# ABSTRACT

Title of dissertation: SUPPORTS FROM FRIENDS AS PREDICTORS OF STRESS AND SCHOOL OUTCOMES DURING THE TRANSITION TO COLLEGE: A LONGITUDINAL STUDY

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This study investigated relations among support from friends, stress, friendship goals, and school-related outcomes during the transition from high school to college. A conceptual framework was developed to examine a) the extent to which the degree of context change during the transition predicts levels of school belongingness and GPA; b) the extent to which stress mediates the potential relation between context change and school-related outcomes; c) the extent to which social supports from high school friends

and college friends moderate the relation between stress and school related outcomes; and d) the extent to which precollege friendship formation and maintenance goals predict future levels of support from high school friends and college friends.

Data were collected at four time points that represent major milestones in the transition process: (T1) precollege, (T2) the beginning of the first semester, (T3) the end of the first semester, and (T4) the beginning of the second semester. Psychometric properties of the support scales were investigated through confirmatory factor analysis. Descriptive statistics and results regarding mean variable change over time are provided.

Multiple regression analyses replicated previous findings that stress negatively predicts school belongingness over time. Furthermore, perceived supports from college friends predicted increased college belonging over time, while perceived supports from high school friends did not. None of the support by stress interaction terms significantly predicted school outcomes, indicating that evidence for a moderation pathway was not found. Results from a latent variable path analysis did not provide evidence that a precollege goal to form friendships predicts future support from college friends, nor that a precollege goal to maintain friendships positively predicts future support from high school friends; models had only borderline fit. Implications and directions for future research are discussed.

# SUPPORTS FROM FRIENDS AS PREDICTORS OF STRESS AND SCHOOL OUTCOMES DURING THE TRANSITION TO COLLEGE: A LONGITUDINAL ANALYSIS

By

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Dissertation submitted to the Faculty of the Graduate School of the
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**Dedication**

To my parents, Carol and Thomas Donlan,
who taught me to ask good questions.

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## Chapter 1: Supports from Friends, Stress, and the College Transition

### Introduction

School transitions contain risk for negative changes in students' academic, social, and psychological outcomes (Blyth, Simmons, & Carlton-Ford, 1983; Bronfenbrenner, 1989; Eccles, Lord, & Midgley, 1991; Hardy, Bukowski, & Sippola, 2002; Newman, Newman, Griffen, O'Connor, & Spas, 2007; Roderick, 1995; Seidman, Aber, Allen, & French, 1996; Simmons & Blyth, 1987; Wigfield, Eccles, Mac Iver, Reuman, & Midgley, 1991). Previous research has documented significant decreases in GPA (Barber & Olsen, 2004; Blyth, Simmons, & Bush, 1978; Benner & Graham, 2009), school engagement (Blyth, Simmons, & Bush, 1978; Finn & Rock, 1997), and self-esteem (Blyth, Simmons, & Bush, 1978; Fenzel, 2000; Finn & Rock, 1997; Hirsch & Rapkin, 1987; Wigfield et al., 1991), as well as increases in psychological symptoms such as depression (Barber & Olsen, 2004; Hirsch & Rapkin, 1987), loneliness (Benner & Graham, 2009), anxiety (Benner & Graham, 2009; Hirsch & Rapkin, 1987), and stress (Fenzel, 2000; Rudolph, Lambert, Clark, & Kurlakowsky, 2001).

Although the reasons for these changes are not well understood, models of person-environment fit raise the possibility that the context of the new school may not fit the personal or developmental needs of the student (Bronfenbrenner, 1989; Eccles et al., 1991). Specifically, lack of essential supports (e.g., emotional, instrumental, informational, and companionate) can make transitions stressful and more difficult for some students. Supporting this notion is evidence that transitions are more successful if students make them with friends (Aikins, Bierman, & Parker, 2005;

Hirsch & DuBois, 1992; Kingery & Erdley, 2007; Newman et al., 2007; Swenson, Nordstrom, & Hiester, 2008).

Over the last several decades, researchers investigating school transitions have found that students who have access to social supports have higher rates of academic and social success in their new school contexts (Aikins, Bierman, & Parker, 2005; Barone, Aguirre-Deandreis, & Trickett, 1991; Berndt, Hawkins, & Jiao, 1999, Levitt et al., 2005; Yamamoto & Ishii, 1995; Parade, Leerkes, & Blankson, 2010). While most of the research on school transitions has focused on younger children, it is reasonable to speculate that college freshmen experience similar challenges in their new school contexts. Indeed, to succeed in college, students need to feel secure enough and supported enough to explore their colleges' academic and social environments (Bohnert, Aikins, & Edidin, 2007; Swenson, Nordstrom, & Hiester, 2008; Wintre & Bowers, 2007). The first semester of college can set the stage for a student's enjoyment of college, as well as her sense of belongingness within the college community.

This chapter will include a concise overview of the literature describing how support from friends and social goals affect stress and school-related outcomes during school transitions, with particular emphasis on the transition from high school to college. I will present a conceptual model that has emerged from research and theory on these constructs. Briefly, school transitions have been strongly related to stress and decreases in school-related outcomes; social support has been shown to moderate individuals' experience of stress; social goals have been predictive of future behavior.

**Transition Context**

In the model developed for this study (see Figure 1), there is a direct path between a change in school context and student stress. This path is moderated by support from friends, such that transitions are perceived as less stressful under conditions of high support. A school transition is defined as any time a student changes from one school to another in the course of typical educational advancement, for example, when a rising sixth grader transitions from her elementary school to a new middle school. Depending on the stage-environment fit between the student and her new school, she may experience high levels of stress and a disruption in school-related outcomes while she adjusts to her new surroundings (Eccles, et al., 1991).

In previous research, change in school context has been predictive of increases in stress (Barber & Olsen, 2004; Brenner & Graham, 2009; Simmons & Blyth, 1987) and decreases in school outcomes including grades (Barone, Aguirre-Deandreis, & Trickett, 1991; Simmons & Blyth, 1987) and school belongingness (Simmons & Blyth, 1987). While the literature has focused mainly on the transition to middle school, a handful of studies have noted some of the same patterns during the transition to college (Kerr, Johnson, Gans, & Krumine, 2004; Larose, Bernier, & Tarabulsy, 2005).

In their work on the elementary-to-middle-school transition, Eccles et al. (1991) argue the mismatch between students' developmental needs and the affordances and demands of their new schools explains why so many students experience declines in grades and school belongingness. In particular, Eccles notes that compared to elementary schools, middle schools are larger, more

departmentalized, have different rules, value grades more than effort, and expose students to a larger, unfamiliar peer group. Students entering middle school typically also experience the onset of puberty, a profound developmental change. Simmons and Blyth (1987) found that incoming middle school students who face more than one transition at a time experience lower school outcomes than students who face the same number of transitions one at a time.

Students transitioning from high school to college experience a similar disruption as these younger students, though the college transition has been the focus of less theoretical application. The same contextual changes that Eccles et al. (1991) observed in middle school transitions (i.e., school size, departmentalization, new structure, strict expectations, new peer group, developmental change) also apply in college transitions. Colleges are typically much larger than high schools, even more departmentalized - frequently a student's teachers are not located in the same building, and do not communicate with each other - and place an even greater emphasis on academic achievement over effort. Students typically are surrounded by new peers, particularly if they attend a college far from home.

Finally, students entering college undergo a developmental change: the end of adolescence and the beginning of adulthood. This period of transition to adulthood has also been referred to as emerging adulthood (Arnett, 2000). In the last decade, emerging adulthood has been viewed as a socially constructed developmental period specific to cultures that allow for extended periods of identity development, and separate from adolescence and adulthood. Emerging adults are between the ages of 18 and 30. At least within a college-going population, this period of life is typified by

deep identity exploration, transitory lives, delay of marriage and childbirth, and a shift of support from parents to friends and romantic partners (Barry, Madsen, Nelson, Carroll, & Badger, 2009; Tanner, 2006). The contextual and developmental similarities between adolescents' transition to middle school, and emerging adults' transition to college are striking. The developmental mismatch between a new college freshman and her school environment provides a useful theoretical framework to guide future research. In the current study, I use stage-environment fit theory to guide my thinking on declines in grades and school belongingness among college freshmen.

Transitions occur over time and meaningful research requires multiple measurements of student outcomes, for example before, during and after the transition. School transition research typically uses short-term longitudinal design and follows students from the period immediately before and after a transition (Kingery & Erdley, 2007; Rudolph, et al., 2001). For example, studies on the transition from high school to college often examine students during the first week of college and again at the end of the first semester (Bohnert, Aikins, & Edidin, 2007; Mounts, Valentiner, Anderson, & Boswell, 2006; Parade, Leerkes, & Blankson, 2010; Paul & Brier, 2001).

**Friendship**

For this study, a friend is defined as someone with whom a person has a positive relationship that fulfills social support goals and relieves distress (Bukowski, Motzoi, & Meyer, 2009). Friends can be more or less close to each other, depending on time spent together, proximity (Epstein, 1989), shared interests, and

communication (Gottman, 1983). Friendships develop over time, and acquaintances may eventually become the best of friends (Aboud, & Mendelson, 1996; Berndt & McCandless, 2009). Students who transition into new schools with friends, or who are able to quickly make new friends, tend to have better outcomes than those without friends (Kingery & Erdley, 2007; Mounts, Valentiner, Anderson, & Boswell, 2006; Newman, Newman, Griffen, O'Connor, & Spas, 2007; Swenson, Nordstron, & Hiester, 2008; Yamamoto & Ishii, 1995). Previous research on adolescents and emerging adults has found that high quality, stable friendships predict positive outcomes, including better school belongingness and academic engagement (Kingery & Erdley, 2007; Ladd, Kochenderfer, & Coleman, 1996; Wentzel, 2009), and reduced anxiety, loneliness and depression (Barone, Aguirre-Deandreis & Trickett, 1991; Ladd, et al., 1996; Newman, et al., 2007).

**Stress**

Even if students have close friends, school transitions are predictive of increased student stress (Brenner & Graham, 2009; Kerr et al., 2004; Rudolph et al., 2001; Seidman et al., 1994). The current study tests whether stress mediates the relationship between school transitions and school-related outcomes. Previous research has related stress and internalizing behaviors to negative school outcomes, such as decreased grades (Kerr et al, 2004; Pritchard & Wilson, 2003) and decreased school belongingness (Pittman & Richmond, 2009). Moreover, social support has been shown to moderate an individual's experience of stress, such that high social support provides a buffer against the experience of stress. Stress is a negative psychological outcome that occurs when a person is threatened and is unable to cope

effectively (Cohen & Wills, 1985). Stress induces elevated physiological states and continuous stress over time predicts physical harm. People who are stressed tend to be irritable, agitated, and strained. Cohen and Wills (1985) present an explanation of the moderating effect of social support upon the relationship between context and stress. The authors contend that social support provides appropriate coping mechanisms (e.g., through emotional support or companionship) or a solution that eliminates the effect of the stressful threat (e.g., through instrumental or informational support) (Cohen & Wills, 1985).

During the transition from high school to college, students often experience stress in response to a variety of changes in environment (Eccles, et al., 1991; Cohen & Wills, 1985). College students navigate new academic and social demands with less structure and adult support than they received in high school (Eccles, et al., 1991), which will likely increase stress. Social support can provide a buffer against the stress of the college transition (Cohen & Wills, 1985).

**Social support**

Social support has been strongly related to decreases in stress (Baumeister & Leary, 1995; Cohen & Wills, 1985), however, not all sources of support are equally beneficial at different stages of development. Attachment theory provides a relevant framework for understanding developmental changes in sources of support. (Bowlby, 1969; Ainsworth et al, 1978). Attachment research demonstrates that infants form a tight bond with supportive parents, who provide them with a secure base where they can feel safe and nurtured. Parents typically serve as a secure base throughout their children's development into adolescence. Emerging adults undergo a secure base shift

(Armsden & Greenberg, 1987; Tanner, 2006) wherein friends become more salient sources of support and security than parents. Support from friends therefore should allow students to more comfortably explore their new school environments.

Friends provide each other with emotional, informational, instrumental, and companionate support. Cohen and Wills (1985) identified these supports as the more relevant for stress relief (though they refer to emotional support as esteem support). The support literature shows that these four provide different benefits to the recipient, and should not be aggregated (Malecki & Demaray, 2003; Winemiller, Mitchell, Sutliff, & Cline, 1993). The current study examines the four dimensions of social support and evaluates the extent to which these dimensions moderate the relationship between context change and stress. The four dimensions of support are used as separate predictors, so each dimension's influence can be assessed independently. Definitions and related criterion for each dimension of social support are provided at the end of this chapter.

Even among friends, some relationships are more protective against stress than others. In their explanation of the belongingness hypothesis, Baumeister and Leary (1995) provide evidence that relationships that are emotionally supportive and physically proximal are the most beneficial in terms of stress relief. Moreover, the authors suggest that relying on friends who provide social support but are physically distant or friends who are close at hand but unsupportive would predict high stress.

Different friendships are likely to provide different types of support and are likely differently related to stress reduction (Donlan & Wentzel, 2011). Depending on the type of support that a student needs, either college friends or high school

friends will be more relevant. For example, if a college student needs information about class or schoolwork, she will most likely turn to a college friend for informational support. However, if at the beginning of the year a college student does not feel close with new college friends, she is more likely to turn to high school friends for intimate communication or emotional support. This differentiation between types of support and relevant sources has not been studied in the college transition literature. In light of this gap, the current study evaluates social support from high school friends and college friends independently throughout the college transition.

**School-Related Outcomes**

In previous research, the change from one school to another has predicted a sudden decline in grades and school belongingness as students adjust to their new surroundings (Larose et al., 2005; Simmons & Blyth, 1987). The current project measures changes in these two outcomes. Grades are a common measure of academic competency. In the college context, students usually are required to maintain a specific grade point average to remain an active student, and to graduate. A decrease in grades during college would likely predict an increase in dropout risk. School belongingness is defined as "the extent to which students feel personally accepted, respected, included, and supported by others in the school social environment" (Goodenow, 1993, p. 80). Within the college context, school belongingness incorporates the entire university environment, including classrooms, extracurricular activities, and campus housing.

Students in transition report that they feel more anonymous in, and disconnected from their new school environment (Simmons & Blyth, 1987). Typically a student's college is much larger than her high school and it takes time for her to explore this unfamiliar setting. School belongingness is an important factor in school success and retention because it predicts higher academic motivation (Goodenow, 1993), grades (Pittman & Richmond, 2007), and healthier psychological well-being (Pittman & Richmond, 2008).

**Friendship formation and maintenance goals**

A part of the model shown in Figure 1 depicts a direct path between friendship goals and social support. Goals are defined as "those things that an individual would like to achieve or accomplish in a given situation" (Wentzel, 1994, p. 173). Several researchers have explored students' social goals (Anderman & Anderman, 1999; Erdley & Asher, 1999; Rose & Asher, 2004; Ryan & Shim, 2008; Wentzel, 1994), and found that what a student wants to do directly predicts her social behavior. Social goals have been studied in terms of social status goals (Anderman & Anerman, 1999), prosocial goals (Rose & Asher, 2004; Wentzel et al., 2010), and conflict resolution goals (Chung & Asher, 1996). However, few researchers have studied friendship formation and maintenance goals, particularly among adolescents and emerging adults. One notable exception is the work of Slotter and Gardner (2011) who found that students tend to select friends who help us fulfill our goals. Specifically, we select friends who help us become who we want to be in the future.

Other previous research has focused on precollege concerns regarding friendship (Belle & Paul, 1989; Paul & Brier, 2001) instead of goals. This work

supports predictions of the belongingness hypothesis (Baumeister & Leary, 1995): students who are overly concerned with maintaining precollege friendships are at higher risk for loneliness, and low self-esteem in college, as compared to students who are more concerned with making new friends on campus (Paul & Brier, 2001).

To meet one or more of their support or relatedness needs (Deci & Ryan, 2000), students with friendship formation goals seek out new peers, and students with friendship maintenance goals emphasize and focus on the friends they already have. New college freshmen typically make friends with proximal peers on campus through dorm life, classes, and campus activities such as sports, music ensembles, and academic clubs. New college students generally also want to maintain their intimate precollege friendships (Baumeister & Leary, 1995) often through regular communication and visits.

The two goals are not mutually exclusive, and many students may want to both form new friendships and maintain precollege friendships. Further, some students may not value either goal. Although college students' friendship formation and friendship maintenance goals have not been previously studied, it is reasonable to speculate that friendship maintenance goals would predict support from high school friends, and friendship formation goals would predict support from college friends. The current study tests this predictive relationship.

Students' motivation for accessing support from friends can be explained by humans' fundamental need for support (Baumeister & Leary, 1995; Deci & Ryan, 2000). McClelland's (1987) work identifies affiliation as an implicit motivation. That is, on an unconscious and primal level, humans are concerned with maintenance,

formation, or restoration of positive affective relationships with other people (Heyns, Veroff, & Atkinson, 1958; Koestner & McClelland, 1992). Using empirical evidence, McClelland argues that affiliative motivation influence is strong because it connects to primary emotions such as happiness and feeling loved (McClelland, 1987; Zurbiggen, 2002).

**Summary**

Transitioning students have more academic and social success in college if they feel supported. Due to the secure base shift that occurs during adolescence and emerging adulthood, friends become the most relevant source of support. Support from high school and college friends likely provides a buffer against the stress associated with the changing transition context. In turn, students who are less stressed will likely have better school-related outcomes such as higher grades and a feeling of campus belongingness. Students' goals to form new friendships and maintain precollege friendships likely predict the amount of supported garnered by college friends and high school friends.

Among the gaps in the literature on social support during the transition to college, is the application of the developmental mismatch framework to study the college transition. Furthermore, to my knowledge no study of the college transition has differentiated between dimensions of support (i.e., emotional, informational, instrumental, and companionate) and the potential mediation role of stress on the relation between change in school context and school-related outcomes (i.e., grades, and belongingness).

While a few studies have documented the shift in support from high school friends to college friends over the first semester (Oswald & Clark, 2003; Swenson, et al., 2008), this finding should be replicated for further validation. In the current study, the support-shift finding is extended with a formal test of moderation, comparing the stress-buffering effects of high school supports and college supports. Finally, no research has tested if friendship maintenance or formation goals predict perceptions that high school or college friends are supportive.

In light of these gaps, the current study extends the research on social support during the transition from high school to college. First, a conceptual model based on theory and previous research frames a longitudinal investigation of the transition context, support from friends, stress, school outcomes, and friendship goals (see Figure 1). Second, stress is tested as a potential mediator between context change and school-related outcomes. Third, the role of multiple dimensions of social support from both high school and college friends is explored as moderators of stress.

Specifically, I test whether emotional, informational, instrumental, and companionate support from high school and college friends differentially moderates stress during the college transition. Finally, the predictive power of friendship maintenance and formation goals on high school and college support is assessed.

## Current Study

The study tests the following pathways (see Figure 1): the context change predicting stress pathway (path a); the context change predicting school outcomes pathway (path b); the mediation pathway of stress on the relationship between

transitional context and school outcomes (paths a, b, b', c); the moderation pathway of college-friend support on the relationship between context change and stress (paths a, d); the moderation pathway of high-school-friend support on the relationship between context change and stress (paths a, e); the friend formation goals predicting college-friend-support pathway (path f); and the friend maintenance goals predicting high-school-friend support pathway (path g).

In the current study, I assess student supports and outcomes at four time points: the summer before college entry, the first week of the fall semester, the last week of the fall semester, and the first week of the spring semester. Assessments include evaluations of students' perceived context change, stress, school-related outcomes, and friendships. Of these four, friendships provide the social support necessary to alleviate stress, improve school-related outcomes and help students adapt to their new context (see Figure 1).

**Sample**

One hundred and seventy-two incoming freshmen at the University of Maryland participated in the study. Participants were identified in the spring of their senior year of high school through their acceptance into the Gemstone Program at the University of Maryland. Gemstone is a multidisciplinary program at the University of Maryland that offers students a unique opportunity to participate in a four-year team research project with a faculty advisor. During the first year of the program, Gemstone students learn basic research skills as they acclimate to college. At the end of the first year, they select teams and project topics ranging from researching bilingual grammar acquisition to the developing technologies to help the blind.

Gemstone admittance requires high levels of academic achievement, determined by high school grades and SAT scores. Students must be admitted into the honors program before they are considered for Gemstone.

**Design**

The current study features a correlational, longitudinal design to assess the role of friendship and stress during the college transition. As described in figure 1, students reported on the degree of context change they experienced during the transition from high school to college, i.e., how different they found college life from high school life. Then where applicable a subset of constructs (i.e., stress, school-related outcomes, support from high school friends, support from college friends, friendship formation goals, friendship maintenance goals) was measured within a month before college entry (T1); the beginning of the first semester (T2); the end of the first semester (T3); and the beginning of the second semester (T4).

**Measurement Strategy**

Each of the constructs was assessed longitudinally through self-report. Students' transition context change and friendship goals were assessed during the summer before college entry (T1) only. Because participants were unable to rate their college friendships before college entry, support from college friends was assessed at each college time point (T2, T3, T4). Stress and support from high school friends was assessed at every time point (T1, T2, T3, T4). Students also nominated the peers from high school and college whom they consider to be their closest friends. Adolescents typically cluster in cliques of three to five friends (Brown & Klute, 2003). During adolescence, friendships become more intimate and provide

emotional, instrumental, informational, and companionate support (Cantin & Boivin, 2004). The current study asks each college freshman to list up to five close high school friends and five close college friends and rate each friend on received support across these four dimensions.

To strengthen the argument for data validity, upperclassmen section leaders were also asked to report on participants' apparent stress levels. Section leaders teach the classes during which data collection will take place (Gems 100 and Gems 102). Section leaders interact with Gemstone freshmen on a regular basis.

**Research questions and predictions.**

The conceptual model was used to generate the following research questions. They adhere to the pathways shown in Figure 1.

1. To what extent does the change in context as assessed prior to entering college during the college transition predict school-related outcomes at the beginning of the second semester of college? The analyses controlled for gender and race. I predicted that the degree of context change would explain a significant amount of the variance in students' school related-outcomes. Specifically, I expected that high context change between high school and college would negatively predict grades and school belongingness at the beginning of the second semester of college.

2. To what extent do levels of stress prior to college entry, the beginning of the first semester, and the end of the first semester mediate the relationship between the change in context and school outcomes at the beginning of the second semester during the transition to college? In pursuit of this question, I also assessed the extent to which context change during the college transition predicts stress. These analyses

control for gender and race. I expected context-change would explain a significant amount of the variance in stress at the beginning of the second semester, and that stress would explain a significant amount of the variance in school-related outcomes at the beginning of the second semester. In turn, I predicted that when stress levels are taken into consideration, the predictive relation between context-change on school-related outcomes would decrease.

3. To what extent do levels of support (i.e., emotional, informational, instrumental, and companionship) from high school and college friends moderate the relations between stress and school-related outcomes among emerging adults during the transition to college? These analyses control for gender and race. Overall, I predicted that the interaction between support and context change would explain a significant amount of the variance in school-related outcomes. Specifically, under conditions of high levels of support, the relations between stress and school-related outcomes would be weak and negative, whereas under conditions of low levels of support, the relations would be strong and negative.

I predicted that both main effects and interaction effects of context change and the four supports from high school friends at the summer before college entry (T1), the beginning of the first semester (T2), and the end of the first semester (T3) would explain a significant amount of the variance in school related outcomes at the beginning of the second semester (T4). Moreover, because social support is more effective when provided by proximal, intimate relationships (Baumeister & Leary, 1995) I predicted that support from high school friends would moderate the relation

between stress and school-related outcomes to a lesser extent than will support from college friend.

4. To what extent do precollege friendship formation and maintenance goals predict social support (i.e., emotional, informational, instrumental, and companionship) from friends among emerging adults during the transition to college? I predicted that precollege friendship formation goals would predict college supports at the beginning of the second semester, and precollege friendship maintenance goals would predict support from high school friends at the beginning of the second semester.

**Assumptions**

This conceptual model assumes that a transition creates a sudden period of discontinuous change, which is why transition measurement is typically short term. I assumed that the new context was either supportive or not, and that students would react to the environment quickly. Therefore changes in social support, stress, and school belongingness should have been measurable within the first few weeks of college. I also assumed that the periods before and after the transition are relatively stable.

Additionally, I assumed that changes in support from friends occurred continuously over time. Changes in support from friends are multi-directional, and individual students follow different trajectories of support gain or loss. However, I assumed that the fundamental need for social support will be stable over time (Deci & Ryan, 2000), though the specific type of support needed may change.

Finally, I assumed that each student's high school friends and college friends exist in separate spheres. While I recognize that some students come to college with their high school friends, for the purpose of these initial analyses I assume that there is little or no overlap between these friend groups. In the current study, I ask participants whether they knew their nominated college friends in high school. This allowed me to assess whether friendship overlap affects a large percentage of the sample.

**Limitations**

The current study fills several gaps in the literature. In particular it includes reliance on a conceptual model, multiple dimensions of support, multiple informants, and extended longitudinal measurement. However, the project also has limitations: It relies on self-report, responses may be confounded by test-retest issues and potential historical effects, the lack of multi-year longitudinal data, and attrition.

With the exception of stress, all the measures rely on the judgments of a single informant – the participant. While the subject is likely the most appropriate source of information regarding her close friendships, perceived context change, and goals, it is possible that her responses may have been biased. For example, subjects might respond to the friendship support measure with stereotyped ideas of what friendships "should" be. Similarly, she may perceive certain expectations to report that she feels stressed, particularly at the end of the semester when students experience multiple final exams.

Students were asked the same questions about perceptions, experiences, and relationships at multiple time points. This repetition might have biased some

students' responses to answer the same way as they did on previous assessments, without considering whether change has taken place. Moreover, because I asked students to consciously consider their friendships, they may have reflected on them more than they normally would, and that could have changed their behavior.

Although one strength of the current study is that measurement is extended beyond the first semester, the design is still relatively short term. Therefore, any recovery of losses that occur beyond the second semester, or other long-term changes are not reflected in the analysis.

