reported perceived ability. Classmate variables accounted for moderate amounts of variance in affiliation goal, perceived ability, performance-approach goal, responsibility goal, and learning goal. A smaller amount of variance was explained by the classmate variables for performance-avoidance goal.

As a group perception of classmate variables explained more variance in perceived ability, performance-approach, performance-avoidance, and affiliation goals than best friend variables. In fact, perception of best friend variables did not contribute to explaining variance in performance-approach goal, performance-avoidance goal, and affiliation goal. In the current study, students' adoption of performance goals appears to be influenced exclusively by information observed in the classroom context and not by information gained through interacting with a best friend. A more detailed examination showed

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that students are more likely to adopt performance goals the more they perceive that students in the classroom devalue studying and doing schoolwork. If students believe they are valued and accepted by the students in the class they are more likely to pursue performance-approach goals during science class, whereas students who pursue performance-avoidance goals did not report being valued and accepted by other members of the class.

Perceived classmates' negative orientation towards learning and perceived classmates' social support were particularly powerful predictors of student motivation in the present study. Not only did these variables explain variance in performance-approach goal but they also explained variance in affiliation goal, learning goal, responsibility goal, and perceived ability.

As with performance-approach goals, classmates' negative orientation and classmates' social support were the only unique predictors of social affiliation goal. Not surprisingly, student pursuit of goals to work with others because it's enjoyable were positively related to perceiving that you are valued and accepted by other members of the class and negatively related to perceiving that classmates make fun of those who do their class work. While most group work is focused on academic outcomes in secondary science classrooms, limited learning is likely to take place if students do not wish to work together.

Though not related to achievement in the present study, affiliation goal was positively associated with perceived ability, which explained unique variance in 9th graders' achievement. Affiliation goal was also positively correlated with learning goal, responsibility goal, and performance-approach goal, all which have been shown to be associated with student achievement (e.g. DeBacker & Nelson, 1999; Elliot & Church, 1997; Miller et al., 1996; Skaalvik, 1997; Wentzel,

1989, 1993). This finding along with others (Wentzel, 1998; Johnson & Johnson, 1983; Johnson, Johnson, Buckman, & Richards, 1985) underscores the important role that supportive relationships between students plays in getting students to work together and help each other during class.

Students who reported high scores on perceived classmates' negative orientation were less likely to have high perceived ability, to pursue learning goals, and to pursue social responsibility goals - all of which are positively related to doing well in school. In addition, students who reported classmates to be negatively oriented toward learning were more likely to pursue approval goals to not do well in school to fit in with other students.

As for perceived classmates' social support, students who reported they were valued and accepted by others in the class were more likely to exhibit adaptive approaches to learning. Specifically, they were more likely to have higher perceived ability and were more likely to purse learning goals and social responsibility goals. With regards to the relationship between perceived classmates' involvement and self-reported motivation during science class, perceiving your classmates to have a high level of involvement in classroom academic activities was related to the pursuit of learning goals and to higher perceived ability.

Findings from the current study suggest that classrooms where adolescents make fun of: (1) those who study, (2) do their homework, and (3) are concerned about grades can undermine the motivation of others in the class. Whereas, classrooms where students feel valued and accepted by their peers and where students are active participants in classroom activities can support student motivation to learn. This is consistent with the findings of other goal theory

studies, which report a positive relationship between supportive learning environments and students pursuit of learning goals (e.g. Battistich et al., 1997; Eccles & Midgley, 1989; Wentzel, 1997).

The current study also investigated the degree to which early adolescents' perception of their best friend's academic behavior and social support explained their achievement motivation in science class. Best friend variables were most important in explaining variance in students' pursuit of learning goals, social responsibility goals, and approval goals. In addition, best friend variables explained a smaller amount of variance in perceived ability.

Having a best friend who valued academics was positively related to the pursuit of learning goals and social responsibility goals. Students who reported a supportive and caring relationship with a best friend were more likely to pursue social responsibility goals during science class and were less likely to pursue approval goals to not do school work in order to fit in with other students in science class. These students also reported having higher perceived ability in science. From the current study it appears that having a quality relationship with a best friend that values learning is related to a pattern of achievement motivation that should be supportive of learning during science class.

Particularly notable is the role that having a best friend that is caring and supportive plays in reducing the need to identify with students who are not academically inclined. Studies in the friendship literature document the positive relationship between having a high quality friendship and a positive adjustment to school (e. g. Berndt & Keefe, 1995; Berndt, Hawkins, & Jiao, 1999).