While the sample of transitioning college students is appropriate for the study, it is possible that the selected students are not representative of the average student population. Students were recruited from a program that requires high academic achievement and an interest in a team research project. While there is no empirical evidence that high academic achievers manage their friendships differently than other students, the sample might be a-typical, and their patterns might not generalize to the university student population

The study takes advantage of four time points, and there is a significant burden placed on participants. It is likely that some students will drop out of the study, or be absent from class during one or more data collection periods. If there is significant missing data that is not appropriately addressed, the generalizability of the study could be called into question.

## Summary

In summary, contextual changes predict stress (Cohen & Wills, 1985), a negative psychological and physical state that occurs when a person feels threatened,

and is unable to cope effectively. I predicted that the increase in transitioning college students' stress serves as a mediator between the change in context and decreased school outcomes such as grades and school belongingness. For example, a student might become stressed by new contextual demands and in response withdraw from academics, peers, and activities.

Previous work has found that social support from friends alleviates contextual stress. I predicted that lower stress will relate to better school outcomes. In particular, students with low stress would have higher grades and feel a greater sense of belongingness at school than students with high stress. The need for social support can be met by high school and college friends. Friendship formation and maintenance goals can predict individual's different sources of support from friends.

The findings will provide evidence concerning the predictive role of proximal, intimate friendships on stress felt by students during the transition to college. Further, I provide evidence that at least in part, increased stress explains the observed declines in school outcomes after a major change in context during emerging adulthood. The conceptual model, analyses, and proposed future research all should serve to deepen the field's understanding of the college transition.

## Key Terms

**Transition Context** – The period of flux that occurs when students change from one school system to another in the course of typical educational advancement.

**Stress -** A negative psychological well-being outcome that occurs when a person is threatened and is unable to cope effectively (Cohen & Wills, 1985).

**Friend -** Someone with whom a person has a reciprocal, positive relationship that fulfills social support goals and relieves distress (Bukowski, Motzoi, & Meyer, 2009). Friends can be more or less close to each other, depending on time spent together, proximity, shared interests, and communication styles.

**Social Support** – An umbrella term for any helpful, bolstering or caring behavior between people. Support is typically defined by its functions, such as emotional aid informational aid, instrumental aid and companionship (Cantin & Boivin, 2004).

**Emotional Support** – The provision of trust, love, and empathy by other people (Malecki & Demaray, 2002).

**Informational Support** – The provision of advice or situationally relevant information by other people (Malecki & Demaray, 2002).

**Instrumental Support** – The provision of resources such as money, time, and equipment by other people (Malecki & Demaray, 2002).

**Companionship** – Social integration and the provision of shared activities with others (Furman & Buhrmester, 1985).

**College Friend** – A person with whom the participant has a proximal, supportive friendship on campus, who was unknown to the participant before the college transition.

**Context Change** – The degree to which students' high school environment differs from their college environment.

**High School Friend** – A person with whom the participant has a distal supportive friendship, who was a friend of the participant before the college transition

**Friend Formation Goal** - An individual's desire to make new friends with proximal peers.

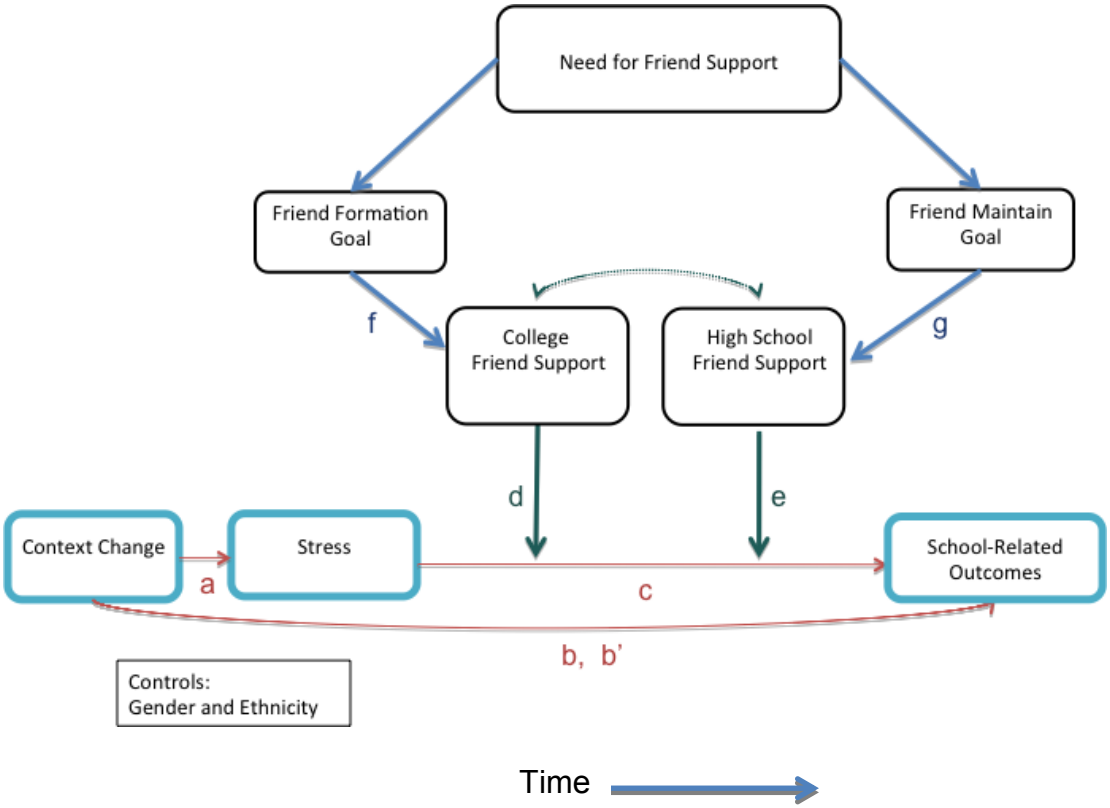
**Friend Maintenance Goal** - An individual's desire to keep previous friendships stable and intimate.

**Grades** – The numerical average of a student's classroom assessments, as defined by a semester grade point average.

**School Belongingness** – The extent to which students feel that they are accepted, respected, and supported members of the campus system and community (Goodenow, 1993).

**Friendship Needs** - The extent to which a student has an underlying need for interpersonal relationships and relatedness with friends. This construct will not be measured directly in the present study, but is assumed to exist for all students.

Figure 1. Conceptual Model




*Note.* Path b' indicates the hypothesized direct relationship between context change and school related outcomes after the mediation of stress has been accounted for.

## Chapter 2: The Relation Between Support from Friends and Stress over School Transitions: A Review of the Literature

The transition from high school to college is rarely studied from a developmental or educational psychology perspective. With few exceptions (Johnson, Staton, Jorgensen-Earp, 1995; Larose & Boivin, 1998; Parade, Leerkes, & Blankson, 2010; Wada, 1992), the college transition is typically studied through the lens of college administrators, education policy makers, or college counselors. Policy-oriented research has provided valuable descriptive information about college entry, but it rarely takes a theoretical perspective, and does not identify mechanisms and processes that may explain changes in student outcomes.

The previous chapter provided an overview of the trends researchers have identified during school transitions. Specifically, previous research has noted significant decreases in GPA (Barber & Olsen, 2004; Blyth, Simmons, & Bush, 1978; Benner & Graham, 2009; Larose, Bernier, & Tarabulsy, 2005), school engagement (Blyth, Simmons, & Bush, 1978; Finn & Rock, 1997), and self-esteem (Blyth, Simmons, & Bush, 1978; Fenzel, 2000; Finn & Rock, 1997; Hirsch & Rapkin, 1987), as well as increases in psychological symptoms such as depression (Barber & Olsen, 2004; Hirsch & Rapkin, 1987), loneliness (Benner & Graham, 2009), anxiety (Benner & Graham, 2009; Hirsch & Rapkin, 1987), and stress (Fenzel, 2000; Kerr et al., 2004; Rudolph, Lambert, Clark, & Kurlakowsky, 2001). Research has also found that support from friends helps adolescents and emerging adults make more positive school transitions (Aikins, Bierman, & Parker, 2005; Barrone, Aguirre-Deandreis, &

Trickett, 1991; Berndt, Hawkins, & Jiao, 1999; Bohnert, Aikins, & Edidin, 2007; Fenzel, 2000; Kingery & Erdley, 2007; Mounts et al., 2006; Newman et al., 2007; Yamamoto & Ishii, 1995).

Developmental and educational psychology has focused primarily on the transition from elementary school to middle school. The current study will apply the psychological findings from early school transitions to the college transition. This chapter reviews the research across three school transitions – from elementary to middle school; from middle school to high school; and from high school to college – as well as fundamental literature regarding friendship, stress, support, and goals to provide potential reasons why friends make a difference. Moreover, this chapter will describe and compare findings, measures, and methodologies used to study the role of friends in alleviating stress during school transitions.

Previous research has focused on early school transitions (Eccles, Lord, & Midgley, 1991; Epstein, 1989,) and the relationship between support and stress (Albrecht & Adelman, 1987; Baumeister & Leary, 1995; Ford & Smith, 2007). In particular, research on the transition to middle school is frequently framed with Eccles' stage-environment fit theory, which notes the mismatch between transitioning students' developmental needs, and the affordances and expectations at their new schools. Middle school transition researchers frequently use stage-environment fit (Harter, Whitesell, & Kowalski, 1992; Reyes, Gillock, & Kobus, 1994; Seidman et al., 1994; Wigfield et al., 1991) and attachment theory to understand the importance of supportive peers (Schneider et al., 2008). However, that theory has rarely guided

empirical work on friendship during the college transition. It is more typical that studies build on previous, often atheoretical, empirical research.

Therefore, the first objective of this review is to justify my support for stage-environment fit theory and attachment theory as viable theoretical frameworks for studying social support from friends during the college transition. Part of this objective is to explore the role of support from friends and stress during each school transition. For example, support from friends might moderate the relation between a change in context and stress. Specifically, students who have high levels of social support might experience less stress from a changing context than those with low support. Subsequently, stress could serve as a mediating variable between context change and school outcomes, such as decreasing self-esteem, and grades. The review of the transition literature provides an empirical basis for the conceptual model used in the current study (see Figure 1).

Further, there is a wide range of research methods and designs used to measure friendship, support, and outcomes during a school transition. The second objective of this review is to identify and critique common measures of friendship used during school transitions research. Subsequently I will justify the use of the measurements I have selected for the current study. Variations in measurement and design may have an effect on findings relating support from friends to successful transitions. For example, friendship measures that narrowly operationalize friends as "people you spend time with," will not capture the full effect of friend relationships on transitions because they do not also measure the reciprocity, mutual liking, and supportive nature of friendships.

In this chapter, I review the research on how social support from friends relates to stress and school-related outcomes during school transitions, as well as the relation between friendship goals and support from friends. I begin with separate reviews of school transitions, stress, friendship, friendship goals, and support. I also review typical patterns of school related outcomes, specifically declines in grades and school belongingness. After identifying the theoretical and empirical background of school transitions, stress, friendship, friendship goals, and social support during school transitions, I review specific studies that have explored how support from friends relates to stress during three school transitions: elementary-to-middle school, middle-to-high school, and high school-to-college. I will identify common findings, designs, and measurement techniques, and provide recommendations for future research.

## The Study of School Transitions

This section provides an overview of research on school transitions. It begins with a definition of a school transition. Both theoretical and common empirical research frameworks are presented. Issues of stage-environment fit, and developmental needs are discussed in terms of factors that help or hinder students' transitions between schools. The majority of theoretical work on school transitions covers middle school entry from elementary school. Although the contexts are not identical, frameworks and models from the middle school transition can serve as a starting place for other school transition research. Subsequent sections separately present research particular to the elementary-to-middle school transition, the middle school-to-high school transition, and the high school-to-college transition.

A school transition is the time when students change from one school's system to another in the course of typical educational advancement. For example, when a student moves from a kindergarten-through-fifth grade (K-5) elementary school to a sixth-through-eighth grade (6-8) middle school, the transition would include the period of time between the end of fifth grade, and when the student feels familiar in her new sixth grade context.

**Developmentally supportive context**

A school environment needs to take into account the match between the needs, values, and abilities of the student and the practices of the administration and teachers to be developmentally supportive (Eccles & Roeser, 2003). Bronfenbrenner (1989) explains this as the person-environment fit between a student and her school. For example, adolescents typically experience an increase in the desire for autonomy and strong social networks. Middle schools and classrooms that emphasize decision-making and the potential for friend-making are considered more developmentally supportive (Epstein, 1989). The disconnect between developmental needs and middle school environments is discussed later in a section devoted to the elementary-to-middle school transition.

In a review of school policies and practices, Jackson and Davis (2000) outlined specific ways schools can provide adolescents developmentally supportive contexts. Their recommendations include a focus on student-relevant content and frameworks; appropriate instruction for individual student's interests and abilities; staff expertise in adolescent development and issues; high academic expectations and

rigor; democratic governance; parent and community involvement; and an emphasis on health and safety.

School transitions present changes in both person and environmental characteristics. Individual-centered characteristics change as the student matures physically, cognitively, and socially, and relationships develop with peers, parents, and teachers (Eccles & Midgley, 1989). Environment-centered characteristics change as the student enters a new school's system of classroom structure, behavioral and academic expectations, and classroom climate (Eccles, Lord, and Midgley, 1991). Competent student outcomes can be thought of as a a result of good fit between a person's individual characteristics, developmental needs, and goals, and her environment's characteristics and provisions of opportunities to achieve goals (Eccles & Midgley, 1989). Since both person and environment are in flux, the most appropriate conceptual models of school transition are chronological models (Bronfenbrenner, 1989) that include person and environment change over time to predict fit and competency.

Moreover, within the school transition context, students undergo the developmental changes of puberty and adolescence, into emerging adulthood. Emerging adulthood is a socially constructed developmental period of extended transition between adolescence and adulthood, characterized by deep identity exploration, increased risk behaviors, and transitory lifestyles (Arnett, 2000). Emerging adulthood can also be thought of as an extension of adolescence for those who are economically advantaged, and members of cultures that encourage extended identity exploration. Eccles and colleagues (Eccles et al., 1993; Eccles & Midgley,

1989; Eccles & Roeser, 2003) use the term "stage-environment fit," to conceptualize whether the school environment is appropriate given the developmental needs of the student. Ability levels, instructional practices, and cultural issues all contribute to the stage-environment fit, and good fit will ease the transition from elementary to middle school.

The next sections divide the literature between the three major school transitions: elementary to middle school, middle to high school, and high school to college. Each subsection begins with a report of unique developmental or contextual issues for that transition, and follows with a review of relevant empirical studies. A table is provided for each transition to summarize the reviewed articles.

**The Elementary-to-Middle School Transition**

The transition from elementary to middle school typically predicts a sudden drop in school-related outcomes, such as grades, and school belongingness (Eccles, Lord, & Midgley, 1991; Simmons & Blyth, 1987) Eccles and her colleagues (Eccles, Lord, & Midgley, 1991; Eccles & Midgley, 1988) attribute this pattern to the nature of the typical elementary and middle school context in relation to the needs of adolescents. According to Eccles, young adolescents have increasing desires for autonomy from adults, and a new focus on the peer context, self-esteem, and self-efficacy. Eccles proposes that schools should be safe, comfortable, and challenging, without exerting too much control (Eccles & Roeser, 2003).

Teacher-student relationships also change over the transition to middle school. Students typically move from a single-teacher setting to a departmentalized multi-teacher setting (Brown, 1989; Eccles, Lord, & Midgley, 1991; Simmons & Blyth,

1987). Since the time a student spends with any particular teacher is dramatically reduced, the opportunity for students to form supportive relationships with teachers is also reduced, and can lead to a sense of disconnectedness and anonymity in school (Barber & Olsen, 2004).

Researchers have found that when middle school teachers create competitive classrooms to meet higher standards, students who are not in the top tier experience decreased academic efficacy (Eccles, Lord, & Midgley, 1991; Eccles & Midgley, 1988). Middle schools tend to be much larger than their feeder elementary schools, contain unfamiliar peers, and more ethnically diverse (Brown, 1989; Simmons & Blyth, 1987), elements that have been found to either directly or indirectly negatively impact self-esteem. These patterns result in a "developmental mismatch" (Eccles, Lord, & Midgley, 1991, p. 534) putting students' needs in direct conflict with their environments.

**Empirical research regarding friends and stress during the transition from elementary school to middle school.**

[Insert Table 1]

Table 1 provides a summary of empirical studies on the transition from elementary to middle school. Articles were identified using the Psycinfo research database, and the references from relevant articles. A list of keywords was generated regarding the different transitions, developmental periods, and support from friends in order to search for appropriate articles. The search was limited to empirical studies published in peer-reviewed English-language journals. The keywords used in the literature search were: *Adolescent/ce*, *Child*, *College/University, Elementary*,

*Emerging Adult*, *Gender/Sex*, *Friend Making*, *Friend(ship)*, *Friend(ship) formation*, *Friend(ship) maintenance, High School*, *K-12*, *Middle School, Peer(s)*, *Support*, *Transition.*

As with the general body of transition research, there were more studies on support from friends and stress during the transition from elementary school to middle school than any other transition. Samples sizes ranged from an 8 person qualitative study, to 1,850. With a few exceptions (Seidman, Allen, Aber & Mitchell, 1994; Yamamoto & Ishii, 1995), samples were primarily white and middle income. Most studies had a short-term longitudinal and correlational design. Rudolph, Lambert, Clark, & Kurlakowsky (2001) used a quasi-experimental design, with an age-matched control group of non-transitioning students. This allowed them to test for transition-specific effects. Most studies relied only on self-report, either through surveys or interviews.

Measures of friendship included both peer nomination (or interview) procedures designed to identify best friends (Aikins, Bierman, & Parker, 2005; Berndt, Hawkins, & Jiao, 1999; Kingery & Eardley, 2007; Oh, Rubin, Bowker, Booth-LaForce, Rose-Krasnor, & Laursen, 2008; Schneider, Tomada, Tonci, & de Domini, 2008; ) and sociometric nominations (Hardy, Bukowski, & Sippola, 2002). However, the majority of studies used likert-type self report scales (ex. Fenzel, 1986; Seidman, Lambert, Allen, & Aber, 2003) of friendship networks, supports, and quality. Examples of these measures include the Friendship Quality Questionnaire-Revised (FQQ; Parker & Asher, 1993), the Children's Convoy Mapping Procedure (Levitt et al., 1993) and the Network of Relationships Inventory (NRI; Furman &

Buhrmester, 1985). Two studies measured both whether a student had a friend, and the quality of that friendship (Aikins, Bierman, & Parker, 2005; Kingery & Eardley, 2007; Oh et al., 2008). Measures of friendship varied on whether students were asked to think of a particular best-friendship, or whether they answered about their friendships and peer relationships in general.

Measures of stress or strain were all likert-type self report scales. Examples of these measures include the Early Adolescent School Role Strain Inventory (EASRSI; Fenzel, 1989), the Loneliness and Social Dissatisfaction Questionnaire (Asher & Wheeler, 1985), the Brief Symptom Inventory (BSI; Derogatis & Spencer 1982), and the Chronic Strain Questionnaire for Children (Rudolph, Kurlakowsky, & Conley, 2001). These scales vary by the type of stress they are designed to measure, whether it is social, academic, or general.

Generally, friendships had positive effects on transitions. In the few studies that tested for an effect, stress, distress, or anxiety increased over the transition (Barber & Olsen, 2004; Hirsch & Rapkin, 1987; Rudolph, Lambert, Clark, & Kurlakowsky, 2001; Seidman, Allen, Aber & Mitchell, 1994), and was reduced by social support (Fenzel, 2000; Fenzel & Blyth, 1986; Hirsch & DuBois, 1992; Yamamoto & Ishii, 1995).

Not all studies reported effect sizes. Those articles that did report R-squared, Cohen's d, or eta-squared values typically had small or moderate effects. Notable effect sizes include Hardy, Bukowski, and Sippola's (2002) finding that girls from large elementary school made more new friends in middle school than girls from small elementary schools (eta-squared = .47). However, more emphasis was placed

on statistical significance than effect size, particularly when eta-squared effect sizes were less than .01 (Levitt et al., 2005; Seidman et al., 1994).

## The Middle School-to-High School Transition

While there is less research on the transition to high school, the literature suggests that students experience similar school-related declines such as grades and school belongingness (Barone, Aguirre-Deandreis, & Trickett, 1991; Benner & Graham, 2009; Ding, 2008) and face similar challenges as transitioning middle school students (Eccles & Roeser, 2003). The size of the school population generally increases, as multiple middle schools often feed into one high school. The larger student body may increase student anonymity, particularly if a student is unable to find a supportive peer group. There is also an increased risk of victimization in high school, particularly for boys, because freshmen are generally the least physically developed (Blyth, Simmons, & Bush, 1978).

The change in school structure from middle school to high school can also affect student outcomes (Eccles & Roeser, 2003). Lee and Smith (2001) found that the typical bureaucratic structure of a high school undermines attempts to build a sense of community and belongingness. High school structure increases distrust between students and teachers, and limits opportunities for mentorship and caring relationships (Lee & Smith, 2001).

### Empirical research regarding friends and stress during the transition from middle school to high school.

[Insert Table 2]

Table 2 provides a summary of empirical studies on the transition from middle school to high school. Articles were identified using the same methodology described in Table 1. Samples ranged from a 29 person qualitative study, to 1,979 students. Several studies' samples were racially diverse, and focused on the particular challenges facing minority students (Barone, Aguirre-Deandreis, & Trickett, 1991; Benner & Graham, 2009; Newman, Lohman, Newman, Myers, & Smith, 2000; Reyes, Gillock, & Kobus, 1994). Most studies had a short-term longitudinal and correlational design. Reyes, Gillock, & Kobus (1994) used a quasi-experimental design, to test the effectiveness of a social support intervention. Most studies relied only on self-report, either through surveys or interviews, and school report of grades.

Measures of friendship included qualitative interview protocols (Kinney, 1993; Newman, Lohman, Newman, Myers, & Smith, 2000) and likert-type self report scales (ex. Newman, Newman, Griffen, O'Connor, & Spas, 2007) of friendship support. Examples of these measures include the Perceived Social Support from Friends scale (PSS-FR; Procidano & Heller, 1983), and the Social Support Rating Scale – Revised (Cauce, Felner, & Primavera, 1982). Measures varied on the types of support they were designed to measure, such as emotional or instrumental, but were uniform in that they all measured support. There were no measures of friendship networks or qualities.

Measures of stress or strain were all likert-type self report scales. Examples of these measures include the Quality of School Life Scale (QSL; Epstein & McPartlan, 1976), the Junior High Life Experiences Survey (JHLES; Swearington & Cohen, 1985) and the Social Anxiety Scale for Adolescents (SAS-A; La Greca & Lopez,

1998), and the Life Events Questionnaire (Newcomb, Huba, & Bentler, 1981). There was no overlap between distress scales during the elementary to middle school transition, and distress scales during the middle school to high school transition. These scales vary by the type of stress they are designed to measure, including academic, social, or pertaining to specific life events judged to induce stress.

Generally, friendships had positive effects on transitions. In the few studies that tested for an effect, stress, distress, or anxiety increased over the transition (Barber & Olsen, 2004; Benner & Graham, 2009; Newman, Newman, Griffen, O'Connor, & Spas, 2007). Only one study (Barone, Aguirre-Deandreis, & Trickett, 1991) tested for, and found a moderating effect of social support on stress.

Not all studies reported effect sizes. Those articles that did report R-squared, Cohen's d, or eta-squared values typically had small or moderate effects. Notable effect sizes include Barone et al.,'s (1991) finding that support positively predicted students' quality of school life ($R^2$ = .56), and Benner and Graham's (2009) finding of long-term grade decreases ($d$ = .21).

**The High School-to-College Transition**

College entry typically marks the beginning of Emerging Adulthood, a socially constructed developmental period of extended transition between adolescence and adulthood. In cultures and economic conditions which allow for a broad range of career and lifestyle choices, the ages of 18 to 30 have become a time for identity exploration, increasing autonomy, risk-taking, and delayed responsibility (Arnett, 2000).

Many emerging adults and older adolescents experience a re-centering process, in which their secure base shifts from parents to non-familial relations such as friends (Barry, Madsen, Nelson, Carroll, & Badger, 2009; Tanner, 2006). Not only do new college students often move out of their parents' homes, they also start to move away from parental control and authority. Many emerging adults and older adolescents take on new, more equal relationships with parents (Arnett, 2004) and turn to friends for guidance and support (Barry et al., 2009). Contextually, the college transition is different from the previous two school transitions in terms of friend-making and friend maintenance. Assuming students move to a campus away from familiar surroundings, they physically leave the continued support of high school friends and are surrounded by new peers. In the transition from elementary school to high school, students likely transition with at least a few familiar friends and peers. Depending on the distance between college and home, new freshmen may not have any familiar faces on campus.

**Empirical research regarding friends and stress during the transition from high school to college.**

[Insert Table 3]

Table 3 provides a summary of empirical studies on the transition from high school to college. Articles were identified using the same methodology described in Table 1. Samples ranged from 70 to 800 college freshmen. Almost all samples were primarily white, though two studies had more diverse samples, and diversity-based research questions (Bohnert, Aikins, & Edidin, 2007; Stearns, Buchmann & Bonneau,

2009). All studies had a short-term longitudinal and correlational design, and relied on self-report only.

Two studies measured friendship using students' nominations to identify best friends (Oswald & Clark, 2003; Stearns, Buchmann, & Bonneau, 2009) and the remaining studies used likert-type self report scales (e.g., Bohnert, Aikins, & Edidin, 2007; Swenson, Nordstrom & Heister, 2008) of friendship functions, supports, attachment and quality. Examples of these measures include the Friendship Quality Questionnaire-Revised (FQQ; Parker & Asher, 1993), the Friendship Questionnaire-Friend's Function (Mendelson & Aboud, 1999) and the Inventory of Parent and Peer Attachment (IPPA; Armsden & Greenberg, 1987). Measures of friendship varied on aspects of the conceptualization of friendship, be it support, functions, or intimacy, though no measure captured reciprocity.

Measures of stress or strain were all likert-type self report scales. Examples of these measures include the Loneliness and Social Dissatisfaction Questionnaire (Asher & Wheeler, 1985), the Beck Anxiety Inventory (BAI; Beck et al., 1988) and the Social Interaction Anxiety Scale (SIAS; Mattick & Clarke, 1998). These scales vary by the type of stress they are designed to measure, whether it is social or general.

Generally, friendships predicted positive outcomes over transitions, though there were differences in support from high school friend and college friends, where support from high school friends had a stronger, more positive influence than support from college friends at the beginning of the semester. However by the end of the first semester those high school relationships weakened, and college friendships were stronger predictors of positive school adjustment (Paul & Brier, 2001; Swenson,

Nordstrom, & Hiester, 2008). Of the studies that used social support to predict distress, all found negative relationships where more support was related to less stress.

Not all studies reported effect sizes. Those articles that did report R-squared, Cohen's d, or eta-squared values were either very small or relatively large. For example, while Mounts et al.,'s (2006) finding that friendship quality significantly predicts lowered anxiety aligns with the hypothesis that support provides a buffer against stress, the change in R-squared attributed to friend quality was .07, though it was highly statistically significant. However, in the same study, the change in R-squared attributed to friendship quality when predicting depression was much larger, .20. However, since both of these findings were statistically significant, they were presented as equally important. Notable effect sizes include Parade et al.,'s (2010) finding that race, attachment, social anxiety and second order interactions predict students' ease at forming new friendships ($R^2$ = .44).

While statistical significance is important to understand the likelihood that the patterns in the data emerged by chance, effect sizes also provide valuable information. Specifically, effect sizes provide the researcher with information about the magnitude of the pattern, or how much of the variance in the outcome variable is explained by the predictor variable. In the current study, I report and interpret effect sizes as well as statistical significance to understand the story within the data.

**Summary**

Studies show that students experience a disruption in their academic and social development during school transitions. Stage-environment fit theory suggests

that a mismatch between students' developmental needs and their school environment is at the root of academic disengagement and alienation experienced by transitioning students. Eccles, Epstein, and Bronfenbrenner each provide descriptions of supportive developmental contexts that can be applied to school transitions.

Empirical research and theory development has focused on the elementary-to-middle school transition. However, research on the transitions to high school and college find that students experience similar changes over all three transitions. In particular, researchers have documented decreases in grades and school participation and increases in student stress, depression, anxiety, and alienation. The structure of the school as well as the developmental stage of the students affects the outcomes of the transition.

## Stress

In a definition that has shaped decades of research, Cohen and Wills (1985) define stress as the affective and physical reaction within an individual who perceives a threatening situation, but is unable to cope with that threat. Previous research has related stress to negative school outcomes, including decreased grades (Kerr et al, 2004; Pritchard & Wilson, 2003) and decreased school belongingness (Pittman & Richmond, 2009), as well as to a host of negative health outcomes including headaches, indigestion, sleep disturbances, and immune system problems (Feldman, 2008).

Individuals with higher levels of social support experience less stress than those with low levels of social support. Cohen and Wills provide evidence that multiple types of social support reduce the affective experience of stress. Their

moderation model contends that social support buffers against stress by providing an appropriate coping mechanism (e.g., through seeking emotional support) or eliminating the threat entirely (e.g., through instrumental or informational support). In keeping with this model, support has been shown to moderate the relation between context and stress, anxiety, and strain (Goldsmith & Albrecht, 1993; Barone, Aguirre-Deandreis, & Trickett, 1991; Cohen & Wills, 1985; Fenzel, 2000; Hamdan-Mansour & Dawani, 2008). Specifically, people with access to social supports feel less stress when faced with stress-producing situations than those without.

In a review of the stress and support literature, Epley (1974) found that a having a person nearby was necessary but not sufficient to provide someone with the stress-buffering effects of companionship. Instead, stressed individuals benefitted from companions who were calm, soothing, or distracting (Ladd & Kochenderfer, 1996) and often did not benefit from companions with other characteristics, such as those who were agitated. In other words, the person needed to provide companionship, not just company. Moreover, previous research has found that seeking support from distal relations can predict increases in stress. For example, while romantic relationships are typically found to predict reductions in stress (Holt-Lunstad, Birmingham, & Jones, 2008; Uchino, Cacioppo, & Kiecolt-Glaser, 1996; Wade & Kendler, 2000), a study that focused specifically on the college transition found that students who attempt to maintain long-distance precollege romantic relationships experienced lower levels of psychological well-being than their peers (Paul, Poole, & Jakubowyc, 1998). Taken together, these findings suggest that the most adaptive social support for stress relief may be proximal, supportive

relationships. In the case of transitioning college students who are likely moving away from parents, friends are the most probable source of proximal support.

## Friendship

This section provides an overview of the study of friendship, including a conceptual definition with related variables, seminal research and theory, and concludes with a discussion of research and theory regarding friendship formation and maintenance.

### Definition of friendship

For the current study, friendship is defined as "the strong, positive affective bonds that exist between two persons and that are intended to facilitate the accomplishment of socioemotional goals." (Bukowski, Motzoi, & Meyer, 2009, p. 218). This definition contains three parts: friendships contain positive affect; friendships are dyadic, and friendships fulfill social support goals and relieve emotional distress. In addition to these parts, friendships have been described as often existing in private, with each member contributing equally to the relationship (Krappmann, 1996; Wentzel, Baker, & Russell, 2009). Since friendship often exists in a private sphere, it can be a challenge for researchers to gain access to the details of the relationship.

Supportive, stable friendships have been linked to numerous positive outcomes, such as school liking, academic engagement (Kingery & Erdley, 2007; Ladd, Kochenderfer, & Coleman, 1996; Wentzel, 2009), and reduced anxiety, loneliness, and depression (Barone, Aguirre-Deandreis & Trickett, 1991; Bohnert, Aikins, & Edidin, 2007; Ladd, Kochenderfer, & Coleman, 1996; Mounts et al., 2006;

Newman, Newman, Griffen, O'Connor, & Spas, 2007) in samples ranging in age from kindergarten through college. However, friendship findings have not all been positive; empirical research has reported that friendships also predict lower test scores (Goldsmith & Albrecht, 1993), and noncompliance (Wentzel, Russell, Morrison, Donlan, & Baker, 2010). Friends tend to be similar to each other in terms of academic motivation (Epstein, 1983; Ryan, 2001), as well as demographic variables such as race and gender (Aboud & Mendelson, 1996; Graham, Taylor, & Ho, 2009), and friends' positive or negative influence seems to depend on the identity of those friends, including their values and motivations.

Friendships also vary in closeness, from acquaintances to "just friends" to "the very best of friends" (Berndt & McCandless, 2009). The closeness of a friendship predicts other aspects of the relationship. In particular, acquaintanceships are less reciprocal and intimate, and display less loyalty and mutual liking than closer friendships (Newcomb & Bagwell, 1996). Factors such as time, proximity, and similarity of interests, activities, values, attributes, and communication styles can contribute to the closeness of friendships (Aboud & Mendelson, 1996; Gottman, 1983; Epstein, 1989).

**Seminal friendship research**

The formal study of friendship began with the work of the psychiatrist Sullivan (1953), who found that "chumships" between child peers could relieve tension, help resolve integrative needs (i.e., companionship, tenderness, intimacy, and acceptance), and provide social comparisons (Hartup, 2009). Sullivan believed that children who do not have their integrative needs met will experience distress

(Buhrmester, 1996). Empirical evidence has provided support for Sullivan's ideas in that children with friends tend to be less lonely, more altruistic, and have higher self-esteem than their friendless counterparts (Kerns, 1996). Sullivan also proposed that children's needs for friendships emerge over time. He observed that young children need play companions, and as they enter adolescence they begin to need peer group acceptance and intimate communication with friends (Buhrmester, 1996).

Friendships and other close relationships fulfill needs for companionship, acceptance, and intimacy, as well as affection, attachment, and nurturance. Robert Weiss (1974) emphasized the importance of a child's social network of relationships, noting that different types of relationships can meet different needs. Specifically, he proposed that friends provide for companionship and intimacy needs, while parents provide for attachment and nurturance needs (Buhrmester, 1996). Sullivan (1953) argued that positive friendships in adolescence may compensate for negative experiences in childhood (Price, 1996). Friends may also protect each other against victimization (Bukowski, Boivin, & Hoza, 1991). Therefore maltreated children without supportive friends in adolescence are at particular risk for long-term negative outcomes.

In their review of friendship measurement, Bukowski and Hoza (1989) identified the need for concrete conceptualizations of friendship that distinguish between a child's popularity and her friendships. Further, children with at least one friend tend to have better outcomes such as reduced loneliness when compared to friendless children (Bukowski, Brett, & Hoza, 2010; Bukowski, Motzoi, & Meyer, 2009; Bukowski & Sippola, 1996; Ladd & Burgess, 1999).

Bukowski and Hoza also argue that because friendship is a dyadic relationship, any measure that focuses on group opinions or opinions about a group actually reflect sociometric popularity Newcomb & Bagwell, 1996). They also acknowledge that there is neither a standard definition of friendship, nor standard assessment that allows for easy comparisons across studies. In order to remedy this gap, the authors argue that any measurement of friendship must focus on three separate questions: (1) Does the child have dyadic friendships? (2) If yes, in how many friendships is she involved? (3) What is the quality of the target child's specific dyadic friendships? The authors argue that many measures either assume students have friends, or equate having a friend with having a high quality friend, instead of treating these as three distinct variables. In the current study, the measurement strategy allows for any students to report that she does not have friends, and assesses each of the student's friendship dyads separately. The separate assessments will then be aggregated into friendship support scores.

As mentioned earlier, childhood friendships are understood to develop over time, and exist over a continuum of closeness, ranging from strangers to one's most intimate friend (Aboud, & Mendelson, 1996; Berndt & McCandless, 2009). However the underlying process by which people move along that continuum is not fully understood. Some potential models focus on the children's conceptual understanding of friendship (Selman, 1980), communication that occurs in order to develop intimacy (Gottman, 1983; Morry, 2001), or antecedents and processes of friendship and peer acceptance (Ladd, 2005; Wentzel, 1992).

Robert Selman (1980) proposed a stage theory of friendship, in which children develop intimacy and dependence as they cognitively develop perspective-taking abilities. In the first stage (stage 0) friends are regarded as neutral playmates, who then develop into sources of reciprocal entertainment (stage 1). Eventually children understand they are part of a reciprocal dyad (stage 2) and as that understanding deepens (stage 3) they realize that they are interconnected and dependent upon one another (stage 4) (Hartup, 2009). However Selman does not explain the process by which children move through these stages.

High quality friendships should be relatively stable if they are to have positive effects on students (Aboud & Mendelson, 1996), and friends generally try to sustain their relationships with one another. Even when students are great distances from their friends, as many are during the college transition, there is a strong desire to maintain relationships with friends (Baumeister & Leary, 1995). To continue friendships over time, students undertake friendship maintenance behaviors. Examples of maintenance behaviors include reaching out for in-depth communication and shared activities (Aboud & Mendelson, 1996; Gottman, 1983).

Gottman (1983) studied the process by which young children (ages 3 to 9 years) form friendships and maintain them. The purpose of his investigation was to discover the important factors that predict when children who meet for the first time will "hit it off." Using in-home observations comparing the conversations of best-friend and unacquainted dyads, he identified seven variables that were integral to friendship formation and maintenance: communication clarity and connectedness, information exchange, common-ground activities, an exploration of similarities and

differences, conflict resolution, positive reciprocity, and self disclosure. (Gottman, 1983). Gottman found that dyads of children who engaged in these behaviors were more likely to remain friends at the end of the study. Similarly, Hays (1985) conducted a longitudinal examination of friendship formation over the first semester of college. Dyads of students whose communication, companionship, affection and consideration increased regularly over the semester were more likely to report that they had become close friends (Aboud & Mendelson, 1996). In the current study, friendship formation and maintenance goals are assessed as predictors of support from friends.

One reason the process of friendship formation has not been fully explored is that we have a tendency to believe friendships "just happen," and we take the process for granted (Ladd, 2005). However, it is possible to determine the antecedents and processes behind friendship, peer group entry, and peer acceptance. In a review of the literature on young children's group entry practices, Ladd found that peer groups are more likely to welcome new members who do not make waves with the current group behaviors and instead hover patiently, waiting to be invited (Ladd, 2005). Ladd also found that a child's attributes such as physical attractiveness, body type, family background, and name affect whether she is accepted into a potential friend group. In previous work, Ladd (1990) found that the tendency to form new friendships in kindergarten predicted increased academic achievement during the school year.

In a study of strategy knowledge, adolescent students reported specific strategies that they use to make friends in school (Wentzel & Erdley, 1993). Strategies varied on whether they were appropriate (e.g., prosocial behavior, provide

social support) or inappropriate (e.g., psychological aggression, antisocial behavior). Students with more strategy knowledge (both appropriate and inappropriate) tended to act more prosocially, and prosocial behavior predicted peer acceptance.

Functions of friendship

Friends provide each other with valuable resources, such as social support, and contexts for social and cognitive development (e.g., Ladd & Kochenderfer). The following section outlines support for each function.

**Support.** Researchers agree that friendships have several functions (Ladd & Kochenderfer, 1996; Price, 1996). The most commonly identified features of friendships across researchers were attachment, reliable alliance, enhancement of self-esteem or self worth, help and guidance, intimacy, sharing or closeness, and conflict (Berndt & Perry 1986; Furman & Burhmester, 1985; Parker & Asher, 1993; Sharabany, Gershoni, & Hofman, 1981; Weiss, 1974). Many of these identified friendship features correspond with forms of support, such as companionship, instrumental help, intimacy, and caring (e.g. Furman & Buhrmester, 1985). Support and applicable theoretical frameworks will be discussed in more depth later in this paper.

**Contextual Provisions.** Friendships provide children and adolescents with valuable contexts for children, adolescents, and adults to learn social competencies (Bukowski & Hoza, 1989), develop cognitively (Piaget, 1926; Vygotsky, 1981), resolve developmental challenges, and participate in socialization and identity exploration (Buhrmester, 1996). Friendship affords children the opportunity to develop cooperation and collaboration skills necessary for being active members of a

community (Hartup, 1996). In turn that community provides more opportunity for growth by drawing participants further into its center (Lave & Wenger, 1991). Additionally, social groups force children to use language, which can be used to receive help from more experienced peers (Vygotsky, 1981). Bandura (1977) believed that friends could learn from each other through vicarious reinforcement, and powerful modeling from a similar peer.

Not all contexts are equally conducive to the development of friendships. Epstein (1989) identified three features of selection that context can either promote or limit: proximity, age, and similarity. She argues that school factors have different contextual influences during the course of development. Specifically, schools influence younger children's friendship selections more than they influence adolescents' friendship selections, because younger children have more fluid and unstable friendships. However, Epstein also argues that during times of transition, those contextual features (i.e., proximity, age, and similarity) would have a stronger effect.

**Friendship among high academic achievers**

The participants for the current study will be drawn from a program for high academic achievers. Therefore it is prudent to review the literature on friendships among students with excellent grades and test scores. One cause for concern is the finding that students who are labeled as "gifted" may have lower self-concept when compared to other students (Lea-Wood & Clunies-Ross, 1995; Coleman & Richardson, 1982), which could hypothetically impair friendship formation. While a few studies have found that gifted students have lower levels of intimacy with their

closest friends (Mayseless, 1993), the majority of previous research has found that high academic achievers have the same or even higher levels of social skills as other students (Bain, Bell & Mee, 2004; Field et al. 1998; Jin & Moon, 2006). Furthermore, in keeping with other research that finds that friends tend to be similar, often students who are strong academic achievers have friends who are also high academic achievers (Ryan, 2001).

It is possible that high academic achievers use specific strategies to overcome their label as "gifted" which could make other students perceive that they are different and not viable friends. To test this hypothesis, one study created and assessed a measure of high academic achieving adolescents' social coping strategies (Rudasill, Foust, & Callahan, 2007). The researchers used exploratory factor analysis and confirmatory factor analysis to provide evidence that there are seven specific strategies used by high academic achievers to cope with social situations: helping others, denial of giftedness, minimizing one's focus on (or value of) popularity, denial of negative impact on giftedness on peer acceptance, conformity to mask giftedness, hiding giftedness, and using humor. However, the researchers acknowledge that gifted students cannot be considered a homogenous group, and likely will not all display all of these coping mechanisms (Rudasill, Foust, & Callahan, 2007).

The current study relied on students enrolled in the University of Maryland Gemstone Program, which requires past high academic achievement for entry into the program. Perhaps being part of a large group of high academic achievers will lessen the likelihood that students will feel the need to mask their giftedness to conform to

group norms, since in this instance high academic achievement is the norm. Whether it is through purposeful strategies or other means, prior work with a previous cohort of Gemstone students has demonstrated that this population is able and likely to form close, supportive friendships in high school and in college (Donlan, Wentzel, & Russell, 2012).

**Friendship formation and maintenance goals**

Goals have been defined as "those things that an individual would like to achieve or accomplish in a given situation" (Wentzel, 1994, p. 173). Several researchers have explored student's social goals in terms of prosocial behavior and conflict resolution (Anderman & Anderman, 1999; Erdley & Asher, 1999; Rose & Asher, 2004; Ryan & Shim, 2008; Wentzel, 1994), and have found that what students want to do directly predicts their social behavior. However, friendship formation and maintenance goals have not been studied specifically, particularly among older adolescents and emerging adults. Instead previous research has focused on precollege concerns (i.e., what students worry about) regarding friendship (Belle & Paul, 1989; Paul & Brier, 2001) instead of goals. Precollege concerns research finds that students who are overly concerned with maintaining precollege friendships are at higher risk for loneliness, and low self-esteem in college, as compared to students who are more concerned with making new friends on campus (Paul & Brier, 2001).

Although friendship formation and maintenance goals have not been the focus of prior research, there is strong theoretical and empirical evidence that in general, goals predict behavior over time (e.g., Wentzel, 2004; Wigfield & Eccles, 2000). In particular, Wentzel's model of classroom competence (Wentzel, 2004; Wentzel,

Filisetti, & Looney, 2007) suggests that prior social support predicts goal pursuit, which in turn predicts goal-directed behavior. As an application to the current study, if students' goals are to obtain social support, this goal pursuit will then lead to behaviors that predict increases in social support.

Furthermore, Expectancy Value Theory offers one explanation of this process, wherein individual's goals are one important influence on students' expectations for success, as well as the degree to which they value achieving the goal (Eccles, Wigfield, Harold, & Blumenfeld, 1993). In turn, students' expectancies and values predict the choices that students will make in pursuit of their goals (Wigfield & Eccles, 2000). These pathways have been replicated in both child and adolescent samples (Eccles & Harold, 1991; Eccles & Wigfield, 1995; Wigfield, 1994). Another potential explanation for the influence of goals can be found in Self-Determination Theory (Deci & Ryan, 1985) which is based in part on the notion that adolescents have a fundamental need to feel competent. This drive for competence is strongly motivating towards both intrinsic and extrinsic goal attainment (Niemiec, Ryan, & Deci, 2009). Finally, social-cognitive theory (e.g., Bandura 1997), which posits that students' beliefs they are able to achieve something feed-forward into their actual success, also provides reasons why goals may predict future behavior. Specifically, students with high efficacy tend to set higher goals for themselves with each successful completion of a prior goal (Bandura & Locke, 2003).

Each of these theoretical perspectives can be applied to the study of friendship goals. For example, students who have a strong goal to form new friendships will likely make choices that align with their expectations and values regarding friendship

formation (Wigfield & Eccles, 2000). Likewise, students who want to maintain friendship will be motivated to feel competent at that task, and try hard to succeed (Deci & Ryan, 1985). Furthermore, students who have early successes in their friendship formation goal attainment may feel more confident in their abilities to make friends in the future, which will make future successes more likely (Bandura, 1997).

**Need for Support**

Friendship formation and maintenance goals are driven by the desire to satisfy a fundamental need for support, or relatedness. Multiple theorists have noted humans' fundamental need for support (Baumeister & Leary, 1995; Deci & Ryan, 2000; McClelland, 1987). Self-determination theory defines a need as "innate psychological nutriments that are essential for ongoing psychological growth, integrity, and well-being" (Deci & Ryan, 2000, p. 229). The belongingness hypothesis expands on this definition by specifying that denial of a fundamental need would cause an individual to experience pain and other negative outcomes, affect behavior broadly, and apply to all people universally (Baumeister & Leary, 1995).

McClelland's (1985; 1987) work describes the affiliative motive, or "the need to be with people." (McClelland, 1987, p.347). McClelland (1987) was particularly interested in the valid measurement of affiliative need, and whether it can be demonstrated to influence behavior. To this end, McClelland and his colleagues adapted a version of the Thematic Apperception Test (TAT; McClelland, 1961, 1985; Tuerlinckx, De Boeck, & Lens, 2002; Vane, 1981) to measure participants motivations toward affiliation, as well as achievement and power. Originally, the

TAT was developed to assess unconscious fantasies for use in psychological clinical treatment (Morgan & Murry, 1935). Participants were shown pictures on cards, and asked to create a dramatic story based on the picture (Vane, 1981). The themes and characters of the created stories were assumed to represent needs and characteristics of the participant. McClelland and his colleagues adapted the measure to include a scoring system based on story characters' goals (McClelland et al. 1953). If participants created characters who wanted to become close to others, the participant was rated as high on the affiliation motivation. McClelland found that using the participants who score high on affiliation motivation are more likely to behave in affiliative ways. Specifically, highly affiliatively motivated people are more attuned to social cues from others, seek approval, seek more contact with friends (including phone calls, letters, and visits), fear rejection, and avoid conflict and competition than people who are less affiliatively motivated. McClelland characterized the affiliative need as implicit and unconscious, and very powerful (McClelland, 1985). In the current study, the need for affiliation is assumed to drive friendship formation and maintenance goals (see Figure 1).

Researchers have begun to ask what features of support are the most adaptive, and why. Baumeister and Leary (1995) observe, "…human beings have a pervasive drive to form and maintain at least a minimum quantity of lasting, positive, and significant interpersonal relationships." (Baumeister & Leary, 1995, p. 497). They further argue that the desire to have proximal, supportive relationships is compelling motivation, similar in strength to the motivation to find food. To provide evidence for their position, they developed criteria to define a fundamental need and reviewed an

extensive literature to illustrate how belongingness meets those criteria. For example, the authors argue that for a desire to qualify as a fundamental need, a person must experience negative effects if the desire is not met. Some of the negative outcomes they address are higher levels of stress, lack of instrumental aid from supportive people, increased risk of illness, and decreased immune system functioning.

Empirical evidence has linked belongingness with reduced loneliness (Baskin, Wampold, Quintana, & Enright, 2010; Chipuer, 2001), and higher self-esteem (Gailliot & Baumeister, 2007). In a recent application of the belongingness hypothesis, Watt and Badger (2009) found that when participants moved to a new community, they typically felt homesick. However, that homesickness was reduced when they felt a strong sense of belonging in the new community.

Baumeister and Leary use empirical research to explain scenarios that will cause a person to feel more or less stress (e.g., Gerstel & Gross, 1982; Govaerts & Dxon, 1988). Of particular relevance to this review, they hypothesize that if one depends on distal people for support, she will experience increased stress and not receive as many of the typical benefits of a supportive relationship, such as relief of stress. Similarly, if one has only acquaintances nearby, and no emotionally close friends, stress will also increase. Therefore, students will experience more stress when experiencing transitions if they are unable to form emotionally close friendships with people near them.

**Summary of Friendship Section**

In summary, theorists have identified conceptual definitions, and patterns of communication, similarity, influence, and intimacy that try to capture the breadth of

the friend relationship. However, the field still lacks a general theory of friendship and friendship formation (Bukowski, Newcomb, & Hartup, 1996; Ladd & Kochenderfer, 1996). Authors tend to use multiple conceptual definitions, or rely on a colloquial understanding of the term friendship without an explicit definition or theoretical basis. Across the research, friendship is believed to have multiple stages of intimacy, serve several functions such as support, and provide a forum for cognitive and social development. Correlational and descriptive evidence (Bandura, 1977; Berndt & Perry 1986; Furman & Burhmester, 1985; Parker & Asher, 1993; Sharabany, Gershoni, & Hofman, 1981; Vygotsky, 1981; Weiss, 1974) support the importance of friendships for competent social and cognitive development, particularly during stressful situations.

## Support Theory

As noted earlier, one of the primary functions of friendship is to provide support within the relationship (Asher & Parker, 1989). In particular, friendship has been shown to provide the following types of support: companionship, emotional, instrumental, informatonal, and self-validation (Aboud & Mendelson, 1996; Bukowski, Hoza, & Boivin, 1994; Cantin & Boivin, 2004; Furman & Burhmester, 1985). This section provides a conceptual definition of support, and discussions of social support's effect on the relation between context and stress.

### Definition of Support

Researchers rarely provide an explicit definition of support. Support is typically defined by its functions, such as companionship, emotional aid, instrumental aid, informational aid (Cantin & Boivin, 2004; Furman & Buhrmester, 1985; Malecki

& Demaray, 2002). Support is an umbrella term for any helpful, bolstering or caring behavior between people. Measures of social support tend to focus on support networks, frequency of support, and perceived support (Chu, Saucier, & Hafner, 2010).

Each dimension has a distinct definition: Emotional support is defined as the provision of trust, love, and empathy by other people (Malecki & Demaray, 2002); informational support is defined as the provision of advice or situationally relevant information by other people (Malecki & Demaray, 2002); instrumental support is defined as the provision of resources such as money, time, and equipment by other people (Malecki & Demaray, 2002); companionship support is defined as social integration and the provision of shared activities with others (Furman & Buhrmester, 1985).