While perceiving that your best friend values school appears to support learning, perceiving that your best friend actively demonstrates a negative

orientation toward learning by putting down those that participate in academic endeavors appears to not support learning during science class. Specifically, adolescents that reported having a best friend who made fun of students who do schoolwork were more likely to not do assignments for science class in order to fit in with students in the class. These students also reported low perceived ability in science.

It was hypothesized that the relationship of perceived classmates variables with self-reported motivation would be moderated by perceived best friend variables. For four motivation variables, perceived ability, performance-approach goal, performance-avoidance goal, and approval goal there were moderator effects that explained significant variance. In classrooms where it was perceived that classmates were less likely to engage in the academic task, students who reported having a quality relationship with their best friend were less likely to pursue goals of not doing school work in order to fit in with others in the class. A similar moderating effect was found on approval goal when students believed that their best friend valued academics.

As for the interaction of perceived classmates' involvement and best friend's negative orientation on approval goal, it was found that perceiving your best friend as unlikely to make fun of students who do school work was related to lower pursuit of approval goals. This effect was more noticeable at lower levels of perceived classmate involvement. At high levels of classmate involvement students' pursuit of approval goals to not do schoolwork in order to fit in is minimal regardless of the best friend's level of negative orientation.

From these findings it appears that perceiving you have a supportive relationship with a best friend can have a positive impact on students self-

reported motivations in situations where classmates are viewed as being uninterested in academic endeavors. There is also evidence of a positive impact of perceiving that your best friend values academics and adolescents willingness to do their schoolwork even when they perceive that others are not.

Other moderating effects involved classmates' negative orientation toward school. Perceiving your best friend to be less likely to make fun of those who do school work was related to higher self-reports of performance-approach goals. This effect was stronger at lower levels of classmates' negative orientation. In classrooms where students are often ridiculed the pursuit of performance-approach goal is low regardless of best friend's level of negative orientation. A similar moderating effect was found on performance-avoidance goal.

Students who reported a quality relationship with their best friend were more likely to pursue performance-approach goals and to report high perceived ability even in classrooms where students made fun of those who did their school work. In contrast, students who reported a poor relationship with their best friend reported low perceived ability in classrooms where students made fun of those who did their school work. Of particular importance is the negative impact on perceived ability of being in a classroom where students have a negative towards learning. Low perceived ability is also associated with having a poor quality relationship with a best friend.

Berndt, Hawkins, & Jiao, (1999) suggested the possibility of interactions between peer academic-related characteristics and peer social support. In the current study a single interaction term between perceived academic-related characteristics of peers and perceived social support by peers was found to

explain significant variance in students' self-reported motivation for doing schoolwork in science class. The single significant interaction occurred between classroom membership and classmates' negative orientation toward learning and explained variance in perceived ability

The negative relationship between classmate negative orientation and perceived ability became more pronounced at lower levels of classmates' social support. So students that perceived they were not accepted by their classmates and who also perceived that their classmates made fun of those who did schoolwork had lower perceived ability. However, the perceived ability of students who believed they were accepted by classmates was not effected regardless of the level at which they reported students in the class made fun of those who do school work. Findings in the current study and other studies of perceived abilities strong relationship with achievement, learning goals, and responsibility goals raises concerns regarding students that seem themselves marginalized by others in the class.

As for achievement, none of the perceived classmate or perceived best friend variables were associated with students' score on the semester exam or with students' end-of-semester grade in science. However, self-reported achievement motivation variables explained significant variance in students' score on the semester exam and in students' end of semester grade in science.

The non-significant finding between perceived classmate and perceived best friend variables may in part be the result of low power due to the low number of subjects in the analysis. The magnitude of several of the squared semi-partial correlations when achievement was regressed on the classmate and best friend variables were comparable to effect sizes reported for statistically

significant findings when goal variables were regressed on the classmate and best friend variables. Additionally, a review of the Standard Error of the Mean shows that there was considerably more error in the achievement measures than in the other outcome measures. This is not surprising given that the students had two different teachers and took different exams.