**Attachment Theory.** A branch of support theory has stemmed from research on parent-child relationships. Bowlby (e.g., 1969) laid the foundation for attachment theory, the notion that there is a critical period where infants develop a sense of attachment, or a strong affective bond with parents or caregivers. During this critical period, parents' attentiveness, care for infants' safety and security, and infants' individual characteristics determine whether infants believe the world is a safe, trustworthy place and prefer their caregivers as a secure base, particularly in stressful contexts (Kerns, 1996). Further, an infant's earliest interactions with caregivers create a child's internal working model, or personal understanding of relationships, which can affect her for life (Booth-LaForce & Kerns, 2009). For example, if an infant's earliest relationship with caregivers is responsive and warm, she will learn

that in general, the world is a safe place with positive, supportive relationships. However, if she is neglected or her caregivers are unresponsive and cold, she will learn to expect negative relationships with others.

Ainsworth et al., (1978) found that children are particularly likely to depend on their working models during stressful periods, such as unfamiliar situations with new people. From an attachment theory perspective, whether or not a child can find security and support in a primary caregiver, and safely explore the world around her with the knowledge that they have a home base to which they can retreat (i.e., a secure attachment style) will predict whether the child will have the opportunity and ability to form and maintain intimate friendships. Empirical research has shown that securely attached children have more positive, supportive relationships with peers, and make friends more easily than insecurely attached children (Booth-LaForce & Kerns, 2009; Booth-LaForce, Oh, Kim, Rubin, Rose-Krasnor, & Burgess, 2006; Doyle & Markiewicz, 1996).

**Developmental aspects of support**

Buhrmester and Furman (1987) build upon Sullivan's theoretical framework by examining children's broad social network of support, and how that network satisfies developing needs for companionship and intimacy. Young children's needs for companionship and intimacy are primarily satisfied by parents and a few same-sex friends. Beginning in early adolescence, however, students begin to nominate their friends more than their parents as sources of support.

Lempers and Clark-Lempers (1992) furthered the field's understanding of the developmental aspects of support with a cross-sectional study of how adolescent

relationships change between the ages of 11 and 19. The authors used the Network of Relationships Inventory (NRI: Furman & Buhrmester, 1985) to assess admiration, affection, companionship, conflict, instrumental aid, intimacy, nurturance, relative power, reliable alliance, punishment, and satisfaction from a participant's family, teacher, and best friend. Across early, middle, and late adolescence, participants consistently rated best friends as importance sources of intimacy and companionship. Moreover, beginning in middle adolescence, students also rated friends as important sources of instrumental aid. Finally participants reported that they engaged in less conflict with friends than with parents or siblings.

As mentioned previously in this section, attachment theory stipulates that young children view their parents as a secure base, on which they can depend for support and comfort. Further research has found that as children mature into adolescents and young adults, they experience a secure base shift from parents to friends, and possibly romantic partners (Tanner, 2006).

**Friends as a source of support**

Friends are an important source of social support. During adolescence, friends become more intimate, as opposed to the playmates they were in childhood (Aboud & Mendelson, 1996; Laursen, 1996). Same-aged friends are appropriate confidants, since they tend to have similar cohort experiences. Generally friends are able to be more honest about their emotions and experiences with each other than with parents, teachers, or other peers (Buhrmester & Prager, 1995). Adolescents depend on peers more than other sources of support to reduce stress, and distance themselves from

parents (Burke & Weir, 1978; Buhrmester, 1996). This pattern continues as students enter young adulthood, compounded by a physical distancing from parents.

## Summary

Within a friendship there are multiple types of social support that can be provided, including emotional aid, instrumental aid, informational aid, and companionship. There is also significant theoretical and empirical evidence that predicts the protective relationship between social support and stress. That is, people with supportive relationships, particularly those with supportive friends close by, are less likely to experience high levels of stress. Friendship is one of many relationships that can provide support, but as children enter into adolescence and young adulthood, supporting friendships become more important sources of support. In the current study, I assess emotional, instrumental, informational, and companionship support from transitioning college students' high school and college friends. In the following section I will review the literature regarding how contextual change is associated with stress and poor academic outcomes.

The previous sections reviewed the background literature on friendship, support, and school transitions. The sections included discussions of how stress relates to each variable. Specifically friendship provides support, which acts as a buffer against stress. Stress also typically increases during school transitions. The next stage in this review the relations between support from friends and stress during school transitions includes a systematic analysis of relevant empirical work.

### School-related outcomes during school transitions

As previously mentioned, grades and school belongingness (among other academic outcomes) have been shown to significantly decrease during school transitions (Ding, 2008; Pittman & Richmond, 2008; Simmons & Blyth, 1987). Several factors have been implicated in this finding. First, as students advance through school, academic expectations become higher (Eccles, Lord, & Midgley, 1991). Therefore if a student puts forth the same effort in college that she did in high school, her grades would likely go down due to raised expectations. Second, school size has been shown to impact school belongingness, where students who are in large schools with more unfamiliar peers tend to feel less belonging at school (Simmons & Blyth, 1987). As students advance from elementary school through college, each school is larger than the next. That is, colleges tend to be larger than high schools; high schools tend to be larger than middle schools, and so on. Third, these academic outcomes may affect each other. Specifically, if students feel less belonging at a new school, they may be less motivated to engage actively in academics, which would lead to a decrease in grades.

Regardless of the cause, students with low grades and low school belongingness are less likely to be successful (Larose, Bernier, & Tarabulsy, 2005; Pittman & Richmond, 2008). In particular, they are less likely to complete high school (Lan & Lanthier, 2003), and less likely to complete college (Zheng, Saunders, Shelley, & Whalen, 2002).

## Methodologies and Design

Several methodologies and designs were used in the identified studies that are summarized in Tables 1, 2, and 3. General findings and effect sizes are also affected by a study's methodologies and designs. This section describes common research methodologies and designs that are used to study school transitions. The section also identifies and describes common measures, and statistical analyses.

**Methodologies.** Although different sources of information are used in transition research, self-report is the most common to measure social support over school transitions. These are likert-type measures that ask participants to report their perceptions of social support from different relationships. Examples of these measures include the Network of Relationships Inventory (NRI-Revised; Furman & Buhrmester, 2009) and the Friendship Quality Questionnaire (FQQ: Parker & Asher, 1993). These measures do not define "friend" for the participant, nor are they used to measure the number of friends of a participant.

A few of the studies also gathered self report data from one-on-one interviews or focus groups (Berndt, Hawkins, & Jiao, 1999; Cantin & Boivin, 2004; Kinney, 1993; Newman et al., 2000) which provide qualitative descriptions about support from friends and stress over school transitions. One study out of the 32 documented utilized observation data (Kinney, 1993). The researcher ethologically followed teens entering high school. He found that even outcast students (i.e., "nerds") gained social skills and social support over time.

Levitt and colleagues used a measurement technique called "convoy mapping" (Levitt et al., 2005). Social support was measured through an interview

processed designed for children. Through the use of representative situations, the interviewer asks elementary students to report who in her life provides specific supports, such as emotional, physical health, instrumental, and companionship. An example item is "who would make you feel better when something bothers you or you are not sure about something" (Levitt et al., 2005 p. 403). This procedure allowed Levitt to create a social network map of supports in a child's life, including close family, extended family, and friends. Students were then grouped in clusters based on the supports they received from different sources. A second interview took place after the majority of students had transitioned to middle school. Levitt found that almost all students reported support from close family, but those who also had support from friends or extended family had better adjustment (i.e., less loneliness, better self concept, fewer internalizing behaviors) in middle school than students who depended on close family alone.

The Network of Relationships Inventory (NRI-Revised; Furman & Buhrmester, 2009) is used frequently by researchers to assess students' support from multiple relationships, including friends, parents, and romantic partners. The measure asks about reciprocal supports from multiple relationships, which allows researcher to identify whether different relations afford different support resources. For example, a participant could respond that they receive emotional support from friends, but view parents as their secure base. The NRI is one of the few friendship measures that was created out of theory, and is more aligned with conceptual frameworks of support than other measures (Furman, 1996).

One gap in the measurement of friendship during the transition to college is

the reliance on measures of students' general friend group. That is, the measures ask about "your friends" as opposed to specific dyadic relationships. A potential problem with this measurement strategy is that it asks participants to aggregate all of their friendships, which may be very different from each other, into one answer (Furman, 1996). Therefore, the current study will use the Network of Relationships Inventory (Furman & Buhrmester, 1985; 2009) to ascertain students' nominations of their closest high school and college friends. Although I will not use reciprocal nominations, students will report on their perceived support from specific friends. Information on specific friend dyads should provide more accurate, valid data about friendship than perceived support from the friend group as a whole.

**Designs.** Almost all of the studies were correlational in design. One of the two quasi-experimental studies took advantage of naturally occurring groups of students transitioning to middle school or age matched non-transitioners (Rudolph, Lambert, Clark, & Kurlakowsky, 2001) and found that non-transitioning students experienced significantly less strain and school hassles, and reported higher levels of academic effort and performance. In the other quasi-experimental study, researchers created an intervention designed to help predominantly Latino students with the transition into high school, and compared participants to a control group (Reyes, Gillock, & Kobus, 1994). The intervention gave students information about high school, and provided peer support with a matched high school partner. However, there were no significant effects for the intervention group, though that may be due to a lack of statistical power from a small sample size (57 students in intervention condition) or delayed

effects. The study did report the typical drop in GPA for all students over the high school transition.

Since most processes regarding school transitions happen over time, the studies were conducted with primarily longitudinal, cross-sectional, and sequential designs. The majority of studies across all of the age ranges were short-term longitudinal studies, ranging from a few months to a year. The longest longitudinal analysis followed students from fifth to tenth grade (Barber & Olsen, 2004), and was able to compare students transition into middle school with their transition into high school. Research on the transition from high school to college typically follows students from the beginning of the first semester of college to the end of the first semester of college. In the current study, I extend the typical longitudinal path by following students from the summer before college entry, until the beginning of the second semester of their freshman year.

School transitions occur over time, and research should be longitudinal in order to explore the relevant processes. For example, to assess whether social support from friends moderates the relation between context change and stress, context, support, and stress would need to be measured over time to watch the relationships change. In the current study, I follow students longitudinally beginning the summer before college entry, until the second semester of college to capture the transition process over time.

**Statistical Analyses**

**Variable Centered.** The majority of the articles reviewed used a variable centered approach. Using statistical analyses such as multiple regression, researchers

are able to correlate and predict student outcomes. More sophisticated modeling techniques require large sample sizes that are typically not available in transition studies, except for those that are part of larger projects.

**Person Centered.** A few studies use person centered approaches like cluster analysis (Levitt et al., 2005; Oh, Bowker, Booth-LaForce, Rose-Krasnor, & Laursen, 2008). These methods use different variables to sort students into profiles, and then use the profiles as a grouping variable for further analyses. For example, one study of the transition to middle school (Levitt et al., 2005) sorted students into clusters based on levels of perceived social support from immediate family, extended family, and friends, and then used cluster membership to predict changes in self-concept, loneliness, and internalizing and externalizing behaviors. All three of the groups included high support from immediate family, but one combined it with friends, and one with extended family. The last group only had immediate family. Findings indicated that students with support from more than one source had better self-concepts and lower loneliness.

While person-centered analyses can be useful, they also deny some of the within group variance of the profiles. Students within a range of scores are sorted into categories, and once they are within a profile they are treated as a homogenous group. Further, those groupings depend on a statistical rather than theoretical basis. Although there might be a statistical significance to the groups' differences, they might be impossible to meaningfully interpret.

In the current study, I use a variable centered approach to conduct my analyses. Currently in the field, there is no theoretical reason to group transitioning

college students into profiles for person-centered analyses. However, this may be a potential avenue for future research.

## Discussion

The literature on school transitions provides evidence that support from friends has a positive effect on adjustment. Moreover, in each of these contexts social support has been shown to buffer against stress, though formal tests for moderation are rare. This section serves to compare and contrast findings from each transition, explicate relevant gaps in the literature, and justify the current study's methods, designs and measurement protocols.

Barber and Olsen (2004) provide the most direct comparison across the transitions, since they include both the transition to middle school and high school in their longitudinal findings. Previous work has found that the context change that occurs during these two transitions is significant (Simmons & Blyth, 1987; Eccles, Lord, & Midgley, 1991), and their findings help compare the relative sizes of change. They found that the decline in school liking, and academic and social outcomes was steeper at the onset of middle school than high school. That is, that the transition to middle school was more disruptive than the transition to high school. Perhaps since students have already coped with one school transition, they are better prepared to face the change into high school. Alternatively, it is possible that this difference is due to the number of concurrent transitions that early adolescents face (puberty, dating onset, etc) that are typically resolved by high school.

## Gaps in the Literature

**Theoretical Framework.** While many studies included detailed reviews of previous research, most did not include theoretical models or explanations. A theoretical framework provides structure to research, and without theory it can be difficult to compare across, and organize empirical findings (Furman, 1996). Theories also have the power to extend the transition research by identifying processes, external variables, and unanswered questions (Furman, 1996).

Other than Sullivan's socioemotional development theory and some use of attachment theory, friendship literature tends to lack a strong theoretical basis (Furman, 1996). Therefore it is not surprising that the study of friendship over school transitions is primarily empirically driven and not framed theoretically. The field needs future research that will link theory from the transition, friendship, and stress literatures to create testable conceptual models that explain the process of change.

In the school transition literature, the changing context was usually part of the reasoning for the importance of the study, but not part of a model to organize measurement or analysis. More common was the reliance on Simmons and Blyth's work and other empirical findings to structure research. Of the studies that used theoretical framework, Eccles' development-context mismatch model (person-environment fit), and attachment theory were the most common. Eccles' model is particularly appropriate because it explains why students experience such heightened distress over school transitions: the environment has changed, and is less supportive. Attachment theory also provides an explanation of the importance of friends: they

serve as a secure base and allow students to comfortably explore and adapt to the new environment.

The current study applies Eccles' model on the college transition and includes contextual changes not present in middle school, such as new living arrangements, dramatic peer group changes, and increased distance from parents. The magnitude of the changes, and discrepancies between the young adults' developmental needs (identity exploration within a supportive environment) will be used to predict changes in stress, grades, and school belongingness. I also assess the magnitude of context change experienced by each participant, and test whether context change explains a significant amount of the variance in students' stress, grades, and school belongingness.

**Prior friendships.** During the transition from high school to college, there is an assumption that most students enter without a familiar peer group, and that any friends on campus will be different people than friends in high school. However, particularly in state colleges, many high schools serve practically as feeder schools, where the majority of a graduating high school class attends one college. In his work with kindergarten entry, Ladd (1990) found that children tend to have more positive attitudes towards school if they have more prior friendships in the classroom. It is unclear whether this pattern would continue in a college population, where identity development might drive students away from previous friendships, but it is worth future exploration. In the current study, I assess how many students in the sample came to college with several precollege friends.

**Conceptualizations.** Beyond the mismatch between measurement and conceptualizations of friendship mentioned earlier, within the body of articles many studies fail to provide explicit definitions for concepts such as friendship or support, which can have implications for measurement and comparison across research (Berndt, 1996). Readers are left to infer the researcher's conceptualizations of friendship and support based on the items within the measures they use. The term "peer" is often used interchangeably with friends, which begs the question, are highly supportive peers the same thing as "friends" or do friends provide something beyond general peer support? The evidence in the current review suggests that peers can be accepting or rejecting, and is usually not particularly intimate or emotionally supportive as a whole. However, friends are by definition mutually positive, accepting, supportive relationships. While friends might be part of the peer context, they are not the same thing. Further, when researchers ask students about their friends, without a clear definition, do those students all think of the same types of relationships? It is possible that when researchers want students to respond to questions about friends by thinking of their supportive age-mates, the student thinks of the people she spends the most time with, who might not actually care for her, or her stereotyped idea of what a friend should be.

Another weakness in the literature is the dependence on data from a single source. One way to help bolster a measure's validity is to show it is in concordance with another measure from another source (Isaac & Michael, 1995). Students may not be the best judge of their social outcomes, or the behavioral effects of high stress. Teachers, school administrators, classmates, and parents could be questioned in order

to gain another perspective on the problem. Only four studies used this technique (e.g. Aikins, Bierman, & Parker; 2005; Berndt, Hawkins, & Jiao, 1999; Levitt et al., 2005; Schneider et al., 2008;). Similarly, only one study (Kinney, 1993) used any natural observations of transitioning students to inform the interpretation of the results. In the current study, I ask the upperclass student section leaders to rate the participants on their stress throughout the semester. The use of multiple informants will allow for a test of validity.

## Conclusions

This chapter provided a review of the theory and research regarding support from friends and stress during school transitions. It began with a theoretical context of transition research, friendship, stress, social support, and friendship goals, and concluded with patterns in empirical research across three school transitions. There is ample research describing the risk associated with school transitions. However, this review promotes three recommendations in order to improve the study of support from friends and stress over school transitions, each of which is employed in the current study.

**1. Ground research designs, measurement, and analysis in strong theory. Strong theory provides a framework that explains why variables are related, identifies potential pathways, and generates thoughtful research questions.** There are several relevant theories that can be merged to ground research into process oriented models of change. Friendship theory has begun distinguishing between different functions and forms of friendship, and those differences should be reflected in measurement. Instead of relying only on previous findings, researchers can frame

their questions within a person-environment fit, or ecological systems model in order to gain new insight and perspective on transitions. These theories help researchers consider the context, and take the developmental needs of students into account. In the current study, I use stage-environment fit theory and attachment theory to drive my conceptualization about the importance of friends during the transition to college.

**2. Explicate detailed conceptual definitions of friendship and support dimensions, and use appropriate operationalizations.** Words like friendship and support are complex, and can have multiple meanings. When researchers fail to explicitly state what within the construct they think is most important, and what they plan to measure, it poses a risk to the validity of the inferences drawn from the study. Unclear conceptualizations also make comparisons across studies difficult.

We know that merely having a friend can predict students' outcomes. None of the reviewed studies measured both having a friend and friendship quality in the two later transitions into high school and college. Researchers need to distinguish between the having a friend, and friendship quality, and be careful that their interpretations of findings do not confuse which construct was measured. In the current study, the measurement strategy also allows students to report that they do not have friends, which will allow for the distinction between students with no friends, and students with low friendship quality.

**3. Explore the underlying processes that explain the descriptive decrease in grades, self-esteem, participation, and belongingness, as well as in increase in internalizing behaviors.** Since researchers have described the changes that occur during school transitions, it is time to explore to the processes. Conceptual models

that predict process relationships between variables will help researchers take a more process oriented approach. In the current study, I test whether support from friends moderates the relation between context change and stress, and whether students with more emotional aid, instrumental aid, informational aid, and companionship experience less stress over school transitions. Moreover, I test the extent to which stress serves as a mediator between context change and school outcomes. I predict that more stress will predict school withdrawal and decreased academic engagement. There is an extended body of research illustrating the potential challenges to healthy development across different school transitions. The next task of the field is to optimize students' academic, social, and psychological outcomes by identifying factors that increase and decrease their risk. These recommendations will move the field forward from simply describing the changes during school transitions to explicating the underlying processes.

Table 1. Elementary to Middle School Transition Empirical Findings.

| *Citation* | *Sample* | *Design* | *Methods* | *Findings* | | |
|---|---|---|---|---|---|---|
| | | | | *Friendship as Predictor of Adjustment* | *Stress in Relation to Transitions* | *Support as a Predictor of Decreased Stress* |
| Aikins, Bierman, & Parker, 2005 | 111 6th graders and best friends | Correlational; Longitudinal | Self report, friend report, parent report | Stable friendships predicted better school adjustment | - | - |
| Barber & Olsen, 2004 | 933 5th graders, (minus attrition) 71% White, middle income | Correlational; Longitudinal | Self report | Decreased interpersonal functioning over transition | Decreased school environment quality, particularly in larger context transition | - |
| Berndt, Hawkins, & Jiao, 1999 | 101 6th graders, White, middle class | Correlational; Longitudinal | Self report surveys and interviews, Interviews, teacher report, peer nominations | High quality, stable friendships predicted better school adjustment | - | - |
| Cantin & Boivin, 2004 | 200 6th graders, French Canadian | Correlational; Longitudinal | Self report interviews | Social friend network decreased, support from friends increased | | |
| Fenzel, 2000 | 116 5th graders, 90% White | Correlational; Longitudinal | Self report surveys | Friend support predicts less strain | - | Yes |

| *Citation* | *Sample* | *Design* | *Methods* | *Findings* | | |
|---|---|---|---|---|---|---|
| | | | | *Friendship as Predictor of Adjustment* | *Stress in Relation to Transitions* | *Support as a Predictor of Decreased Stress* |
| Fenzel & Blyth, 1986 | 410 6th graders, White, middle class | Correlational; Longitudinal | Self report | Peer contact and intimacy predicted gains in self esteem for males | - | Yes, for boys |
| Hardy, Bukowski, & Sippola, 2002 | 134 6th graders, Canadian | Correlational; Longitudinal | Peer nominations, school data | Peer rejection was stable, peer acceptance unstable, student made new friends | - | - |
| Hirsch & DuBois, 1992 | 143 6th graders, 73% White | Correlational; Longitudinal | Self report | Peer support was a negative predictor of psychiatric symptoms | - | Yes |
| Hirsch & Rapkin, 1987 | 159 6th graders, 74% White | Correlational; Longitudinal | Self Report | Peer support for academically successful Blacks increased | Perceived quality of school life sig decreased | - |
| Kingery & Erdley, 2007 | 146 5th graders, 99% White | Correlational; Longitudinal | Self report, Peer nominations | Mutual friends, friend quality, and peer acceptance predict better adjustment | - | - |
| Kingery, Erdley, & Marshall, 2011 | 365 5th graders 99% White | Correlational; Longitudinal | Self-report, Peer nomination, School data | Peer acceptance, number of friends, and friendship quality predicted better adjustment | - | - |

| *Citation* | *Sample* | *Design* | *Methods* | *Findings* | | |
|---|---|---|---|---|---|---|
| | | | | *Friendship as Predictor of Adjustment* | *Stress in Relation to Transitions* | *Support as a Predictor of Decreased Stress* |
| Levitt, Levitt, Bustos, Crooks, Santos, Telan, Hodgetts, & Milevsky, 2005 | 691 4th and 6th grade children | Correlational; Sequential | Self report, Teacher report | Students with close family and friends reported better self concepts and lower loneliness than those without friends | - | - |
| Oh, Bowker, Booth-LaForce, Rose-Krasnor, & Laursen (2008) | 342 5th graders, ethnically diverse county | Correlational; Longitudinal | Self-report, Peer nominations. | Students in the increasing social withdrawl class had significantly less friendship involvement after transition | - | - |
| Rudolph, Lambert, Clark, & Kurlakowsky, 2001 | 329 5th graders, 187 transitioning | Quasi-Experimental; Longitudinal | Self report, Teacher report | - | Non-Transitioning students had sig lower chronic strain in 6th grade | - |
| Schneider, Tomada, Normand, Tonci, & de Domini, 2008. | 434 10-year-olds Italian, diverse SES | Correlational; Longitudinal | Self report, Peer nomination, Parent report | Friend support not as powerful as parent support | - | - |
| Seidman, Allen, Aber & Mitchell, 1994 | 580 pretransition 5th or 6th graders, ethnically diverse | Correlational; Longitudinal | Self report | Friend conflict decreased, noncompliant values increased | Daily hassles at school increased over transition | - |

| *Citation* | *Sample* | *Design* | *Methods* | *Findings* | | |
|---|---|---|---|---|---|---|
| | | | | *Friendship as Predictor of Adjustment* | *Stress in Relation to Transitions* | *Support as a Predictor of Decreased Stress* |
| Wigfield, Eccles, Iver, Reuman, & Midgley, 1991 | 1850 6th graders, low-middle income | Correlational; Longitudinal | Self report | Boys social ability self concept decreased over transition; | - | - |
| Yamamoto & Ishii, 1995 | 8 elementary schoolers, Japanese | Qualitative; Longitudinal | Self report | More friends predicted adjustment and decreased anxiety | - | Yes |

Note: - indicates the findings were not mentioned in the study

Table 2. Middle School to High School Transition Empirical Findings.

| *Citation* | *Sample* | *Design* | *Methods* | *Findings* | | |
|---|---|---|---|---|---|---|
| | | | | *Friendship as Predictor of Adjustment* | *Stress in Relation to Transitions* | *Support as a Predictor of Decreased Stress* |
| Barber & Olsen, 2004 | 933 5th graders, (minus attrition) 71% White, middle income | Correlational; Longitudinal | Self report | Decreased interpersonal functioning over transition | Decreased school environment quality, particularly in larger context transition; MS transition more disruptive than elem | - |
| Barone, Aguirre-Deandreis, & Trickett, 1991 | 103 14-year-olds, 59% Black, 28% White, 10% Hispanic | Correlational; Longitudinal | Self report, School report | Friend support predicted decreased state anxiety, social environmental task difficulty | - | Yes |
| Benner & Graham, 2009 | 1,979 7th graders, 46% Latino, 21% Black, 11% Asian, 9% White, 13% multiethnic | Correlational; Longitudinal | Self report, School report, State report, CDE website | - | Anxiety increased, short term effect | - |

| *Citation* | *Sample* | *Design* | *Methods* | *Findings* | | |
|---|---|---|---|---|---|---|
| | | | | *Friendship as Predictor of Adjustment* | *Stress in Relation to Transitions* | *Support as a Predictor of Decreased Stress* |
| Kinney, 1993 | 81 High School Students | Qualitative Ethnography; Retrospective | Self report interviews and focus groups, observations | "Nerds" in middle school find social support in high school | - | - |
| Newman, Lohman, Newman, Myers, & Smith, 2000 | 29 8th and 9th graders, low income, racial minorities | Qualitative; Cross Sectional | Self report surveys and interviews, School report | High academic performers had similarly achieving friends | - | - |
| Newman, Newman, Griffen, O'Connor, & Spas, 2007 | 104 (60 followed longitudinally) 8th graders, 101 9th graders, White, middle class | Correlational; Sequential | Self report | Social support from friends predicts reduced depression | Perceived school belongingness decreases, depression increases | - |
| Reyes, Gillock, & Kobus, 1994 | 145 8th graders, (57 in transition intervention program) primarily Hispanic | Quasi-Experimental; Longitudinal | Self report | Perceived support from friends decreased over transition for all students | - | - |

Note: - indicates the findings were not mentioned in the study

Table 3. High School to College Transition Empirical Findings.

| *Citation* | *Sample* | *Design* | *Methods* | *Findings* | | |
|---|---|---|---|---|---|---|
| | | | | *Friendship as Predictor of Adjustment* | *Stress in Relation to Transitions* | *Support as a Predictor of Decreased Stress* |
| Bohnert, Aikins, & Edidin, 2007 | 85 High School Seniors, White, Black and Asian | Correlational; Longitudinal | Self report | Friendship quality moderated the relation between activity and loneliness | - | Yes |
| Larose & Boivin, 1998 | 298 High School Seniors, Quebec | Correlational; Longitudinal | Self report | - | - | Yes |
| Mounts, Valentiner, Anderson, & Boswell, 2006 | 350 College Freshmen, 61% White, 19% Black | Correlational | Self report | Low friendship quality predict depression and anxiety | - | Yes |
| Oswald & Clark, 2003 | 137 College Freshmen, Primarily White | Correlational; Longitudinal | Self report | Students became less close to high school best friends over time | - | Yes |
| Parade, Leerkes, & Blankson, 2010 | 172 High School Seniors, all female, 30% minority | Correlational; Longitudinal | Self report | Parent attachment predicted friendmaking | - | - |
| Paul & Brier, 2001 | 70 College Freshmen, 87% White | Correlational; Longitudinal | Self report | Friend maintenance predicted loneliness; concern for making new friends negatively predicted loneliness | - | Yes |

| *Citation* | *Sample* | *Design* | *Methods* | *Findings* | | |
|---|---|---|---|---|---|---|
| | | | | *Friendship as Predictor of Adjustment* | *Stress in Relation to Transitions* | *Support as a Predictor of Decreased Stress* |
| Stearns, Buchmann & Bonneau, 2009 | 800 College Freshmen | Correlational; Longitudinal | Self report | Exposure, minority status, and cultural groups lead to interracial friendships | - | - |
| Swenson, Nordstrom, & Hiester, 2008 | 271 College freshmen | Correlational; Longitudinal | Self report | Support from HS friends is important in the beginning of the semester, but for longer term adjustment college students need new friends | - | Yes |

Note: - indicates the findings were not mentioned in the study

# Chapter 3: Method

This chapter describes the planned design, procedure, measures, and analysis for the current study. The elements of the study are driven by the following research questions:

1. To what extent does the change in context as assessed prior to entering college during the college transition predict school-related outcomes at the beginning of the second semester of college?

2. To what extent do levels of stress prior to college entry, the beginning of the first semester, and the end of the first semester mediate the relationship between the change in context and school outcomes at the beginning of the second semester during the transition to college?

3. To what extent do levels of support (i.e., emotional, informational, instrumental, and companionship) from high school and college friends moderate the relations between stress and school-related outcomes among emerging adults during the transition to college?

4. To what extent do precollege friendship formation and maintenance goals predict social support (i.e., emotional, informational, instrumental, and companionship) from friends among emerging adults during the transition to college?

## Design

Incoming college students completed measures of their transition context change, stress, school-related outcomes, support from college friends, support from high school friend, friendship maintenance goals, and friendship formation goals at four longitudinal

time points. Data collection began in July, 2011 and concluded in February, 2012. Data were collected once during the summer, twice during the fall semester, and once during the spring semester. The study is designed to be correlational and tests for relations among variables across the four time points.

**Participants**

Data were collected from 172 transitioning college freshmen. However, not every participant provided data for every time point of data collection. One hundred and thirty-one students participated in Time 1, 136 students participated in Time 2, 152 students participated in Time 3, and 125 students participated in time 4. While only 39 students participated in all four time points, 121 students participated in at least three points. Issues of attrition and missing data are discussed in more detail in chapter 4.

As mentioned in chapter two, medium effect sizes are common within the study of school transitions, particularly with respect to school-related outcomes (Barone et al., 1991; Bohnert, Aikins, & Edidin, 2007; Fenzel, 2000; Hardy, Bukowski, & Sippola, 2002; Paul & Brier, 2001). According to an *a priori* power analysis assuming medium effect sizes in a regression context, a minimum sample of 178 students was needed to detect significant differences with the original analytic plan. Below, I will describe how I adapted the statistical models to account for the smaller sample size.

Participants were identified in the spring of their senior year of high school by their acceptance into the Gemstone Program, a living-learning program at the University of Maryland, which began in Fall 2011. In the Summer of 2011, after receiving approval from the Internal Review Board at the University of Maryland, the staff of the Gemstone

program emailed me all of the names and email addresses of their incoming students so that I could contact them for the precollege measure. The program requires high levels of academic achievement for admittance. The exact academic requirements change each year, but Gemstone students represent the portion of the top 10% of Honors students who choose to participate. According to the Gemstone website, in 2009 new Gemstone students had "an average weighted GPA of 4.5, and average SAT score of 1459" (University of Maryland, 2010). In freshman year, Gemstone students typically live in the same dorm. The directors of Gemstone approved the project, and provided in-class access to the new freshmen class during two required courses, Gems 100 (Fall semester), and Gems 102 (Spring semester). Gender distribution of the total sample was nearly equal; 49.4% of students were female. The sample was primarily Caucasian (55.2%) and Asian (30.2%), and the remaining students were Multi-Ethnic (6.4%), African-American (4.1%), Latino (1.2%), and Pacific Islanders (1.2%). Three students did not report their ethnicities.

While most students were not immigrants to the United States themselves, more than one-third of the students were the children of immigrants. Specifically, 83.1% of students reported they were born in the United States (two students did not report), 57.0% reported that their mothers were born in the United States (two students did not report), and 58.1% reported that their fathers were born in the United States (one student did not report).

**Procedures**

During the spring of 2011, I met with the Gemstone administration and student section leaders to explain the purpose of the project: "learning how friendship helps students successfully transition into college." During the summer of 2011, participants received an email describing the study, so they were able to provide informed consent before the first round of data collection.

Participants were followed longitudinally, with measures at specific milestones during the transition to college. Those milestones included (T1) within a month before college entry; (T2) the beginning of the first semester; (T3) the end of the first semester; and (T4) the beginning of the second semester. The pre-college measures were administered online and at summer orientation events. Students who participated through the online assessment were emailed a link to the survey. The college measures were administered during a required class for program participants.

Gemstone staff members and section leaders were informed of the dates for data collection. Surveys took approximately 20 minutes to complete. Participants completed surveys in Gemstone classrooms with approximately 12 other students in the room. Students under the age of 18 were excluded from the study unless they were able to provide parental consent; no student under 18 provided a parental consent form.

All consent forms informed the students that they would be asked to complete measures related to their transition context, stress, support from friends, friendship goals, and school-related outcomes. As an incentive to remain in the study across the four time points, participants were entered in a raffle for three iTunes gift cards for each time point

in which they participate. Students could win one of two $50 gift cards or a $30 gift card. Students were informed that the winner would be selected from the participants after data collection has concluded.

**Measures**

Student self-report data were used to assess all variables of interest. In addition, as a validation of the stress measure, upperclass student section leaders who lead the required freshmen courses, were asked to report on their students' stress. Table 4 contains a description of the variables measured at each time point. Full copies of each measure can be found in Appendix B.

Table 4. Measurement plan at each time point

| | **T1: Precollege** | **T2: Beginning of Fall Semester** | **T3: End of Fall Semester** | **T4: Beginning of Spring Semester** |
|---|---|---|---|---|
| Context Change | *Included* | - | - | - |
| Stress | *Included* | *Included* | *Included* | *Included* |
| GPA | *Included* | - | - | *Included* |
| School Belongingness | - | *Included* | *Included* | *Included* |
| Supports from High School Friends | *Included* | *Included* | *Included* | *Included* |
| Supports from College Friends | - | *Included* | *Included* | *Included* |
| Friendship goals | *Included* | - | - | - |
| Demographics | *Included* | *Included* | *Included* | *Included* |

**Extent of Context Change.** The degree to which a student experienced a change in context was operationalized in four ways: difference in school size, difference in peer group, physical distance between high school and college, and whether students are part of a committed romantic relationship on campus. These effects were treated as cumulative context-change variables, similar to the way that researchers measure cumulative risk (Sameroff, Seifer, Baldwin, & Baldwin, 1993). Specifically, values were assigned to each contextual aspect based on the distribution of scores. Responses to each question were divided on a median split to create two categories, high change and low change. High change groups were assigned the value of 1 and low change groups were assigned the value of 0. This method was chosen to build off of the cumulative risk measurement strategies (Sameroff, Seifer, Baldwin, & Baldwin, 1993) to ensure variability of scores within the sample. Each student's context change aggregate score was calculated by summing the number of high change groups to which she belonged.

Difference in school size was assessed with the question, "Approximately how large was your high school?" Students from above-median sized high schools were rated as low-change, and students from below-median sized high schools were rated as high-change. Difference in peer group was assessed with the two items, "Approximately how many people from your high school class are now attending the University of Maryland?" and "Approximately how many of your close friends from high school are now attending the University of Maryland?" High numbers of overlapping peers was rated as low-change, and low numbers of overlapping peers was rated as high-change because those

students would face a more unfamiliar peer context than students who came to the University with Many friends.

Distance between high school and college was assessed with the item, "How many miles is this college from your permanent home?" I also asked students to list their hometown city and state to verify the distance. Students who are physically far from their high schools were rated as high-change, and students who are close to their high schools were rated as low change because students who traveled farther to college are also farther from home support and familiar settings. For each of these school demographic and location questions, students were provided with the option of reporting that they did not know the information.

As romantic relationships are a potential source of support that may change during the college transition for many students, romantic relationships were assessed with the three items, "Are you currently in a committed romantic relationship with someone from your high school?" "Does your romantic partner attend the University of Maryland?" and "In the last month, have you experienced the end of a romantic relationship?" Students who are either in romantic relationships with partners who are far away or who have recently ended a relationship were rated as high-change, and those in on-campus romantic relationships were rated low-change because these students have the continuity of a proximal romantic partner across the transition. Students who are not in a romantic relationship were rated as low change because they are not adjusting to a new status during the college transition.

Context change regarding close friendships were assessed using the two items, "Does your very best friend attend the University of Maryland?" and "In the last month, have you experienced a relationship-ending altercation with your very best friend?" Students who have access to their very best friend on campus were rated as low change, and students who had recently ended their friendship were rated as high change.

Table 5. Item level context change variable median values.

| Context Change Variable | Median | Minimum | Maximum |
|---|---|---|---|
| High school size | 4.50 | 1 (< 10 Students) | 10 (> 4000 Students) |
| Distance from high school | 3 | 1 (< Five Miles) | 6 (> 500 Miles) |
| Number of high school peers attending UMD | 3.00 | 1 (< 10 Students) | 9 (> 200 Students) |
| Number of close high school friends attending UMD | 6.0 | 0 | 16 |

**Friendship Support.** The friend subscale of the Network of Relationships Inventory (NRI-Revised; Furman & Buhrmester, 2009) was used to assess emotional and companionship support from high school and college friends. The NRI is one of the few measures of friendship based on theory (Furman, 1996). Furman and Buhrmester (1985; 2009) based the NRI on attachment theory and Robert Weiss's (1974) work on the social networks of children. Weiss hypothesized that different sources of support could provide children with different resources, which is why the full version of the measure asks participants about friends, peers, parents, and other relationships.

The NRI was be used to measure students' companionship and emotional support from their high school and college friends. The measure asks about supports from

specific people, so participants nominated up to five of their closest high school friends and five closest college friends and report on these relationships. I chose to limit the nominations to the closest five friends to access information about the participant's intimate clique friendships.

The selected subscales of the NRI include "seeks secure base" for emotional support (e.g., "How much does this person encourage you to try new things that you'd like to do but are nervous about?"), and companionship (e.g., How much do you and this person spend free time to together?"). Participants rated all scale items using six-point Likert scales (1 = *Little or none*, 6 = *the Most*). The subscales of seeking safe haven and seeking a secure base were used as a measure of emotional support. Previous reports of scale reliabilities ranged from .81 to .91 (Furman & Buhrmester, 2009). Previous test-retest information was not available, but scores would not necessarily remain consistent over time. Furman and Buhrmester (1985) developed the items in the NRI, with strict adherence to conceptual definitions of friendship (Furman, 1996). Further, previous versions of the scales have been used to find similar results in multiple countries, including Indonesia (French, Rianasari, Pidada, Nelwan, & Buhrmester, 2001), Brazil (Van Horn & Marques, 2000), and Costa Rica (DeRosier & Kupersmidt, 1991), which provide further evidence for construct validity. In the current study, the emotional and companionship support scales show acceptable reliability across the four time points and two contexts (high school support and college support), ranging from .78 to .95 (see Table 6). Alpha values are presented for each friend to provide evidence that information gathered on the fifth friend was as reliable as information gathered on the first friend.

To examine instrumental and informational support, I used the Child and Adolescent Social Support Scale – Level 2 (CASSS; Malecki & Demaray, 2002) The CASSS is based on Tardy's (1985) theoretical conceptualization of social support. Specifically, Tardy conceptualized social support as a multi-faceted, bidirectional construct. The CASSS level 2 was designed for use with 12$^{th}$ grade subjects, and I selected the instrumental and informational support subscale items from the classmate and close friends scales.

Four items reflect instrumental support (e.g., "shares his or her things") and three items reflect informational support (e.g., "gives me advice"). Participants responded to all scale items using a six-point Likert scale (1 = *Never*, 6 =*Always*). Since I used the CASSS in conjunction with the NRI, participants answered each question with regard to their five closest high school friends and five closest college friends. Previous reports of scale reliabilities ranged from .92 to .95 (Malecki & Demaray, 2002). Previous test-retest information was not available, but scores would not necessarily remain consistent over time. In terms of criterion validity, the CASSS has been found to converge with other theoretically-related constructs such as self-concept and social skills (Malecki & Demaray, 2002). In the current study, the instrumental and informational support scales show acceptable reliability across the four time points and two contexts (high school support and college support), ranging from .74 to .95 (see Table 6).

Students identified up to five close friends from high school and five close friends from college. Frequencies of number of friends nominated at teach time point are presented in Table 46 in Appendix B. Information on each relationship was aggregated

into a score for instrumental and informational support from high school friends and college friends. Each friend's subscale score was averaged across items, and then summed with the other friend scores for each subscale. These summations take into account the number of close friends students nominate; it is likely that students gain more social support when they have more close friends.

I examined whether emotional, informational, instrumental, and companionship support represent independent predictors of student outcomes using confirmatory factor analysis. I compared model fit indices of a four-factor model with a one-factor model that combines the four dimensions into one factor. Results of these analyses are presented in Chapter 4.

Table 6. Support internal reliability values

| Variable | T1 Alpha | T2 Alpha | T3 Alpha | T4 Alpha |
|---|---|---|---|---|
| HS Emo | F1 = .84 | F1 = .89 | F1 = .94 | F1 = .94 |
| | F2 = .80 | F2 = .91 | F2 = .92 | F2 = .93 |
| | F3 = .88 | F3 = .90 | F3 = .90 | F3 = .93 |
| | F4 = .86 | F4 = .91 | F4 = .92 | F4 = .91 |
| | F5 = .85 | F5 = .94 | F5 = .88 | F5 = .93 |
| HS Inst | F1 = .79 | F1 = .83 | F1 = .87 | F1 = .88 |
| | F2 = .85 | F2 = .88 | F2 = .86 | F2 = .79 |
| | F3 = .79 | F3 = .80 | F3 = .84 | F3 = .83 |
| | F4 = .81 | F4 = .87 | F4 = .87 | F4 = .86 |
| | F5 = .86 | F5 = .85 | F5 = .82 | F5 = .82 |
| HS Info | F1 = .87 | F1 = .91 | F1 = .93 | F1 = .95 |
| | F2 = .88 | F2 = .93 | F2 = .92 | F2 = .90 |
| | F3 = .89 | F3 = .90 | F3 = .91 | F3 = .91 |
| | F4 = .86 | F4 = .90 | F4 = .92 | F4 = .92 |
| | F5 = .93 | F5 = .90 | F5 = .91 | F5 = .87 |
| HS Comp | F1 = .84 | F1 = .92 | F1 = .93 | F1 = .93 |
| | F2 = .86 | F2 = .93 | F2 = .93 | F2 = .94 |
| | F3 = .89 | F3 = .92 | F3 = .93 | F3 = .95 |
| | F4 = .89 | F4 = .91 | F4 = .93 | F4 = .92 |
| | F5 = .83 | F5 = .93 | F5 = .93 | F5 = .91 |
| College Emo | - | F1 = .82 | F1 = .87 | F1 = .90 |
| | | F2 = .78 | F2 = .89 | F2 = .90 |
| | | F3 = .80 | F3 = .91 | F3 = .91 |
| | | F4 = .84 | F4 = .85 | F4 = .84 |
| | | F5 = .83 | F5 = .87 | F5 = .91 |
| College Inst | - | F1 = .75 | F1 = .80 | F1 = .84 |
| | | F2 = .74 | F2 = .85 | F2 = .90 |
| | | F3 = .79 | F3 = .82 | F3 = .84 |
| | | F4 = .80 | F4 = .78 | F4 = .88 |
| | | F5 = .76 | F5 = .86 | F5 = .90 |
| College Info | | F1 = .85 | F1 = .87 | F1 = .90 |
| | | F2 = .82 | F2 = .87 | F2 = .91 |
| | | F3 = .86 | F3 = .91 | F3 = .91 |
| | | F4 = .82 | F4 = .88 | F4 = .93 |
| | | F5 = .84 | F5 = .89 | F5 = .92 |
| College Comp | | F1 = .90 | F1 = .89 | F1 = .90 |
| | | F2 = .85 | F2 = .92 | F2 = .87 |
| | | F3 = .91 | F3 = .87 | F3 = .88 |
| | | F4 = .86 | F4 = .89 | F4 = .91 |
| | | F5 = .88 | F5 = .86 | F5 = .91 |

*Note.* F1 = friend 1; F2 = friend 2; F3 = friend 3; F4 = friend 4; F5 = friend 5; HS = high school; Emo = emotional support; Inst = instrumental support; Info = informational support; Comp = companionship support
Variable n's range from 113 to 150.

**Friendship Goals.** An adaptation of the Precollege Concerns Questionnaire (Paul & Brier, 2001) asked students what they want to do in college. Originally this measure was used to examine whether students worried about forming new friendships or maintaining precollege friendships. Four items examined the new friend goal subscale (e.g., "find someone at college I can be really close to"; 1 = *I do not want to do this at all*, 6 = *Definitely want to do this*) and three items examined the precollege maintenance goal subscale (e.g., "keep in touch with my hometown friends"; 1 = *I do not want to do this at all*, 6 = *Definitely want to do this*). One item ("become popular in college") was deleted from the friendship formation subscale because it altered the reliability estimate below an acceptable value. The three remaining friendship formation items and three remaining friendship maintenance items were averaged to yield two composite scores. In previous work, the subscale alphas were .82 for new friend concern, and .82 for precollege maintenance concern (Paul & Brier, 2001). Previous test-retest information was not available. In terms of criterion validity, the Precollege Concerns Questionnaire has been found to converge with measures of anxiety (Paul & Brier, 2001). In the current study, the precollege friendship formation goal scale show a Cronbach alpha of .76) and the precollege friendship maintenance goal had a Chronbach alpha of = .57 (see Table 7).

**Stress.** Student stress was examined using the Perceived Stress Scale (Cohen, Kamarck, & Mermelstein, 1983). The 14-item scale measures general stress experienced over the past month (e.g., "In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?"). Participants rated all scale items using a six-point Likert scale (0 = *Never*, 5 = *Very Often*). Previous reports of scale

reliabilities ranged from .84 to .86 (Cohen, Kamarck, & Mermelstein, 1983). In the current study, the stress scales show acceptable reliability across the four time points, ranging from .86 to .89 (see Table 7).

To provide evidence of criterion validity, the Perceived Stress Scale was also be adapted for use by the upperclassmen section leaders who instruct the introductory classes. At T3, the section leaders were asked to rate their students' stress using three adapted items about how stressed their students have appeared over the last month (e.g., "In the last month, how often has this student appeared nervous and 'stressed?'"). Section leaders rated all scale items using a six-point Likert scale (0 = *Never*, 5 = *Very Often*). Unexpectedly, section leaders rated stress significantly, though weakly, correlated with student self-reported stress at T1($r = .20$, $p < .05$) and T2 ($r = .20$, $p < .05$), but not at T3 $r = .16$, $p = .05$) or T4 ($r = .17$, $p = .07$). Potential reasons for this weak relation will be discussed in chapter 5, but the students' self-report scores were used alone in subsequent analyses because they were determined to be the most appropriate sources of information about internal feelings of stress.

**School-Related Outcomes.** Grades and campus belongingness were examined as school-related outcomes. Grades were examined using participants' report of grade point averages from their last semester of high school, and their first semester of college. Participants selected from a range of GPA scores where a selection of 1 = *0.0 – 0.5*, up to a selection of 9 = *Over 4.0*). Campus belongingness was be examined using 10-items from the Revised Psychological Sense of School Membership Scale (PSSM) for general university belonging (Freeman, Anderman, & Jensen, 2007). The measure was adapted

from Goodenow's (1993) Psychological Sense of School Membership (PSSM) for a college setting. The items were drawn from two subscales: university belonging, and social acceptance (e.g., "People at this university are friendly to me"; ""I feel proud of belonging to this university's community."). Participants rated all items using a six-point Likert scale (1 = N*ot at all true of me*, 6 = *Completely true of me*). Previous reports of scale reliabilities ranged from .79 to .83 (Goodenow, 1993). In the current study, the belonging scale shows acceptable reliability across the four time points, ranging from .84 to .89 (see Table 7).

Table 7. Internal reliability values

| Variable | T1 Alpha | T2 Alpha | T3 Alpha | T4 Alpha |
|---|---|---|---|---|
| Stress | .87 | .88 | .89 | .86 |
| Form Goal | .76 | .73 | .74 | .82 |
| Main Goal | .57 | .70 | .64 | .73 |
| HS Belongingness | .85 | - | - | - |
| College Belongingness | - | .84 | .88 | .89 |

*Note.* HS = high school; Form Goal = friendship formation goal; Main Goal = friendship maintenance goal.

Variable n's range from 121 to 152.

**Demographics.** Participants also completed a general background measure that asked their sex, age, and race. For race, students were asked to select one or more of the following: *White, Black or African-American*, *Hispanic or Latino*, *Asian*, *American Indian or Alaska Native*, and *Native Hawaiian or Other Pacific Islander*. These ethnic

categories are the same as those used in the admissions process at the University of Maryland.

# Chapter 4: Results

This study examined the role of friendships as related to stress, college belongingness, and grades during the transition from high school to college. Further, it explored the extent to which precollege friendship formation and maintenance goals predict support from two sources: high school friends and college friends. Relations within a theory-driven conceptual model were tested using multiple regression and latent variable path analysis.

In this chapter I describe the data and present findings for the analyses pertaining to the research questions. First, the assumptions of normality, linearity, and homoscedasticity are examined. Second, patterns of missing data and imputations are described. Third, descriptive analyses regarding central tendency, variability, and bivariate correlations are presented. Fourth, mean differences across the four time points are described. Fifth, the results of a confirmatory factor analysis examining the underlying structure of the social support scales are provided. Finally the core findings that examine the conceptual model using multiple regression and structural equation modeling are described.

## Model Assumptions

### Normality.

Each scale's skew and kurtosis values were calculated to examine scale normality. Skew values examine horizontal asymmetry within data and kurtosis values examine vertical non-normality within data, specifically that there are many more or many fewer scores at the mean than in a normal distribution. Normality statistics are presented in

Table 8, and results from these analyses will drive decisions later in the chapter. One variable had a statistic that indicated non-normality: the kurtosis statistic for friendship formation goal was above the 3.0 kurtosis value threshold (Finney & Distefano, 2006). A likely source of the high kurtosis value is that there were two outlier values that were more than three standard deviations away from the mean ($M_{\text{formgoal}}$ = 5.38, *sd* = .68, outlier value 1 = 1.67, outlier value 2 = 1.88). However, these scores are part of the naturally occurring continuum of friendship goals. Conceptually speaking it is likely that some students had very low friendship formation goals, and these students should not be removed from the analyses. The decision was made to leave both scores in the dataset because there was more than one student with a very low score, and none of the other survey responses from these students was aberrant. This decision to leave the two outlying scores in the data will violate the assumption of normality for the friendship formation goal variable. Therefore, as the data are later shown to be non-normal, friendship formation goals were analyzed using latent variable path analysis, and test statistics and estimates robust to violations of normality were used.

Table 8. Skew and kurtosis values using original data.

| | Skewness (SE) | | | | Kurtosis (SE) | | | |
|---|---|---|---|---|---|---|---|---|
| **Variable** | **T1** *Precollege* | **T2** *Sept* | **T3** *Dec* | **T4** *Jan* | **T1** *Precollege* | **T2** *Sept* | **T3** *Dec* | **T4** *Jan* |
| Context Change | .13 (.20) | - | - | - | -.53 (.39) | - | - | - |
| Stress | .00 (.22) | .23 (.21) | -.16 (.20) | -.01 (.22) | -.42 (.43) | -.32 (.41) | -.33 (.37) | -.62 (.44) |
| HS Emo | -.59 (.22) | -.28 (.21) | -.22 (.20) | -.13 (.22) | .53 (.44) | -.21 (.42) | -.79 (.40) | -.74 (.44) |
| HS Inst | -.42 (.22) | .12 (.21) | .11 (.20) | .09 (.23) | .67 (.44) | -.47 (.42) | -.80 (.40) | -.66 (.45) |
| HS Info | -.43 (.22) | .01 (.21) | -.01 (.20) | .01 (.23) | .53 (.44) | -.50 (.42) | -.84 (.40) | -.76 (.45) |
| HS Comp | -.73 (.22) | .24 (.21) | .13 (.20) | .04 (.22) | 1.07 (.44) | -.56 (.42) | -.82 (.40) | -.94 (.44) |
| Col Emo | - | -.39 (.21) | -.42 (.20) | -.38 (.22) | - | -.30 (.42) | .01 (.39) | -.18 (.44) |
| Col Inst | - | -.31 (.21) | -.22 (.20) | -.18 (.23) | - | -.17 (.42) | -.14 (.40) | -.28 (.45) |
| Col Info | - | -.33 (.21) | -.29 (.20) | -.20 (.23) | - | -.25 (.42) | -.25 (.40) | -.29 (.45) |
| Col Comp | - | -.70 (.21) | -.68 (.20) | -.60 (.03) | - | -.01 (.42) | .16 (.40) | -.03 (.44) |
| Form Goal | -1.94 (.22) | - | - | - | 6.70 (.43) | - | - | - |
| Main Goal | -.36 (.22) | - | - | - | -.48 (.43) | - | - | - |
| HS Belong | -.31 (.22) | - | - | - | -.68 (.44) | - | - | - |
| Col Belong | - | -.69 (.21) | -.68 (.20) | -.38 (.22) | - | .10 (.41) | .09 (.39) | -.44 (.44) |

*Note.* HS = high school; Col = college; Emo = emotional support; Inst = instrumental support; Info = informational support; Comp = companionship support; Form Goal = friendship formation goal; Main Goal = friendship maintenance goal

Variable n's range from 113 to 152.