Students' confidence in their ability in science class was the single strongest predictor of semester exam and semester grade. Performance-approach goals and approval goals also explained variance in end of semester grades. Students who reported higher performance-approach goals and lower approval goals had higher semester grades. The finding that there was no relationship between learning goals and the achievement measures was disappointing as one would like there to be some correlation between the achievement measures used by teachers to evaluate student learning and what motivates students to want to acquire and understand new knowledge. Weak or non-significant correlations between achievement and learning goal, as well as non-significant ß when learning goal is entered into regression models with other motivation variables are not unusual in studies of adolescents (e.g. Anderman & Anderman, 1999; Meece et al. 1988; Roeser et al. 1996; Ryan et al. 1997; Urdan et al. 1997). influence should also be considered.

This study adds to the evidence that adolescents who believe they are valued and respected members of the learning community are more likely to engage in behaviors that support learning. In the current study this includes the pursuit of learning goals, performance-approach goals, responsibility goals, and affiliation goals to work with others because it's enjoyable. In contrast, when adolescents perceived that members of the classroom devalued learning they

were likely to exhibit maladpative behaviors. In these situations students pursued performance-avoidance goal, and approval goals to not do class work to fit in with other class members.

This study also considered the relationship of best friends to explaining adolescents' motivation in science class. Of particular importance in this study was the positive relationship between the characteristics and social support of best friends and an adapative pattern of motivation. Adolescents who had a best friend that valued academics and was supportive were likely to pursue learning goals and responsibility goals. Also of importance was the role that having a quality best friendship with a student who valued learning had on minimizing the negative motivational impact of being in a classroom where it was perceived that students did not care about learning.

Due to the exploratory nature of this study a large number of relationships were explored resulting in a high number of test. Because of the heightened potential for Type 1 errors, findings should be interpreted with caution. The generalizability of this study is limited to secondary science classrooms in large urban schools. Additionally, the results of this study are applicable only for classrooms where students work together on a regular basis during class. Measures asked students to report their perceptions of others' behaviors and may not reflect what an outside observer or the teacher believes to be occurring.

Future studies should consider the contribution of peers and teachers to adolescents' motivation during class. Do teachers and peers account for unique variance in students' motivation as suggested by Wentzel's (1998) study, do teachers mediate the relationship between peers and motivation and/or do

peers mediate the relationship between teachers and students motivation. The use of longitudinal designs to investigate developmental changes in peer influence on student motivation as well as changes in motivation that occur over the school year that may be the result of peer influence. Longitudinal designs can also be used to investigate changes in motivation across the transition from middle school to high school that might be caused by changes in social status, discontinuation of friendships, and fewer opportunities to socialize.

Future studies need to explore differences that might arise due to gender, instructional practices, having a best friend in class, having a best friend at school, and social status. Studies should also investigate the relationship of other peer groups such as cliques, crowds, athletic teams, and clubs to explaining students' classroom motivation. Studies should consider the relationship of parents' attitudes toward school, beliefs about the importance of learning, and beliefs about reasons for learning to students' classroom motivation as well as their relationship with the characteristics and social support of friends.

For the motivation researcher this study suggest that it is important to remember that peer influence arises from a variety of contexts and that measures of peer support and peer characteristics should move beyond a generalized friend or peer and reflect distinct peer interactions. Researchers should also keep in mind that both the quality of peer relationships and the characteristics of peers are likely to influence students' classroom motivation. Finally, I think it is important that researchers continue to investigate social reasons for why students do or do not engage in classroom activities to further clarify when peers are likely to have a positive impact on adolescents' motivation to learn.

For teachers the findings of the current study points to the potentially damaging influence to motivation that can occur when students are permitted to make fun of and harass classmates who care about their class work. As part of their classroom management teachers should make an effort to prevent students from publicly chastising classmates for doing their work. This study also points to the need for students to believe they are valued by other students in of the class. In addition to academics outcomes classroom activities should also have the building of quality social relationships as a desired outcome. Finally, it appears that when adolescents perceive their classmates to be actively involved in the learning process they are more likely to pursue doing learning goals. Once again teachers play a prominent role through developing and delivering engaging instruction and through practicing effective classroom management.