**Linearity**

The assumption of linearity requires that there is a linear relationship between the independent and dependent variables, as opposed to a curvilinear or quadratic relationship. One way to examine for linearity is through an examination of the residuals, or the variance of the dependent variable left unexplained by the predictor variables. While the normality of the residuals does not indicate normality *per se*, if a plot of the residuals is extremely skewed in its distribution, it is taken as evidence that the relationship between the predictors and the outcome variables may be nonlinear. Residuals plots for each relationship are provided in Figures 18-26 in Appendix B. Because there were variables that served as both independent and dependent variables, two sets of residuals plots are presented. In the first set, context change is used to predict college GPA, college belongingness, and stress, and figures for these three dependent variables are provided across three time points. In the second set of plots, stress is used to predict college GPA and college belongingness, and figures for both of these dependent variables are provided. The figures indicate that there is support for the assumption of linearity, and that no transformations are necessary.

**Homoscedasticity**

The assumption of homoscedasticity requires the variance of the dependent variable is approximately equivalent at leach level of the independent variable (Hair, Black, Babin, Anderson, & Tatham, 2006). Levene's test of equality of error variances was used to examine this assumption. In Levene's test, a non-significant finding indicates

that the assumption has not been violated, and no transformations are necessary (Hair et al., 2006). In this case, all findings were non-significant (see Table 9).

Table 9. Results of Levene's test of equality of error variances using original data

| Variables | F |
|---|---|
| *Independent Variable: Context Change* | |
| T4 Stress | 1.30 |
| T4 College Belongingness | 1.54 |
| T4 College GPA | .95 |
| *Independent Variable: Stress* | |
| T4 College Belongingness | .10 |
| T4 College GPA | .25 |

Note. Variable n's range from 121 to 124.

## Missing Data Analysis and Imputations

As is common with longitudinal research, there were cases where participants did not respond to all of the items during all four time points. There were four likely causes for this missing data: (1) Students were absent from class on one or more of the days that the surveys took place; (2) Students skipped an item or series of items while taking the survey; (3) Students were not 18 during the data collection period and were not able to participate without parental consent until they had a birthday; or (4) Students dropped out of gemstone during the data collection period, and did not respond the online versions of the survey.

Missing data is dealt with based on the overall pattern of missingness. Missing data is categorized based on whether it seems more likely that participants systematically avoided questions and the data is missing not at random (MNAR), or if it seems likely that the data is missing at random (MAR) or missing completely at random (MCAR). If data is MNAR, further analyses need to take the bias in the existing data into account. However, if the data is considered to be MCAR, the missingness is considered "ignorable" because it most likely does not bias the sample, and imputations can be performed. Little's test for MCAR provides a quantifiable way to determine whether the pattern of missing data is based on another variable in the sample, and therefore skews the results (Little, 1988). A non-significant finding of Little's test indicates that the data can be considered MCAR. In this case, we found that our $\chi^2$ value associated with Little's test was not significant ($\chi^2 = 2603.80$, $p = .18$) and I could indeed proceed under the assumption that the missing data was classified as MCAR.

Missing data was addressed in two ways: Multiple Imputation (MI) and Full Information Maximum Likelihood (FIML), and both approaches are considered to be improvements upon more traditional methods of dealing with missing data (Allison, 2002; Peugh & Enders, 2004). In particular MI and FIML yield more unbiased results than listwise deletion, which only includes students in the analyses that completed all variables of interest at all time points. More student experiences captured in data analysis maximize the generalizability of the study, instead of limiting analysis to the students with complete data. MI and FIML have been shown to limit bias, and provide more accurate parameter estimates and standard errors than listwise deletion (Peugh & Enders,

2004). Furthermore, imputed values that vary somewhat from the actual, true value that a student would have reported should not bias the results to a great extent because these analyses do not attempt to examine any particular students' scores, but rather sample-level relations between variables; any outliers not captured by the imputation process should not drastically change the sample-level results.

MI was used for the regression analyses, and FIML was used for the Latent Variable Path Analysis. MI is dependent upon a series of estimates of the missing scores based on the information that the student did provide. Similarly to how outcome variables can be predicted using regression equations, missing data aggregate scores are generated using equations built from other variables in the data. This process is repeated a pre-determined number of times, to create a set of plausible values for each case of missing data. Statistical analyses are then run on each of the imputed datasets. The results from these analyses are then pooled, or combined together into a single set of results that represents the most plausible case of complete data (Allison, 2002). In this study, ten imputations were created and pooled together to estimate the most likely responses the student would have given. Furthermore, only variables that were missing less than 30% of the data were imputed, so that the majority of responses were original.

FIML is the standard missing data approach in Latent Variable Path Analysis. It incorporates all available raw data into the estimation of the parameters, instead of only the data with complete cases. Furthermore, FIML has been found to produce more accurate means and standard deviations than other traditional methods (Peugh & Enders, 2004). In the current study, FIML procedures are incorporated as part of the default

analysis in the LISREL software used to perform the confirmatory factor analysis and latent variable path analysis.

While there was a significant percent of missing data (see Table 10), procedures were chosen that retain as many of the original participants as possible, without creating bias in the analyses (i.e., Multiple Imputation and Full Information Maximum Likelihood). Throughout the preliminary analyses, both the original, unimputed results and the pooled imputed results (where available) will be presented, so it will be clear that the results were not significantly altered in the process.

Table 10. Percent of data missing by variable.

| | Percent Missing (Count) | | | |
|---|---|---|---|---|
| **Variable** | **T1** | **T2** | **T3** | **T4** |
| Stress | 28.07% (48) | 20.47% (35) | 11.11% (19) | 28.65% (49) |
| HS Emo | 29.82% (51) | 22.81% (39) | 12.87% (22) | 30.41% (52) |
| HS Inst | 29.82% (51) | 22.22% (38) | 14.04% (24) | 32.75% (56) |
| HS Info | 30.41% (52) | 22.81% (39) | 13.45% (23) | 33.92% (58) |
| HS Comp | 29.82% (51) | 22.81% (39) | 12.87% (22) | 29.82% (51) |
| College Emo | - | 21.64% (37) | 12.28% (21) | 29.24% (50) |
| College Inst | - | 21.64% (37) | 15.20% (26) | 32.75% (56) |
| College Info | - | 21.64% (37) | 14.62% (25) | 32.75% (56) |
| College Comp | - | 21.64% (37) | 13.45% (23) | 29.24% (50) |
| Form Goal | 25.73% (44) | - | - | - |
| Main Goal | 25.73% (44) | - | - | - |
| HS Belongingness | 29.24% (50) | - | - | - |
| College Belongingness | - | 20.47% (35) | 11.70% (20) | 29.24% (50) |

*Note.* HS = high school; Emo = emotional support; Inst = instrumental support; Info = informational support; Comp = companionship support; Form Goal = friendship formation goal; Main Goal = friendship maintenance goal.

- indicates that variable was not measured at a time point.

Variable n's range from 113 to 150.

## Descriptive Analyses

Descriptive information for all scale variables was examined in the form of single value indicators (e.g., a mean) and graphical representations of the data (e.g., line plots). Means and standard deviations of all continuous variables are presented in Tables 11 and 12. Table 11 provides the variable means and standard deviations of the original, unimputed data, and Table 12 provides the pooled means of the data after 10 imputations as discussed above.

### Means and Standard Deviations

Scale means provide a measure of central tendency, and for each case higher means indicate higher levels of that variable. Both original (see Table 11) and imputed (see Table 12) means were calculated across all variables. Standard deviation scores (see Table 11) examine variability of scores, and higher standard deviations indicate more variability among students. These values were not available as pooled data across the imputed datasets.

Table 11. Original data means and standard deviations.

| Variable | T1 Mean (SD) *Precollege* | T2 Mean (SD) *September* | T3 Mean (SD) *December* | T4 Mean (SD) *January* | Range |
|---|---|---|---|---|---|
| Context Change (n = 150) | 3.23 (1.62) | - | - | - | .00 – 7.00 |
| Stress (n = 123, 136, 152, 122) | 2.07 (.72) | 1.79 (.65) | 2.01 (.71) | 1.74 (.66) | .04 – 3.79 |
| HS Emo (n = 120, 132, 149, 119) | 18.86 (5.90) | 17.51 (6.17) | 16.63 (7.49) | 15.34 (7.48) | .00 – 30.00 |
| HS Inst (n = 120, 133, 147, 115) | 17.82 (5.67) | 15.42 (6.25) | 14.63 (7.13) | 13.78 (7.25) | .00 – 30.00 |
| HS Info (n = 119, 132, 148, 113) | 18.46 (5.9) | 16.43 (6.42) | 15.70 (7.47) | 14.64 (7.54) | .00 – 30.00 |
| HS Comp (n = 120, 132, 149, 120) | 18.68 (5.43) | 14.39 (6.51) | 14.22 (7.33) | 13.72 (7.43) | .00 – 30.00 |
| College Emo (n = - , 134, 150, 121) | - | 17.51 (6.02) | 18.00 (5.54) | 17.50 (6.40) | .00 – 30.00 |
| College Inst (n = - , 134, 145, 115) | - | 16.00 (5.19) | 16.71 (5.98) | 16.81 (6.45) | .00 – 30.00 |
| College Info (n = - , 134, 146, 115) | - | 16.42 (5.22) | 17.38 (6.15) | 17.07 (6.50) | .00 – 30.00 |
| College Comp (n = - , 134, 148, 121) | - | 18.00 (5.54) | 18.06 (5.96) | 18.00 (6.28) | .00 – 30.00 |
| Form Goal (n = 127) | 5.38 (.68) | - | - | - | 1.67 – 6.00 |
| Main Goal (n = 127) | 4.80 (.77) | - | - | - | 2.67 – 6.00 |
| HS Belongingness (n = 121) | 4.71 (.76) | - | - | - | 3.00 – 6.00 |
| College Belongingness (n = - , 136, 151, 121) | - | 4.91 (.71) | 4.86 (.80) | 4.87 (.75) | 2.30 – 6.00 |

*Note.* HS = high school; Emo = emotional support; Inst = instrumental support; Info = informational support; Comp = companionship support; Form Goal = friendship formation goal; Main Goal = friendship maintenance goal.

- indicates that variable was not measured at a time point.

Table 12. Pooled Scale Means after Multiple Imputations.

| Variable | T1 Mean *Precollege* | T2 Mean *September* | T3 Mean *December* | T4 Mean *January* |
|---|---|---|---|---|
| Context Change (n = 150) | 3.23 | | | |
| Stress (n = 171, 171, 171, 171) | 2.09 | 1.78 | 1.97 | 1.70 |
| HS Emo (n = 171, 171, 171, 119) | 18.52 | 17.43 | 16.58 | 15.33 |
| HS Inst (n = 171, 171, 171, 115) | 17.71 | 15.51 | 14.81 | 13.78 |
| HS Info (n = 119, 171, 171, 113) | 18.46 | 16.44 | 15.85 | 14.64 |
| HS Comp (n = 171, 171, 171, 171) | 18.24 | 14.50 | 14.28 | 13.46 |
| College Emo (n = - , 171, 171, 171) | - | 16.98 | 17.50 | 17.55 |
| College Inst (n = - , 171, 171, 115) | - | 16.01 | 16.83 | 16.81 |
| College Info (n = - , 171, 171, 115) | - | 16.47 | 17.39 | 17.07 |
| College Comp (n = - , 171, 171, 171) | - | 17.99 | 18.22 | 18.22 |
| Form Goal (n = 171) | 5.35 | - | - | - |
| Main Goal (n = 171) | 4.77 | - | - | - |
| HS Belongingness (n = 171, 171, 171, 171) | 4.70 | - | - | - |
| College Belongingness (n = - , 171, 171, 171) | - | 4.90 | 4.86 | 4.89 |

*Note.* HS = high school; Emo = emotional support; Inst = instrumental support; Info = informational support; Comp = companionship support; Form Goal = friendship formation goal; Main Goal = friendship maintenance goal.

**Correlation matrices.**

Relations between all predictor and outcome variables were preliminarily examined with Pearson Correlations, and results are provided in Tables 13-15. The first correlation table is split between two tables due to the size of the full table. Furthermore, a summary table with all of the correlations across all of the variables is presented in Table 47 in Appendix B.

Notable correlations are that context change was not significantly correlated with any variable ($p > .05$), (see Figure 1, path a) and T4 College GPA was not significantly correlated with any variable ($p > .05$) (see Figure 1, paths b and c), which was not what was predicted. However, T4 college belongingness was significantly negatively correlated with T1 stress, T2 stress, T3 stress and T4 stress, as well as positively correlated with T2 college emotional support, T2 college instrumental support, and T2 college informational support as predicted (see Figure 1, paths c, d, and e).

Table 13. Context change aggregate correlation matrix with pooled multiple imputation data.

| **Variables** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** |
|---|---|---|---|---|---|---|---|---|---|
| 1. Context Change | - | | | | | | | | |
| 2. T1 Stress | -.01 | - | | | | | | | |
| 3. T2 Stress | -.02 | .42** | - | | | | | | |
| 4. T3 Stress | -.03 | .46** | .60** | - | | | | | |
| 5. T4 Stress | .07 | .44** | .43** | .54** | - | | | | |
| 6. T2 College Belongingness | .03 | -.29* | -.47** | -.33** | -.30** | - | | | |
| 7. T3 College Belongingness | .07 | -.29* | -.35** | -.35** | -.40** | .74** | - | | |
| 8. T4 College Belongingness | .09 | -.27* | -.25* | -.39** | -.37** | .66** | .78** | - | |
| 9. T4 GPA | .07 | -.03 | .01 | -.09 | -.06 | .05 | .16 | .07 | - |

*Note.* T1 = Time 1 (precollege); T2 = Time 2 (September); T3 = Time 3 (December); T4 = Time 4 (January).

Variable n's range from 113 to 152.

*$p$ < .05. **$p$ < .01

Table 14. Predictor and outcome variable correlation matrix with pooled multiple imputation data.

| **Variables** | **1** | **2** | **3** | **4** | **5** | **6** |
|---|---|---|---|---|---|---|
| 1. T4 Stress | - | | | | | |
| 2. T4 Col Bel | -.37** | - | | | | |
| 3. Fall Sem GPA | -.06 | .07 | - | | | |
| 4. T1 Stress | .44** | -.27* | -.03 | - | | |
| 5. T1 Form Goal | .02 | .07 | .20 | .03 | - | |
| 6. T1 Main Goal | -.11 | .09 | .10 | .06 | .12 | - |
| 7. T2 Col Bel | -.30** | .67** | .05 | -.29* | .07 | .15 |
| 8. T2 HS Emo | -.14 | .17 | .20 | -.17 | .20 | .21 |
| 9. T2 HS Inst | -.14 | .11 | .14 | -.14 | .12 | .19* |
| 10. T2 HS Info | -.16* | .12 | .14 | -.15 | .13 | .21* |
| 11. T2 HS Comp | -.03 | .03 | .14 | -.03 | .08 | .17 |
| 12. T2 Col Emo | -.15 | .29** | .12 | -.11 | .12 | .17 |
| 13. T2 Col Inst | -.11 | .17* | -.06 | -.04 | -.01 | .12 |
| 14. T2 Col Info | -.11 | .18* | -.00 | -.04 | .01 | .13 |
| 15. T2 Col Comp | -.06 | .23 | .16 | -.07 | .10 | .11 |

*Note.* T1 = Time 1 (precollege); T2 = Time 2 (September); T3 = Time 3 (December); T4 = Time 4 (January); HS = high school; Col = college; Emo = emotional support; Inst = instrumental support; Info = informational support; Comp = companionship support; Form Goal = friendship formation goal; Main Goal = friendship maintenance goal.

Variable n's range from 113 to 152.

*$p$ < .05. **$p$ < .01

Table 15. Time 2 predictor variable correlation matrix with pooled multiple imputation data.

| Variable | 1 | 2 | 3 | 4 | 5 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|
| 1. T2 Col Bel | - | | | | | | | | |
| 2. T2 HS Emo | .19* | - | | | | | | | |
| 3. T2 HS Inst | .11 | .87** | - | | | | | | |
| 4. T2 HS Info | .13 | .90** | .97** | - | | | | | |
| 5. T2 HS Comp | -.04 | .62** | .72** | .68** | - | | | | |
| 7. T2 Col Emo | .32** | .48** | .37** | .41** | .15 | - | | | |
| 8. T2 Col Inst | .24* | .39** | .42** | .42** | .23* | .82** | - | | |
| 9. T2 Col Info | .26** | .42** | .43** | .45** | .26** | .85** | .95** | - | |
| 10. T2 Col Comp | .31** | .42** | .34** | .36** | .27* | .76** | .67** | .70** | - |

*Note.* T1 = Time 1 (precollege); T2 = Time 2 (September); T3 = Time 3 (December); T4 = Time 4 (January); HS = high school; Col = college; Emo = emotional support; Inst = instrumental support; Info = informational support; Comp = companionship support; Form Goal = friendship formation goal; Main Goal = friendship maintenance goal.

Variable n's range from 113 to 152

*$p < .05$. **$p < .01$

## Mean differences over time

Repeated measures analysis of variance (ANOVA) was used to examine the mean change in scale scores over the four time points. Repeated measures ANOVA is the traditional statistical method for measuring mean within-subject effects across a specific outcome variable (Lix & Keselman, 2010).

The time 1 assessment took place before college entry, time 2 in September of the first semester, time 3 in December of the first semester, and time 4 in January of the second semester. A series of ten single factor within-subjects ANOVAs were run using original (non-imputed) data. A significant omnibus test indicates that there was statistically significant change during at least one time point. A summary of the results is presented in Table 16. Of the ten variables, six had significant omnibus tests: High School Emotional Support $F(3, 72) = 10.64$, $p < .01$, High School Instrumental Support $F(3, 70) = 11.54$, $p < .01$, High School Informational Support $F(3, 68) = 8.40$, $p < .01$, High School Companionship $F(3, 74) = 17.91$, $p < .01$, Belongingness $F(3, 80) = 5.98$, $p < .01$, and Stress $F(3, 80) = 10.43$, $p < .01$.

A series of post hoc pairwise t-tests with adjusted alpha values using the Bonferroni correction was used to determine where the statistically significant differences lie. The results are presented in Table 17 and on Figures 2 – 11. Generally, trend analyses revealed that stress displayed a linear ($F(1, 80) = 9.62$) and cubic pattern ($F(1, 80) = 24.45$, $p < .01$), indicating a modest linear trend overall, but specifically decreasing significantly from T1 to T2 (Mean Difference = -.30, $p < .01$), increasing significantly from T2 to T3 (Mean Difference = .22, $p < .01$), and decreasing significantly from T3 to T4 (Mean Difference = -.24, $p < .01$). All four supports from high school friends (i.e., emotional, instrumental, informational, companionship) declined significantly and linearly over the four time points. In particular, emotional ($F(1, 72) = 19.22$, $p < .01$; Mean Difference = -3.11, $p < .01$), instrumental ($F(1, 70)= 20.14$, $p < .01$; Mean Difference = -3.52, $p < .01$), informational ($F(1, 68)= 15.36$, $p < .01$; Mean Difference = -

3.10, $p < .01$) and companionship ($F(1, 74) = 19.22$, $p < .01$; Mean Difference = -4.75, $p < .01$) supports from high school friends were significantly higher at T1 than at T4. High School companionship also displayed a quadratic ($F(1, 74 = 10.73$, $p < .01$) and cubic pattern ($F(1, 74) = 7.65$, $p < .01$). None of the four supports from college friends (i.e., emotional, instrumental, informational, companionship) had any significant changes over the four time points, and trend analyses did not yield any significant results. Belongingness significantly increased from high school to college (Mean Difference = .33, $p < .01$) and then remained stable over the three college time points. Trend analysis revealed this to be a quadratic ($F(1, 80) = 7.67$, $p < .01$) and cubic pattern ($F(1, 80) = 9.38$, $p < .01$)

Table 16. Omnibus repeated measures ANOVAs – Original Data

| Variable | Sum of Squares | df | Mean Square | F | Partial Eta Squared |
|---|---|---|---|---|---|
| Belonging | 4.49 | 2.04† | 2.20 | 5.98** | .07 |
| Stress | 6.03 | 3 | 2.01 | 10.43** | .12 |
| HS Emo | 434.16 | 2.39† | 181.86 | 10.64** | .13 |
| HS Inst | 480.97 | 2.25† | 214.05 | 11.54** | .14 |
| HS Info | 353.77 | 2.37† | 149.42 | 8.40** | .11 |
| HS Comp | 1030.79 | 2.45† | 420.34 | 17.91** | .12 |
| Col Emo | 7.55 | 2 | 3.78 | .32 | .00 |
| Col Inst | 23.83 | 2 | 11.92 | .81 | .01 |
| Col Info | 50.73 | 2 | 25.37 | 1.79 | .02 |

| | | | | | |
|---|---|---|---|---|---|
| Col Comp | 4.24 | 1.78† | 2.38 | .16 | .00 |

*Note.* HS = high school; Col = college; Emo = emotional support; Inst = instrumental support; Info = informational support; Comp = companionship support; Form Goal = friendship formation goal; Main Goal = friendship maintenance goal.
† Indicates that the assumption of sphericity was violated for this variable, and greenhouse-geisser values were used, which adjust the degrees of freedom to make them more accurate. Fractional degrees of freedom represent this sphericity correction. Greenhouse-geisser values are often overly conservative, but significant results were still found using this correction. Variable n's range from 113 to 152.

*$p < .05$. **$p < .01$

Table 17. Post-Hoc contrasts using original data.

| Variable | T1-T2 | | T1-T3 | | T1-T4 | | T2-T3 | | T2-T4 | | T3-T4 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mean Diff | SE | Mean Diff | SE | Mean Diff | SE | Mean Diff | SE | Mean Diff | SE | Mean Diff | SE |
| Belonging | .33* | .10 | .21 | .10 | -.22 | .14 | -.11 | .06 | -.11 | .06 | .00 | .05 |
| Stress | -.30** | .07 | -.08 | .07 | .31** | .07 | .22* | .06 | -.01 | .07 | -.24* | .07 |
| HS Emo† | -.30 | .56 | -1.44 | .74 | 3.13** | .69 | -1.14 | .23 | -2.83** | .62 | -1.69* | .49 |
| HS Inst† | -1.76 | .64 | -2.63* | .72 | 3.52** | .75 | -.87 | .55 | -1.77 | .63 | -.89 | .39 |
| HS Info† | -1.38 | .66 | -2.22 | .71 | 3.15** | .78 | -.84 | .55 | -1.77 | .66 | -.93 | .44 |
| HS Comp† | -4.04** | .70 | -3.92** | .81 | -4.77** | .76 | .11 | .71 | -.73 | .77 | -.84 | .50 |
| Col Emo | - | | - | | - | | .40 | .52 | .13 | .54 | -.27 | .42 |
| Col Inst | - | | - | | - | | .73 | .60 | .44 | .62 | -.29 | .48 |
| Col Info | - | | - | | - | | 1.06 | .58 | .52 | .61 | -.54 | .49 |
| Col Comp† | - | | - | | - | | -.24 | .52 | -.28 | .60 | -.04 | .44 |

*Note.* Positive mean difference values indicate an increase between the time points.

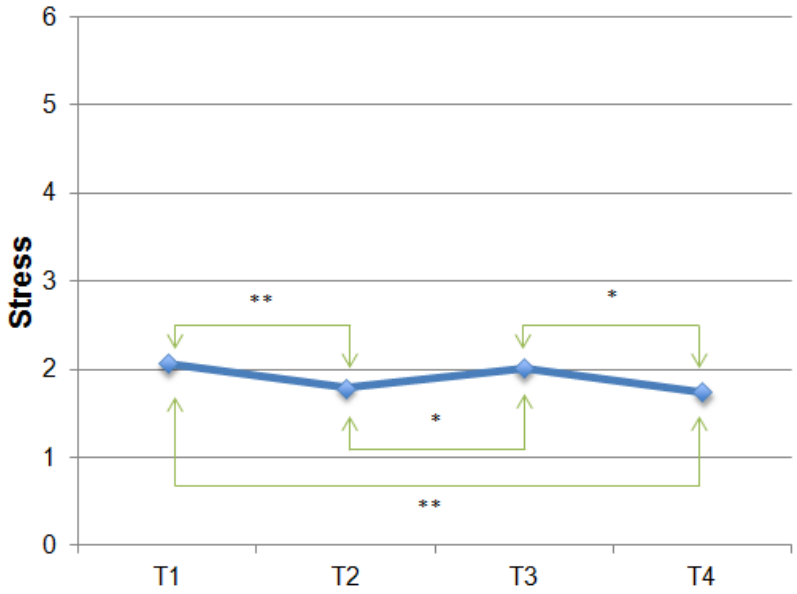
Diff = Difference

- indicates that variable was not measured at a time point.

Variable n's range from 113 to 152.