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Appendices

Appendix A

Scales

Classmates' Involvement

1. Most students in this class daydream.

2. Most students in this class put a lot of energy into their schoolwork..

3 A lot of students in this class "clockwatch".

4. Most students in this class really pay attention to what the teacher is saying.

5. Very few students in this class take part in class discussions.

6. A lot of students pass notes during this class.

7. Most students in this class participate during lab activities.

8. A lot of students seem to be only half-awake during this class.

Classmates' Negative Orientation Toward Learning

1. A lot of students in this class tease students who do their homework.

2. A lot of students in this class won't work with students who study.

3. A lot of the students in this class make fun of students who are concerned about grades.

4. A lot of students in this class don't really care about school.

5. A lot of students in this class don't like to be around students who work hard in school.

Classmates' Social Support

1. Other students in this class notice when I'm good at something.

2. It is hard for people like me to be accepted by the other students in this class.

3. Other students in this class take my opinions seriously.

4. Other students in this class make me feel as if I don't belong here.

5. There's at least one student in this class I can talk to if I have a problem.

6. Other students in this class are friendly to me.

7. Students in this class are not interest in people like me.

8. I am included by other students in class activities.

9. I feel very different from most other students in this class.

10. I can really be myself around the other students in this class

11. The other students in this class respect me.

12. Other students in this class know I can do good work.

13. Because of the way other students in this class treat me I wish I were in a different class.

14. Other students in this class like me the way I am.

Best Friend's Academic Valuing

1. My best friend feels like the things he/she does in school are a waste of time.

2. My best friend thinks that most of the things he/she learns in class are useless.

3. My best friend thinks he/she can get a good job even if his/her grades are bad.

4. My best friend believes that school is more important than most people think.

5. My best friend thinks that what he/she does in school will be useful for getting a job.

6. My best friend believes that it would be a mistake to drop out of school

7. School is important in the life of my best friend.

Best Friend's Negative Orientation Toward Learning

1. My best friend teases kids who do their homework.

2. My best friend doesn't like to hang out with kids who study.

3. My best friend makes fun of kids who are concerned about grades.

4. My best friend doesn't really care about school.

5. My best friend doesn't like to be around students who work hard in school.

Best Friend's Social Support

1. If I forgot my lunch or needed a little money, my best friend would loan it to me.

2. My best friend helps me when I am having trouble with something.

3. My best friend would help me if I needed it.

4. If other kids were bothering me my best friend would help me.

5. My best friend would stick up for me if another kid was causing me trouble.

6. If I have a problem at school or at home, I can talk to my best friend about it.

7. If there is something bothering me, I can tell my best friend about it even if it is something I cannot tell to other people.

8. If I said I was sorry after I had a fight with my best friend, he/she would still stay mad at me.

9. If my best friend or I do something that bothers the other one of us, we can make up easily.

10. If my best friend and I have a fight or argument, we can say 'I'm sorry' and everything will be all right.

11. If my best friend had to move away, I would miss him/her.

12. I feel happy when I am with my best friend.

13. I think about my best friend even when my best friend is not around.

14. When I do a good job at something, my best friend is happy for me.

15. My best friend does things for me, or makes me feel special.

Learning Goals

1. I do the work in this class because I want to understand the concepts

2. I do the work in this class because I like learning new ideas.

3. I do the work in this class because I like the challenge of learning new things.

4. I do the work in this class because I like to understand what I am learning.

5. I do the work in this class because I like to acquire new knowledge.

Performance-Approach Goals

1. I do the work in this class because I like to get better grades than other students.

2. I do the work in this class because I like to look capable to other students.

3. I do the work in this class because I like others to think I'm smart.

4. I do the work in this class because I want to show that I know more than my classmates.

5. I do the work in this class because I want to show that I understand the material being studied.

Performance-Avoidance Goals

1. I do the work in this class because I don't want to look stupid to my classmates.

2. I do the work in this class because I don't want others to think I know less than they do

3. I do the work in this class because I don't want to get lower grades than other students.

4. I do the work in this class because others might think I'm not very smart.

5. I do the work in this class so my classmates won't think I don't understand.

Perceived Ability

1. Compared to other students in this class I don't know very much about science.

2. I understand the ideas being taught in this class.

3. I am doing well in this class compared to others.

4. My science skills are better than those of other students in this class.

5. I expect to do well in this science class.

6. I don't understand ideas in this class very well

7. I can do the work in this class.

8. I think I am better at science than most students in this class.

Social Responsibility Goals

1. I do the work in this class because that is what the teacher asks me to do.

2. I do the work in this class because that is what you are expected to do at school.

3. I do the work in this class because its important to me to do what's right.

4. I don't goof-off in this class because you're not supposed to.

5. I do the work in this class because that is the responsible thing to do.

Social Affiliation Goals

1. I work with other students in this class because I want to make friends with them.

2. I work with other students in this class because it's fun to talk with them.

3. I don't work with other students in this class because I'm afraid they won't like me.

4. I work with other students in this class because I want to be a part of what they are doing.

5. I work with other students in this class because I enjoy being around them.

Social Approval Goals

11. I let my work in this class slip in order to be popular with other students in this class.

12. I don't act as smart as I really am in this class so I will be liked by other students in this class.

13. I don't finish all my work in this class so that I will fit in with other students in this class.

14. I get a lower grade in this class so that other students in this class won't make fun of me.

Appendix B

<u>Questionnaire: Learning in Science Class</u>

Part 1 - Directions: Write the initials of your closest best friend in the blank _____.