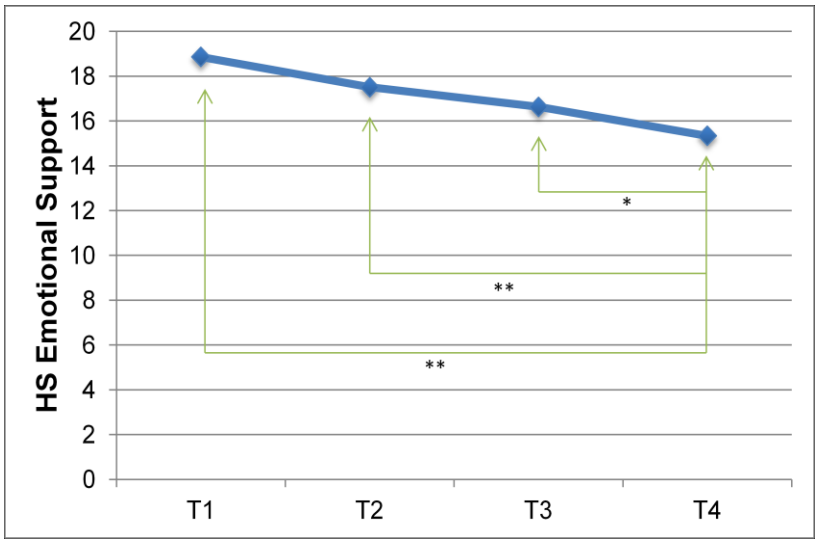
*$p$ < .0083. **$p$ < .0016

Figure 2. Mean differences of stress across all time points with original data.



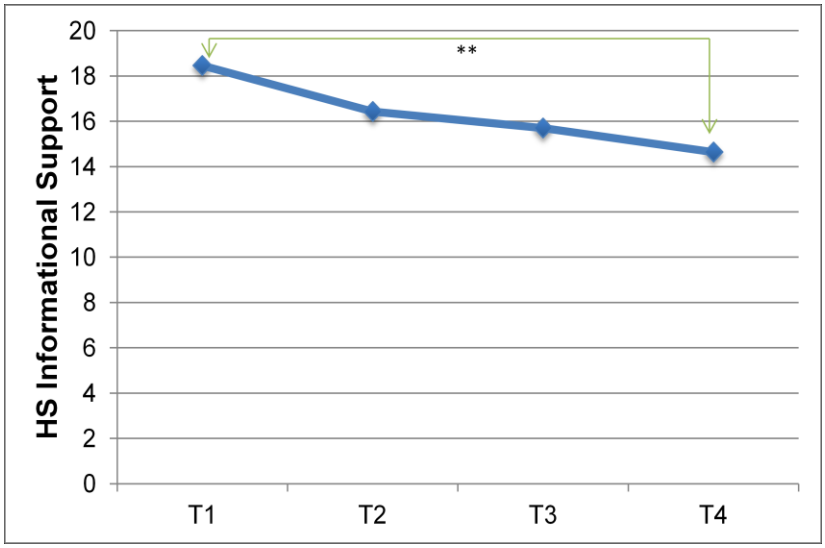

*Note* *$p$ < .0083. **$p$ < .0016

Figure 3. Mean differences of high school emotional support across all time points with original data.



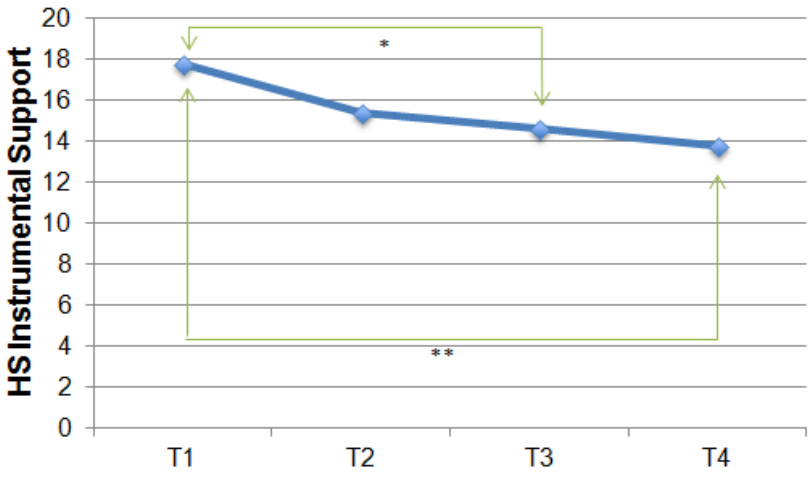

*Note.* *$p$ < .0083. **$p$ < .0016

Figure 4. Mean differences of high school informational support across all time points with original data.



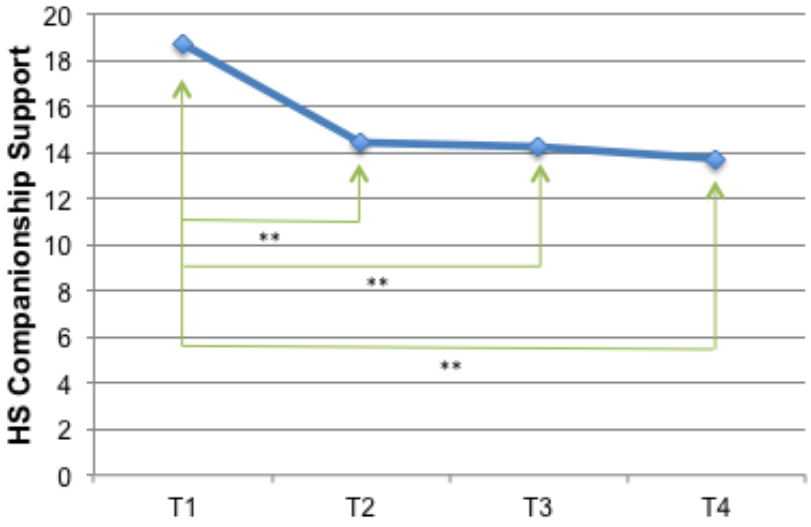

*Note.* *$p$ < .0083. **$p$ < .0016

Figure 5. Mean differences of high school instrumental support across all time points with original data.



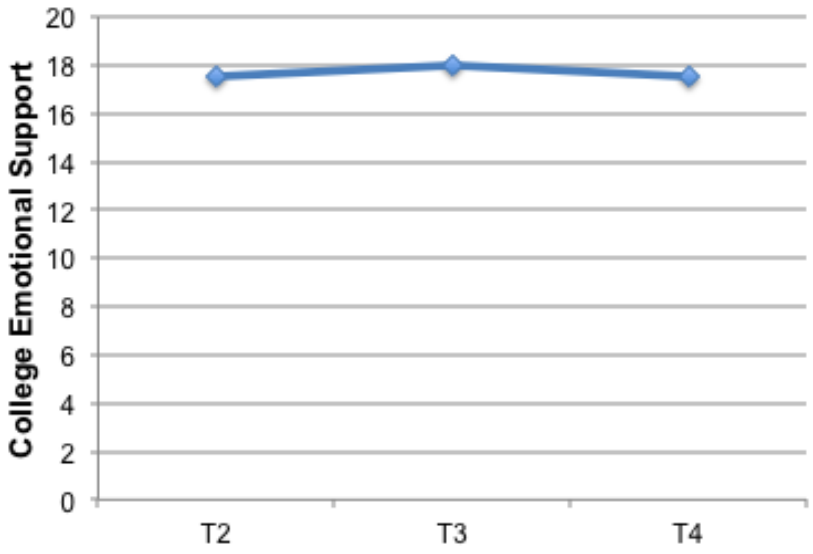

*Note.* *$p$ < .0083. **$p$ < .0016

Figure 6. Mean differences of high school companionship across all time points with original data.



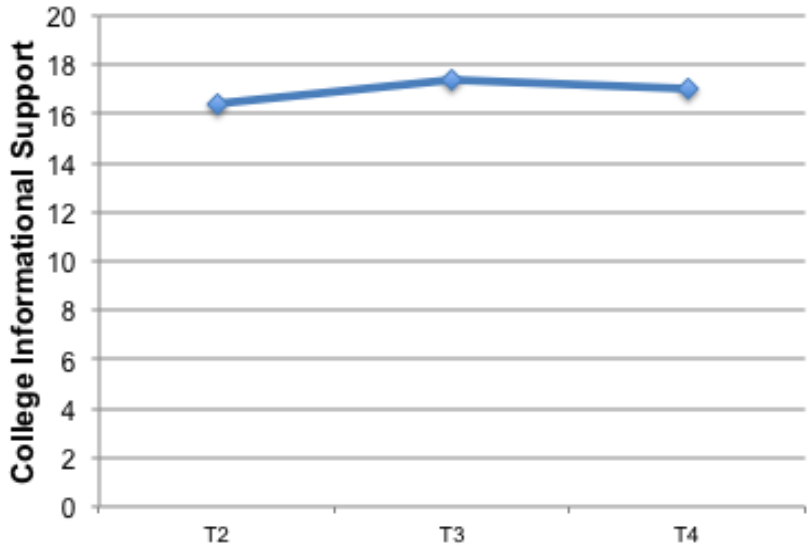

*Note.* $*p < .0083$. $**p < .0016$

Figure 7. Mean differences of college emotional support across all time points with original data.



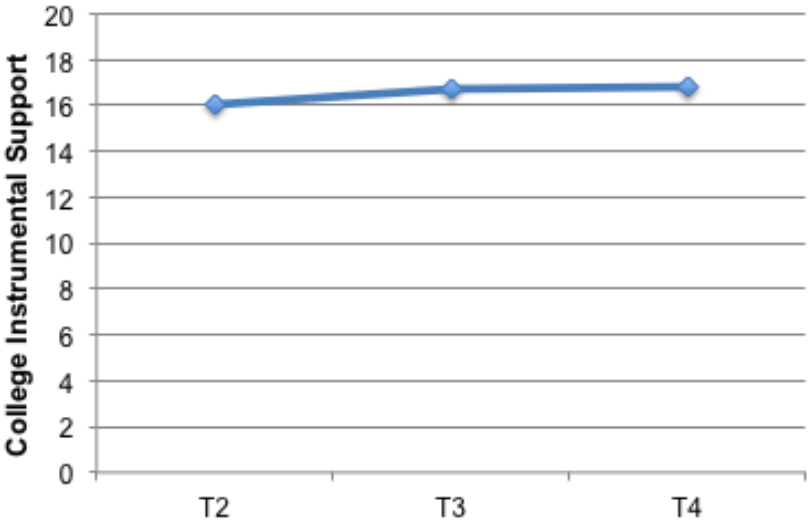

*Note.* $*p < .05$. $**p < .01$

Figure 8. Mean differences of college informational support across all time points with original data.



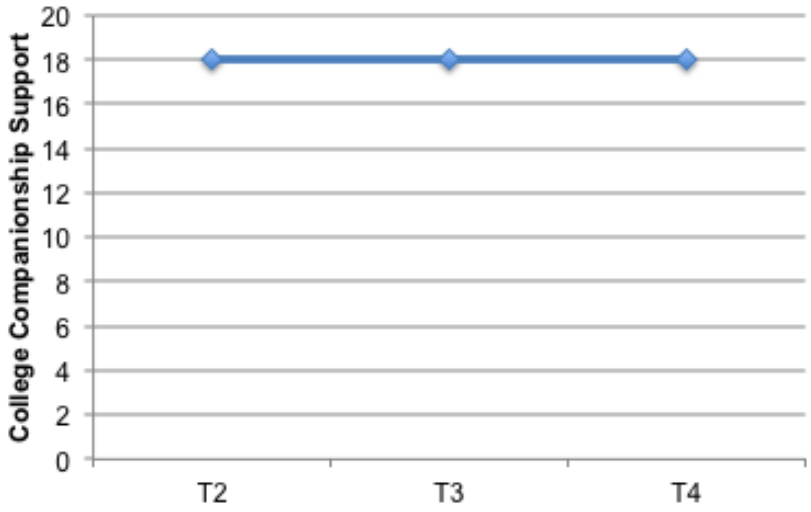

*Note.* $*p < .05$. $**p < .01$

Figure 9. Mean differences of college instrumental support across all time points with original data.



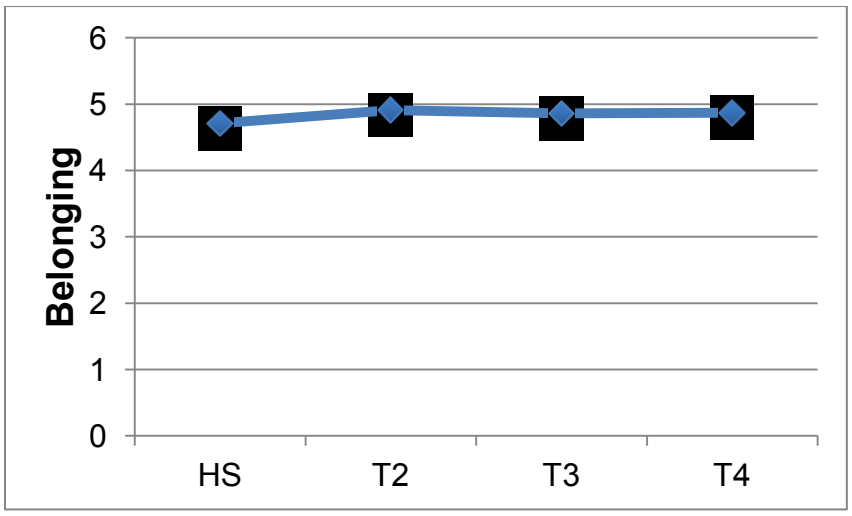

*Note.* $*p < .05$. $**p < .01$

Figure 10. Mean differences of college companionship support across all time points with original data.




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

Figure 11. Mean differences of belonging across all time points with original data.




*Note.* $*p < .0083$. $**p < .0016$

## Confirmatory Factor Analysis

Although there is a strong theoretical basis for the notion that social support is multifaceted (Furman & Burhmester, 2009; Malecki & Demaray, 2002; Tardy, 1985), it is important to statistically verify that the four domains of support (i.e., emotional, instrumental, informational, and companionship) are represented in the data as distinct constructs. To examine the hypothesized existence of four latent support constructs, LISREL software (Jöreskog & Sörbom, 2007) was used to perform a pair of confirmatory factor analyses (CFA) of the support scales, the first in the high school context, and the second in the college context. It would not be reasonable to use T1 or T2 data to perform the CFA because they take place before college friendships have had time to develop (precollege and the first two weeks of college, respectively). The choice, therefore, was between T3 and T4 data, and T3 data were used for each of the two sets of analyses because that time point had a larger sample size (n = 152) than T4. The four domains are expected to relate to one another, so a CFA with an oblique rotation was performed. An oblique rotated factor solution allows the four imposed factors to covary (Hair, Black, Babin, Anderson, & Tatham, 2006). Further, the error terms of items with parallel stems were allowed to covary (see Figures 12 and 13).

Figure 12. Hypothesized structure of support from high school friends.

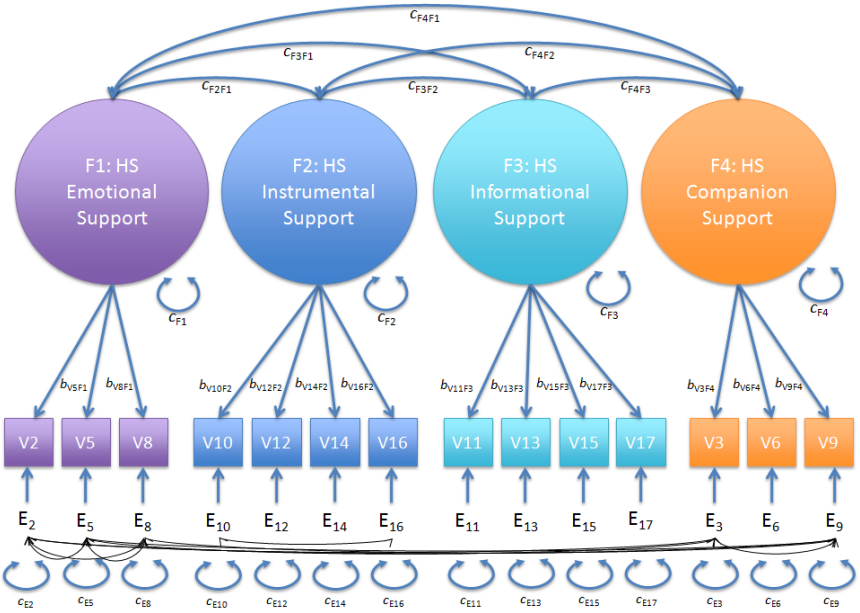
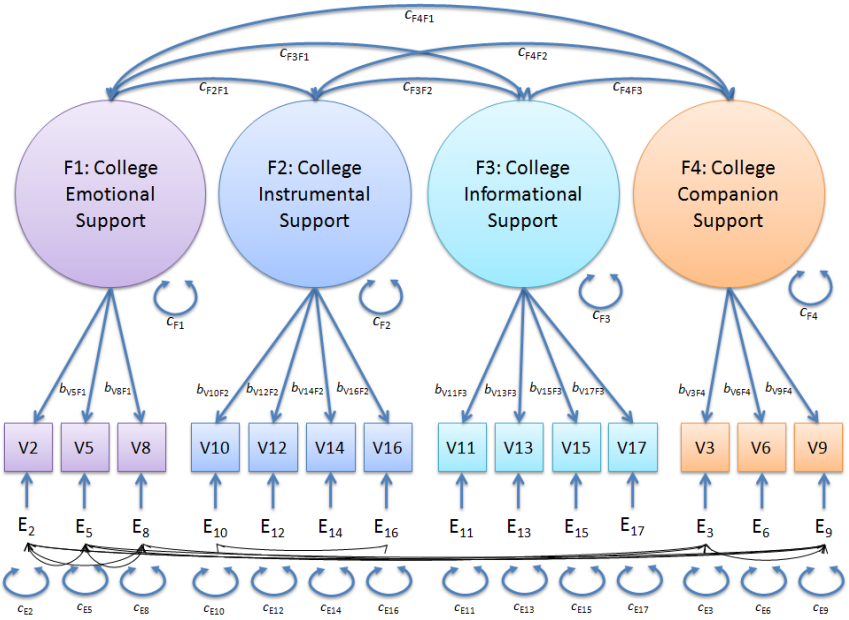



Figure 13. Hypothesized structure of support from college friends.



Standard maximum likelihood estimates were used here because no violation in normality existed for the support variables. Two test statistics were used to examine the fit of the imposed four-factor model of support: Chi-Square, and RMSEA. Chi-Square is an absolute fit index and smaller values indicate better fit. RMESA is a parsimonious fit index and values less than or equal to .06 indicate good fit. While the high school support CFA met the threshold of good fit ($\chi^2 = 20.83$, RMSEA = 0.00) the college support CFA did not ($\chi^2 = 118.78$, RMSEA = .08). Based on these two indices, from a statistical standpoint I concluded that the underlying structure of my data did support the existence of a four factor support structure for high school friends but not for college friends. This finding will be discussed conceptually in chapter five, but it created a problem for analyzing all of the data using four domains of support. The choice was made to perform the main analyses on the support aggregates on both the high school and college support data to maintain consistency across individual models.

However, the fit of the high school CFA should not be ignored, and there is still strong psychological theory that indicates these four supports may protect against stress in the school transition context. Therefore the four distinct supports were analyzed as a subsequent analysis, though the focus will be on the aggregated support measures. After the two general support aggregate variables, high school support and college support, were used to predict school outcomes, the support subscales were analyzed separately.

## Core Research Question Analyses

The first three research questions were each examined using multiple regression, and the fourth research question was examined using latent variable path analysis (LVPA). Multiple regression is a traditional statistical tool that examines the predictive relation between a set of independent variables and a dependent variable, through the use of a linear regression equation (Kelley & Maxwell, 2010). Multiple regression analyses was determined to be the most appropriate procedure because of its ability to ascertain the amount of outcome-variable variance explained by a specific predictor, while holding other variables constant (Kelley & Maxwell, 2010). Moreover, multiple regression was selected to address research questions 1, 2 and 3 because those questions are interested in the predictive, mediating, and moderating pathways related to single outcomes in the model (see Figure 1) and multiple regression allows for flexible models designed to test these pathways, in which interaction terms are easily generated and included. In a multiple regression framework, specific effects of context change, stress, and support from friends are tested, and the degree of explained variance after the key model parameters is calculated. Multiple regression also allows for the calculation of the effect sizes of context change, stress, and support from friends, as well as whether the models are statistically significant. Multiple regression analysis also allowed for a variable-centered analysis, which is desirable for the current study since I have no theoretical reason to believe latent groups exist. Finally, multiple regression analysis allowed me to test multiple moderating pathways, as it is more flexible with regard to interaction terms than other analyses (G. Hancock, personal communication, April 21, 2011).

Originally, I used unstandardized predictors in my regression model, which would have allowed me to assume that any measurement error terms will have a mean of zero, and therefore not significantly influence my models (Kelley & Maxwell, 2010). However, in subsequent analyses it was necessary to standardize the predictor variables to create aggregates and reduce multicollinearity.

LVPA is a form of structural equation modeling that provides a means to examine a theoretically sound causal model, using latent factors (Mueller & Hancock, 2010). Latent variable path analysis (LVPA) was used to explore the fit of a model with hypothesized causal paths from friendship formation and maintenance goals to the support from high school friends and support from college friends. Specifically, I examined whether goals to form and maintain friendship directly affect future supports. Missing data was resolved using full information maximum likelihood (FIML), which is typical in LVPA (Mueller & Hancock, 2010). Maximum Likelihood (ML) procedures were used to calculate model parameters and goodness-of-fit statistics.

LVPA was selected to address research question 4 because that question deals with multiple outcome variables simultaneously, and LVPA allows for that in a way that Multiple Regression does not. However, ML may deflate standard error values in cases of non-normality (Mueller & Hancock, 2010). Therefore, since descriptive statistics regarding skewness and kurtosis showed that the data is non-normal, I employed robust test statistics.

Analyses were conducted using IBM SPSS 20 and LISREL software. LVPA parameters robust to violations of normality were estimated using maximum

likelihood. Results from the pooled regression analyses are presented in Tables 18 to 20, Tables 23 to 38, and Tables 42 to 45. In each analysis that controlled for gender and ethnicity, gender was dummy coded as 0 = male and 1 = female, and ethnicity was coded as 0 = minority students and 1 = white students. Furthermore, all predictor variables were mean centered to reduce the impact of multicollinearity (Raudenbush & Bryk, 2000). Pooled imputed mean scale scores were used to mean center each support subscale and stress across all four time points. The following sections present the specific models that were be used to answer each research question

**Research question 1: Context change predicting school outcomes**

The first research question asks whether changes in context predict school-related outcomes (i.e., school belongingness and grades) in transitioning college students. To address this question, I use cumulative transition context change (T1) to predict first semester grades (T4) (see Figure 1, path a). Next, I used cumulative transition context change (T1) to predict campus belongingness at the beginning of the second semester (T4) (see Figure 1, path a).

Linear multiple regression was used to examine the degree of context change that students experienced as a predictor of grades and college belongingness, while controlling for gender and ethnicity. As shown in Tables 18, 19, and 20, context change did not significantly predict students' T4 GPA, T4 college belongingness, or T3 college belongingness.

Table 18. Summary of multiple regression analysis for context change predicting T4 GPA with pooled multiple imputation data.

| Variable | *B* | *SE B* | $\Delta R^2$ |
|---|---|---|---|
| Model 1 | | | .02 |
| Gender | .19 | .14 | |
| Ethnicity | .05 | .14 | |
| Model 2 | | | .00 |
| Gender | .19 | .14 | |
| Ethnicity | .02 | .15 | |
| Context Change | .03 | .05 | |

*Note.* $R^2$ values were calculated using original data. No coefficients were significant (all *p*-values > .05)

Original n = 111

Pooled n = 111

Table 19. Summary of multiple regression analysis for context change predicting T4 college belongingness with pooled multiple imputation data.

| Variable | *B* | *SE B* | $\Delta R^2$ |
|---|---|---|---|
| Model 1 | | | .08 |
| Gender | .14 | .14 | |
| Ethnicity | .24 | .15 | |
| Model 2 | | | .00 |
| Gender | .14 | .14 | |
| Ethnicity | .24 | .15 | |
| Context Change | .02 | .04 | |

*Note.* $R^2$ values were calculated using original data. No coefficients were significant (all *p*-values > .05)

Original n = 108

Pooled n = 147

Table 20. Summary of multiple regression analysis for context change predicting T3 college belongingness with pooled multiple imputation data.

| Variable | *B* | *SE B* | $\Delta R^2$ |
|---|---|---|---|
| Model 1 | | | .03 |
| Gender | .25 | .14 | |
| Ethnicity | .18 | .14 | |
| Model 2 | | | .00 |
| Gender | .25 | .14 | |
| Ethnicity | .17 | .15 | |
| Context Change | .02 | .04 | |

*Note.* $R^2$ values were calculated using original data. No coefficients were significant (all *p*-values > .05)

Original n = 134

Pooled n = 147

**Summary.** In summary the data does not provide evidence that the cumulative context change variable significantly predicts school outcomes (i.e., grades and school belongingness) during the transition from high school to college. Because the context change was not predictive, context change items were examined as a subsequent analysis. Table 21 provides a summary of the responses for each categorical context item, and Table 22 provides the correlations among the continuous context change items and stress, grades, and school belongingness. As can be seen in Table 22, none of the continuous context change items was significantly related to any of the other variables in the model. Cumulative context change during

the transition did not predict reported grades or school belongingness at the beginning of the second college semester.