Below are statements of things friends might do or think. Read each statement and indicate whether you agree that the best friend you named above is like this. Please answer honestly.

Strongly Disagree -- **Strongly Agree**
           1   **5**

1. My best friend teases kids who do their homework.................................1 2 3 4 5

2. My best friend helps me when I am having trouble with
   something 1 2 3 4 5

3. My best friend believes that it would be a mistake to
   drop out of school..1 2 3 4 5

4. My best friend would stick up for me if another kid was causing
   me trouble. 1 2 3 4 5

5. My best friend doesn't like to be around students who
   work hard in school..1 2 3 4 5

6. Sometimes my best friend does things for me, or makes
   me feel special 1 2 3 4 5

7. My best friend thinks that what he/she does in school
   will be useful for getting a job 1 2 3 4 5

8. If I forgot my lunch or needed a little money, my best
   friend would loan it to me. 1 2 3 4 5

9. My best friend feels like the things he/she does in
   school are a waste of time 1 2 3 4 5

10. My best friend would help me if I needed it...1 2 3 4 5

11. If my best friend had to move away, I would miss
    him/her...1 2 3 4 5

12. My best friend doesn't really care about school 1 2 3 4 5

13. If other kids were bothering me my best friend would
    help me..1 2 3 4 5

14. School is important in the life of my best friend..........1 2 3 4 5

15. If I have a problem at school or at home, I can talk to
    my best friend about it..........1 2 3 4 5

16. My best friend makes fun of kids who are concerned
    about grades..........1 2 3 4 5

17. If there is something bothering me, I can tell my best
    friend about it even if it is something I cannot tell to
    other people 1 2 3 4 5

18. My best friend thinks that most of the things he/she
    learns in class are useless..........1 2 3 4 5

19. When I do a good job at something, my best friend is
    happy for me..........1 2 3 4 5

20. If I said I was sorry after I had a fight with my best
    friend, he/she would still stay mad at me..........1 2 3 4 5

21. My best friend doesn't like to hang out with kids who
    study 1 2 3 4 5

22. I think about my best friend even when my best friend
    is not around..........1 2 3 4 5

23. If my best friend and I have a fight or argument, we can
    say 'I'm sorry' and everything will be alright..........1 2 3 4 5

24. My best friend thinks he/she can get a good job even if
    his/her grades are bad..........1 2 3 4 5

25. If my best friend or I do something that bothers the
    other one of us, we can make up easily..........1 2 3 4 5

26. My best friend believes that school is more important
    than most people think 1 2 3 4 5

27. I feel happy when I am with my best friend..........1 2 3 4 5

Part 2 - Directions: Below are statements that represent reasons students might have for doing their work during science class. Read each statement and indicate whether you agree that it is one of your reasons for doing the work in this class. Please answer honestly.

Strongly Disagree --- Strongly Agree
1   5

1. I do the work in this class because I want to understand the concepts.........1 2 3 4 5

2. I do the work in this class because I like to get better grades than others...1 2 3 4 5

3. I think I am better at science than most students in this class.....................1 2 3 4 5

4. I do the work in this class because that is what the teacher asks me to do..1 2 3 4 5

5. I let my work slip in order to be popular with other students in this class...1 2 3 4 5

6. I do the work in this class so others won't think I don't understand...........1 2 3 4 5

7. I work with other students in this class because I want to be a part of what they are doing..1 2 3 4 5

8. I do the work in this class because I like to acquire new knowledge..............1 2 3 4 5

9. I do the work in this class because I don't want others to think I know less than they do 1 2 3 4 5

10. I can do the work in this class..1 2 3 4 5

11. I do the work in this class because that is the responsible thing to do..........1 2 3 4 5

12. I do the work in this class because I like to look capable to others..............1 2 3 4 5

13. I work with other students in this class because I want to make friends with them 1 2 3 4 5

14. I do the work in this class because I like to understand what I am learning 1 2 3 4 5

15. I don't act as smart as I really am so I will be liked by other students in this class...1 2 3 4 5

16. Compared to other students in this class I don't know very much about science 1 2 3 4 5

17. I work with other students in this class because I enjoy being around them...1 2 3 4 5

18. I do the work in this class because I like others to think I'm smart...............1 2 3 4 5

19. I understand the ideas being taught in this class..1 2 3 4 5

20. I do the work in this class because that is what you are expected to do at school 1 2 3 4 5

21. I do the work in this class because I don't want to get lower grades than others...1 2 3 4 5

22 I work with other students in this class because it's fun to talk with them...1 2 3 4 5

23. I expect to do well in this science class...1 2 3 4 5

24. I do the work in this class its important to me to do what's right.................1 2 3 4 5

25. I don't finish all my work so that I will fit in with other students in this class...1 2 3 4 5

26. I do the work in this class because I like the challenge of learning new things...1 2 3 4 5

27. I do the work in this class because I want to show that I know more than others...1 2 3 4 5
28. I don't understand ideas in this class very well..1 2 3 4 5

29. I don't work with others in this class because I'm afraid they won't like me. 1 2 3 4 5

30. I do the work in this class because others might think I'm not very smart...1 2 3 4 5

31. My science skills are better than those of other students in this class..........1 2 3 4 5

32. I do the work in this class because you're not supposed to goof-off............1 2 3 4 5

33. I do the work in this class because I want to show that I understand
the material being studied..1 2 3 4 5

34. I do the work in this class because I like learning new ideas.........................1 2 3 4 5

35. I am doing well in this class compared to others..1 2 3 4 5

36. I do the work in this class because I don't want to look stupid others..........1 2 3 4 5

37. I get a lower grade so that other students in this class won't make fun
of me...1 2 3 4 5

****

Part 3 - Directions: Below are statements of things students might do in this class or ways that students might act during class. Read each statement and indicate whether you agree that students are like this in this class. Please answer honestly.

Strongly Disagree --**Strongly Agree**
       1   **5**

38. Most students in this class daydream...1 2 3 4 5

39. Other students in this class notice when I'm good at something....................1 2 3 4 5

40. A lot of students in this class tease students who do their
homework...1 2 3 4 5

41. It is hard for people like me to be accepted by the other students in
this class..1 2 3 4 5

42. Other students in this class like me the way I am...1 2 3 4 5

43. A lot of students seem to be only half-awake during this class.....................1 2 3 4 5

44. I am included by other students in class activities...1 2 3 4 5

45. A lot of students in this class won't hang out with students who
study 1 2 3 4 5

46. Other students in this class take my opinions seriously 1 2 3 4 5

47. A lot of students in this class "clockwatch" 1 2 3 4 5

48. Sometimes other students in this class make me feel as if I don't
belong here..1 2 3 4 5

49. A lot of the students in this class make fun of students who are
concerned about grades..1 2 3 4 5

50. Other students in this class are friendly to me...............................1 2 3 4 5

51. I feel very different from most other students in this class 1 2 3 4 5

52. Very few students in this class take part in class discussions.........1 2 3 4 5

53. Because of the way other students in this class treat me, I wish I
was in a different science class...1 2 3 4 5

54. There's at least one student in this class I can talk to if I have a
problem 1 2 3 4 5

55. Most students in this class put a lot of energy into their school
work 1 2 3 4 5

56. Other students in this class know I can do good work 1 2 3 4 5

57. Most students in this class really pay attention to what the teacher
is saying..1 2 3 4 5

58. A lot of students pass notes during this class..................................1 2 3 4 5

59. I can really be myself around the other students in this class.........1 2 3 4 5

60. A lot of students in this class don't like to be around students who
work hard in school..1 2 3 4 5

61. Most students in this class participate during lab activities............1 2 3 4 5

62. The other students in this class respect me 1 2 3 4 5

63. A lot of students in this class don't really care about school 1 2 3 4 5

64. Students in this class are not interested in people like me 1 2 3 4 5

Directions – Part 4: The items below ask a few things about you. For each one please circle the choice that describes you.

1. **Gender:**

   Male   Female

2. **Grade level:**

   6th grader   7th grader   8th grader

3. **Age:**

   10   11   12   13   14

4. **Ethnicity:**

   Asian   Black   Caucasian   Hispanic   Native American

   Other_____

5. **Does your best friend go to this school?**

   Yes   No

6. **Is your best friend in this class?**

   Yes   No