Table 21. Number of each response for categorical context change items.

| **Variable** | **Yes** | **No** | **N/A** |
|---|---|---|---|
| HS romance | 35 | 132 | 4 |
| HS partner attend UMD | 16 | 82 | 72 |
| End romance | 29 | 122 | 20 |
| Best friend attend UMD | 47 | 120 | 4 |
| End friendship | 8 | 159 | 4 |

Table 22. Correlations of continuous context change items and stress, grades, and school belongingness using pooled imputed data.

| **Variable** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. HS Size | 1 | | | | | | | | | | | | |
| 2. HS friends Attend | .39** | 1 | | | | | | | | | | | |
| 3. Close HS friends attend | .02 | .14 | 1 | | | | | | | | | | |
| 4. Miles from home | -.19* | -.48** | -.24** | 1 | | | | | | | | | |
| 5. T1 Stress | .03 | .03 | -.05 | .02 | 1 | | | | | | | | |
| 6. T2 Stress | -.06 | -.04 | -.03 | -.01 | .42** | 1 | | | | | | | |
| 7. T3 Stress | -.03 | -.05 | -.03 | -.01 | .46** | .60** | 1 | | | | | | |
| 8. T4 Stress | -.08 | -.09 | -.03 | .06 | .44** | .43** | .54** | 1 | | | | | |
| 9. T4 GPA | -.15 | -.11 | -.11 | .02 | -.03 | .01 | -.09 | -.06 | 1 | | | | |
| 10. HS Bel | -.15 | -.08 | .07 | -.01 | -.49** | -.35** | -.30** | -.36** | .06 | 1 | | | |
| 11. T2 Col Bel | -.05 | -.04 | .02 | .04 | -.29* | -.47** | -.33** | -.30** | .05 | .43** | 1 | | |
| 12. T3 Col Bel | -.08 | -.07 | -.01 | .06 | -.29* | -.35** | -.34** | -.40** | .16 | .52** | .74** | 1 | |
| 13. T4 Col Bel | -.12 | -.04 | .04 | .05 | -.27* | -.25 | -.39** | -.37** | .07 | .49** | .66** | .78** | 1 |

*Note.* Variable n's range from 121 to 171.

*$p$ < .05. **$p$ < .01

**Research question 2: Stress as a mediator between context change and school outcomes**

The second research question asks whether stress mediates the relationship between context change and school-related outcomes. To address this question, I used context change (T1) to predict stress at the beginning of the second semester (T4). Next I used context change (T1) and subsequently stress (T1, T2, T3) to predict academic outcomes at the beginning of the second semester (T4) (see Figure 1, paths a, b, b' and c).

Linear multiple regression was used to examine the degree to which stress attenuated the predictive relation between context change and the school outcomes of grades and college belongingness, while controlling for gender and ethnicity. As presented in Tables 23 and 24, context change did not significantly predict T4 stress $B = .04$, $p > .05$, or T3 stress $B = -.02$, $p > .05$. Since context change does not significantly predict stress or outcomes, I could not conclude that a relation between context change and school outcomes could be mediated by stress, at least not in the way context change has been operationalized here. Therefore, I examined the relation between stress and school outcomes next.

Table 23. Summary of multiple regression analysis for context change predicting T4 stress with pooled multiple imputation data.

| Variable | *B* | *SE B* | $\Delta R^2$ |
|---|---|---|---|
| Model 1 | | | |
| Gender | -.23 | .13 | .33 |
| Ethnicity | -.12 | .13 | |
| T1 Stress | .56** | .09 | |
| Model 2 | | | .01 |
| Gender | -.23 | .13 | |
| Ethnicity | -.15 | .14 | |
| T1 Stress | .54** | .10 | |
| Context Change | .04 | .04 | |

*Note.* $R^2$ values were calculated using original data.

Original n = 83

Pooled n = 83

*$p$ < .05. **$p$ < .01

Table 24. Summary of multiple regression analysis for context change predicting T3 stress with pooled multiple imputation data.

| Variable | *B* | *SE B* | $\Delta R^2$ |
|---|---|---|---|
| Model 1 | | | |
| Gender | .05 | .13 | .31 |
| Ethnicity | -.10 | .13 | |
| T1 Stress | .56** | .09 | |
| Model 2 | | | .00 |
| Gender | .10 | .16 | |
| Ethnicity | -.07 | .14 | |
| T1 Stress | .57** | .09 | |
| Context Change | -.02 | .04 | |

*Note.* $R^2$ values were calculated using original data.

Original n = 103

Pooled n = 103

*$p$ < .05. **$p$ < .01

As presented in Table 25 neither T1 stress $B$ = -.00, $p$ > .05, T2 stress $B$ = .20, $p$ > .05, nor T3 stress $B$ = -.16, $p$ > .05 was a significant predictor of T4 GPA, which represents students' grade point average at the end of the first semester of college.

Table 25. Summary of multiple regression analysis for stress predicting T4 GPA with pooled multiple imputation data.

| Variable | *B* | *SE B* | $\Delta R^2$ |
|---|---|---|---|
| Model 1 | | | .06 |
| Gender | .30 | .16 | |
| Ethnicity | .22 | .16 | |
| Model 2 | | | .00 |
| Gender | .30 | .16 | |
| Ethnicity | .22 | .16 | |
| T1 Stress | -.01 | .11 | |
| Model 3 | | | .01 |
| Gender | .30 | .16 | |
| Ethnicity | .23 | .16 | |
| T1 Stress | -.05 | .13 | |
| T2 Stress | .11 | .16 | |
| Model 4 | | | .13 |
| Gender | .30 | .16 | |
| Ethnicity | .24 | .16 | |
| T1 Stress | -.00 | .14 | |
| T2 Stress | .20 | .18 | |
| T3 Stress | -.16 | .16 | |

*Note.* $R^2$ values were calculated using original data.

Original n = 84

Pooled n = 84

No coefficients were significant (all *p*-values > .05)

As presented in Table 26, T3 stress was related negatively with college belongingness. Furthermore, ethnicity was a significant predictor of T4 college belongingness $B = -.44$, $p < .01$. When all other variables in the model are held constant, white students reported significantly higher T4 college belongingness than minority students.

Table 26. Summary of multiple regression analysis for stress predicting T4 college belongingness with pooled multiple imputation data.

| Variable | *B* | *SE B* | $\Delta R^2$ |
|---|---|---|---|
| Model 1 | | | .08 |
| Gender | .11 | .15 | |
| Ethnicity | .44** | .16 | |
| Model 2 | | | .02 |
| Gender | .17 | .15 | |
| Ethnicity | .35* | .16 | |
| T1 Stress | -.21 | .12 | |
| Model 3 | | | .02 |
| Gender | .17 | .15 | |
| Ethnicity | .35* | .16 | |
| T1 Stress | -.14 | .13 | |
| T2 Stress | -.19 | .16 | |
| Model 4 | | | .10** |
| Gender | .23 | .15 | |
| Ethnicity | .38* | .15 | |
| T1 Stress | -.04 | .14 | |
| T2 Stress | .13 | .17 | |
| T3 Stress | -.46** | .14 | |

*Note.* $R^2$ values were calculated using original data.

Original n = 84

Pooled n = 107

*$p$ < .05. **$p$ < .01

**Summary.** As there is no significant relationship between the measure of context change and school outcomes, the current analyses did not provide evidence that stress mediates a relation between context change and school outcomes that was not found. Furthermore, stress was not a significant predictor of first semester college GPA at any time point. However, stress at the end of the first semester was a significant negative direct predictor of college belongingness at the beginning of the second semester when controlling for gender and ethnicity. Specifically, stress at the end of the first semester was negatively associated with college belongingness at the beginning of the second semester.

**Research question 3: Social support as a moderator of stress and school outcomes.**

The third research question asks whether supports from high school friends and college friends moderates the relation between transition context change and stress. To address this question, I used context change, precollege stress, support from friends, and the interaction between support from friends and context change to predict stress at the beginning of the second semester (T4) (see Figure 1, paths c, d, and e). Based on my findings from the confirmatory factor analysis, and to adjust for the smaller-than-anticipated sample size, I performed two sets of analyses. The first set used general aggregates of (1) high school support and (2) college support and their corresponding interaction terms to predict stress at each time point. The second set examined direct effects of each of the four support domains (emotional, instrumental, informational, companionship) across the two friend contexts (high school and college), which created eight support predictors (4 domains x 2 contexts).

However, the second set of analyses with four individual models displayed the same patterns of significance as the first set. Therefore only the first set is presented here, and tables with the second set can be found in Appendix B.

Linear multiple regression was used to examine the degree to which social support affected the predictive relation between stress and the school outcomes of grades and college belongingness while controlling for gender and ethnicity. As mentioned above, linear multiple regression analyses was preferable to latent approaches because there were multiple moderators in the model, which are difficult to incorporate in latent variable path analysis. First I will present the findings for the support aggregates, and then I will present the follow-up analyses regarding the four aspects of support,

Stress by support-domain interaction terms for each time point were computed, and included in interaction models predicting school outcomes (i.e., GPA and college belongingness). A significant interaction term would provide evidence that a moderating relationship exists. Tables 27-30 present the results for models that include direct and interaction effects of stress and support (high school and college friend) on T4 college belongingness for each time point. Tables 31-33 present the results for models that include direct and interaction effects of stress and support (high school and college friend) on T3 college belongingness for each time point. Finally, Tables 34-36 present the results for models that include direct and interaction effects of stress and support (high school and college friend) on T4 college GPA for each time point.

Table 27. Summary of multiple regression analysis for T1 stress, T1 support, and interaction predicting T4 college belongingness with pooled multiple imputation data.

| Variable | *B* | *SE B* | $\Delta R^2$ |
|---|---|---|---|
| Model 1 | | | .08* |
| Gender | .19 | .15 | |
| Ethnicity | .41** | .15 | |
| Model 2 | | | .07* |
| Gender | .13 | .15 | |
| Ethnicity | .35* | .15 | |
| T1 HS Support | .03 | .02 | |
| T1 Stress | -.23* | .11 | |
| Model 3 | | | .01 |
| Gender | .13 | .16 | |
| Ethnicity | .35* | .15 | |
| T1 HS Support | -.00 | .04 | |
| T1 Stress | -.23* | .11 | |
| T1 Stress by HS Support Int | .01 | .02 | |

*Note.* $R^2$ values were calculated using original data. HS = high school; Col = college, Int = Interaction.

Original n = 89

Pooled n = 116

*$p < .05$. **$p < .01$

Table 28. Summary of multiple regression analysis for T2 stress, T2 support, and interactions predicting T4 college belongingness with pooled multiple imputation data.

| Variable | *B* | *SE B* | $\Delta R^2$ |
|---|---|---|---|
| Model 1 | | | .07* |
| Gender | .13 | .13 | |
| Ethnicity | .27* | .14 | |
| Model 2 | | | .23** |
| Gender | .18 | .13 | |
| Ethnicity | .24 | .13 | |
| T2 HS Support | .00 | .01 | |
| T2 Col Support | .04* | .01 | |
| T2 Stress | -.28** | .10 | |
| Model 3 | | | .01 |
| Gender | .17 | .13 | |
| Ethnicity | .24 | .13 | |
| T2 HS Support | .02 | .04 | |
| T2 Col Support | .02 | .05 | |
| T2 Stress | -.28** | .02 | |
| T2 Stress by HS Support Int | -.01 | .02 | |
| T2 Stress by Col Support Int | .01 | .02 | |

*Note.* $R^2$ values were calculated using original data. HS = high school; Col = college, Int = Interaction.

Original n = 92

Pooled n = 168

*$p < .05$. **$p < .01$

Table 29. Summary of multiple regression analysis for T3 stress, T3 support, and interactions predicting T4 college belongingness with pooled multiple imputation data.

| Variable | *B* | *SE B* | $\Delta R^2$ |
|---|---|---|---|
| Model 1 | | | .06 |
| Gender | .13 | .13 | |
| Ethnicity | .27* | .14 | |
| Model 2 | | | .23** |
| Gender | .20 | .12 | |
| Ethnicity | .24 | .13 | |
| T3 HS Support | -.01 | .01 | |
| T3 Col Support | .03 | .02 | |
| T3 Stress | -.40** | .09 | |
| Model 3 | | | .01 |
| Gender | .20 | .12 | |
| Ethnicity | .24 | .13 | |
| T3 HS Support | -.02 | .04 | |
| T3 Col Support | .03 | .05 | |
| T3 Stress | -.41** | .10 | |
| T3 Stress by HS Support Int | .01 | .02 | |
| T3 Stress by Col Support Int | -.00 | .02 | |

*Note.* $R^2$ values were calculated using original data. HS = high school; Col = college, Int = Interaction.

Original n = 100

Pooled n = 168

*$p < .05$. **$p < .01$

Table 30. Summary of multiple regression analysis for T4 stress, T4 support, and interactions predicting T4 college belongingness with pooled multiple imputation data.

| Variable | *B* | *SE B* | $\Delta R^2$ |
|---|---|---|---|
| Model 1 | | | .08 |
| Gender | .35* | .14 | |
| Ethnicity | .22 | .14 | |
| Model 2 | | | .19** |
| Gender | .28* | .13 | |
| Ethnicity | .13 | .13 | |
| T4 HS Support | -.01 | .01 | |
| T4 Col Support | .03* | .02 | |
| T4 Stress | -.32** | .11 | |
| Model 3 | | | .01 |
| Gender | .32 | .13 | |
| Ethnicity | .12 | .13 | |
| T4 HS Support | -.04 | .04 | |
| T4 Col Support | .08 | .05 | |
| T4 Stress | -.30** | .11 | |
| T4 Stress by HS Support Int | .01 | .02 | |
| T4 Stress by Col Support Int | -.03 | .03 | |

*Note.* $R^2$ values were calculated using original data. HS = high school; Col = college, Int = Interaction.

Original n = 100

Pooled n = 106

*$p < .05$. **$p < .01$

Table 31. Summary of multiple regression analysis for T1 stress, T1 support, and interaction predicting T3 college belongingness with pooled multiple imputation data.

| Variable | *B* | *SE B* | $\Delta R^2$ |
|---|---|---|---|
| Model 1 | | | .09** |
| Gender | .33* | .14 | |
| Ethnicity | .37** | .14 | |
| Model 2 | | | .13** |
| Gender | .24 | .15 | |
| Ethnicity | .31* | .14 | |
| T1 HS Support | .03* | .01 | |
| T1 Stress | -.24* | .11 | |
| Model 3 | | | .00 |
| Gender | .27 | .14 | |
| Ethnicity | .31* | .14 | |
| T1 HS Support | -.00 | .04 | |
| T1 Stress | -.24* | .10 | |
| T1 Stress by HS Support Int | .01 | .02 | |

*Note.* $R^2$ values were calculated using original data. HS = high school; Col = college, Int = Interaction.

Original n = 110

Pooled n = 116

*$p < .05$. **$p < .01$

Table 32. Summary of multiple regression analysis for T2 stress, T2 support, and interactions predicting T3 college belongingness with pooled multiple imputation data.

| Variable | *B* | *SE B* | $\Delta R^2$ |
|---|---|---|---|
| Model 1 | | | .04 |
| Gender | .23 | .13 | |
| Ethnicity | .20 | .14 | |
| Model 2 | | | .23** |
| Gender | .31* | .13 | |
| Ethnicity | .15 | .13 | |
| T2 HS Support | .01 | .01 | |
| T2 Col Support | .03* | .01 | |
| T2 Stress | -.43** | .11 | |
| Model 3 | | | .00 |
| Gender | .31* | .12 | |
| Ethnicity | .15 | .13 | |
| T2 HS Support | .00 | .03 | |
| T2 Col Support | .04 | .04 | |
| T2 Stress | -.43** | .11 | |
| T2 Stress by HS Support Int | .01 | .02 | |
| T2 Stress by Col Support Int | -.01 | .02 | |

*Note.* $R^2$ values were calculated using original data. HS = high school; Col = college, Int = Interaction.

Original n = 124

Pooled n = 168

*$p < .05$. **$p < .01$

Table 33. Summary of multiple regression analysis for T3 stress, T3 support, and interactions predicting T3 college belongingness with pooled multiple imputation data.

| Variable | *B* | *SE B* | $\Delta R^2$ |
|---|---|---|---|
| Model 1 | | | .03 |
| Gender | .23 | .13 | |
| Ethnicity | .20 | .14 | |
| Model 2 | | | .25** |
| Gender | .28* | .12 | |
| Ethnicity | .17 | .12 | |
| T3 HS Support | -.01 | .01 | |
| T3 Col Support | .04* | .01 | |
| T3 Stress | -.37** | .09 | |
| Model 3 | | | .01 |
| Gender | .29* | .12 | |
| Ethnicity | .17 | .12 | |
| T3 HS Support | -.03 | .04 | |
| T3 Col Support | .07 | .05 | |
| T3 Stress | -.37** | .09 | |
| T3 Stress by HS Support Int | .01 | .02 | |
| T3 Stress by Col Support Int | -.01 | .02 | |

*Note.* $R^2$ values were calculated using original data. HS = high school; Col = college, Int = Interaction.

Original n = 137

Pooled n = 168

*$p < .05$. **$p < .01$

Table 34. Summary of multiple regression analysis for T1 stress, T1 support, and interaction predicting T4 college GPA with pooled multiple imputation data.

| Variable | *B* | *SE B* | $\Delta R^2$ |
|---|---|---|---|
| Model 1 | | | .06 |
| Gender | .30* | .14 | |
| Ethnicity | .18 | .14 | |
| Model 2 | | | .02 |
| Gender | .26 | .15 | |
| Ethnicity | .16 | .15 | |
| T1 HS Support | .02 | .02 | |
| T1 Stress | -.05 | .11 | |
| Model 3 | | | .01 |
| Gender | .26 | .15 | |
| Ethnicity | .15 | .15 | |
| T1 HS Support | .06 | .05 | |
| T1 Stress | -.05* | .11 | |
| T1 Stress by HS Support Int | -.02 | .02 | |

*Note.* $R^2$ values were calculated using original data. HS = high school; Col = college, Int = Interaction.

Original n = 90

Pooled n = 91

*$p < .05$. **$p < .01$

Table 35. Summary of multiple regression analysis for T2 stress, T2 support, and interactions predicting T4 college GPA with pooled multiple imputation data.

| Variable | *B* | *SE B* | $\Delta R^2$ |
|---|---|---|---|
| Model 1 | | | .03 |
| Gender | .29* | .14 | |
| Ethnicity | .02 | .15 | |
| Model 2 | | | .03 |
| Gender | .27 | .15 | |
| Ethnicity | .00 | .15 | |
| T2 HS Support | .02 | .01 | |
| T2 Col Support | .00 | .02 | |
| T2 Stress | -.01 | .13 | |
| Model 3 | | | .03 |
| Gender | .26 | .15 | |
| Ethnicity | -.02 | .15 | |
| T2 HS Support | .08 | .05 | |
| T2 Col Support | -.02 | .06 | |
| T2 Stress | -.03 | .12 | |
| T2 Stress by HS Support Int | -.03 | .03 | |
| T2 Stress by Col Support Int | .00 | .03 | |

*Note.* $R^2$ values were calculated using original data. HS = high school; Col = college, Int = Interaction.

Original n = 94

Pooled n = 124

*$p$ < .05. **$p$ < .01

Table 36. Summary of multiple regression analysis for T3 stress, T3 support, and interactions predicting T4 college GPA with pooled multiple imputation data.

| Variable | *B* | *SE B* | $\Delta R^2$ |
|---|---|---|---|
| Model 1 | | | .03 |
| Gender | .29* | .15 | |
| Ethnicity | .02 | .15 | |
| Model 2 | | | .04 |
| Gender | .31* | .15 | |
| Ethnicity | -.01 | .15 | |
| T3 HS Support | .02 | .01 | |
| T3 Col Support | -.00 | .02 | |
| T3 Stress | -.10 | .11 | |
| Model 3 | | | .00 |
| Gender | .30* | .15 | |
| Ethnicity | -.00 | .15 | |
| T3 HS Support | .03 | .04 | |
| T3 Col Support | -.00 | .05 | |
| T3 Stress | -.09 | .12 | |
| T3 Stress by HS Support Int | -.01 | .02 | |
| T3 Stress by Col Support Int | .00 | .02 | |

*Note.* $R^2$ values were calculated using original data. HS = high school; Col = college, Int = Interaction.

Original n = 101

Pooled n = 124

*$p$ < .05. **$p$ < .01

Table 37. Summary of multiple regression analysis for T4 stress, T4 support, and interactions predicting T4 college belongingness with pooled multiple imputation data.

| Variable | *B* | *SE B* | $\Delta R^2$ |
|---|---|---|---|
| Model 1 | | | .04 |
| Gender | .34* | .16 | |
| Ethnicity | .03 | .16 | |
| Model 2 | | | .01 |
| Gender | .32 | .17 | |
| Ethnicity | -.00 | .17 | |
| T4 HS Support | .00 | .02 | |
| T4 Col Support | .01 | .02 | |
| T4 Stress | .01 | .14 | |
| Model 3 | | | .00 |
| Gender | .30 | .17 | |
| Ethnicity | .01 | .17 | |
| T4 HS Support | .02 | .05 | |
| T4 Col Support | -.02 | .06 | |
| T4 Stress | -.00 | .14 | |
| T4 Stress by HS Support Int | -.01 | .03 | |
| T4 Stress by Col Support Int | .02 | .03 | |

*Note.* $R^2$ values were calculated using original data. HS = high school; Col = college, Int = Interaction.

Original n = 103

Pooled n = 105

*$p$ < .05. **$p$ < .01

However, none of the interaction coefficients were significant in a full model with all time points, or in smaller models that only included a single time point predicting time 4 grades and college belongingness. There were cases in which stress and support had direct, but not moderating, effects on school belongingness. To investigate this finding further, Table 38 provides results models testing the direct effects of aggregated support and stress on T4 college belongingness. The model indicates that ethnicity $B = .39$, $p < .01$, T2 support from college friends $B = .07$, $p < .01$, and T3 stress $B = -.49$, $p < .01$ each significantly predict college belongingness at the beginning of the second semester.

Table 38. Summary of multiple regression analysis for stress and aggregated support predicting T4 college belongingness with pooled multiple imputation data.

| Variable | *B* | *SE B* | $\Delta R^2$ |
|---|---|---|---|
| Model 1 | | | .11* |
| Gender | .19 | .15 | |
| Ethnicity | .41** | .15 | |
| Model 2 | | | .02 |
| Gender | .13 | .15 | |
| Ethnicity | .35* | .15 | |
| T1 Stress | -.23* | .11 | |
| T1 HS Support | .03 | .02 | |
| Model 3 | | | .30** |
| Gender | .18 | .15 | |
| Ethnicity | .35* | .15 | |
| T1 Stress | -.18 | .13 | |
| T1 HS Support | .03 | .02 | |
| T2 Stress | -.15 | .15 | |
| T2 HS Support | -.03 | .02 | |
| T2 Col Support | .06** | .02 | |
| Model 4 | | | .04 |
| Gender | .25 | .14 | |
| Ethnicity | .39** | .14 | |
| T1 Stress | -.03 | .14 | |
| T1 HS Support | .03 | .17 | |
| T2 Stress | .16 | .15 | |
| T2 HS Support | -.03 | .02 | |
| T2 Col Support | .07** | .02 | |
| T3 Stress | -.49** | .14 | |
| T3 HS Support | -.00 | .02 | |
| T3 Col Support | -.00 | .02 | |

*Note.* $R^2$ values were calculated using original data. HS = high school; Col = college.

Original n = 67

Pooled n = 116

*$p$ < .05. **$p$ < .01.

The models that tested direct effects of domains of support had parallel findings as those with the aggregated support measures, and are presented in Tables 42 – 45 in Appendix B. In each case, college support had a direct effect on college belongingness, but only when interaction terms were not included in the model.

Specifically, T2 college emotional support $B = .06$, $p < .01$, T2 college instrumental support $B = .08$, $p < .01$, T2 college informational support $B = .08$, $p < .01$, and T2 college companionship support $B = .06$, $p < .01$ significantly predicted T4 college belongingness. In each of the four regression models, T3 stress was also a statistically significant predictor of T4 belongingness.

**Summary.** Because none of the stress by support interaction terms were significant, I conclude that there is no evidence of a moderation model, in which support from friends moderates the relations between stress and school outcomes (i.e., GPA and college belongingness). None of the high school supports (i.e., emotional, instrumental, informational, companionship, aggregated support from high school friends) were significant predictors of T4 college belongingness, and there were no significant models predicting T4 GPA. However, all of the T3 support from college friends variables (i.e., emotional, instrumental, informational, companionship, aggregated support from college friends) were significant, positive, direct predictors of T4 college belongingness. That is, higher support from college friends was associated with higher levels of college belongingness, when controlling for gender and ethnicity. Furthermore, T3 stress remained a significant, negative, direct predictor of T4 college belongingness, even when supports from college friends were included in the model.

**Research question 4: Friendship goals as predictors of supports from friends.**

The fourth research question asks whether friendship formation and maintenance goals predict support from friends from high school and college friends. I used latent variable path analysis to address this question, and test for goodness-of-

fit for the pathways. In the model (see Figure 1), the four supports from college friends (i.e., emotional, informational, instrumental, and companionship) were dependent upon friendship formation goals. The four supports from high school friends (i.e., emotional, informational, instrumental, and companionship) were dependent upon on friendship maintenance goals. Supports from high school and college friends were allowed to covary, as were any error variances of items with similar stems. The goals were examined only at the precollege (T1) data collection and were used to predict support at the beginning of the second semester (see Figure 1, paths f and g).

Latent variable path analysis was used to examine the fit of a model that assumes that friendship formation goals predict supports from college friends and friendship maintenance goals predict supports from high school friends. Missing data was resolved using full information maximum likelihood (FIML), which is typical in LVPA (Mueller & Hancock, 2010), as described above. Full Information Maximum Likelihood (FIML) procedures were used to calculate model parameters and goodness-of-fit statistics. However, ML may deflate standard error values in cases of non-normality (Mueller & Hancock, 2010). Therefore, since descriptive statistics regarding skewness and kurtosis show that the data is non-normal, I employed robust test statistics.

A two-phase process was used: phase one examined the measurement model, and phase two examined the structural model. The measurement model includes all of the imposed paths from the latent factors to their measured variable indicators, but does not impose any directional paths on the latent factors. In the measurement model

phase, all latent constructs were allowed to covary (see Figure 14), so that any issues with model fit could be parsed out to the measurement, and not any constraints of the structural model. In the structural model phase, the hypothesized directionality and connections were imposed (see Figure 15). In both models the errors of parallel items across high school and college supports and goals were allowed to covary. Furthermore, to correct for the kurtosis present in the friendship formation goal variable, the Satorra-Bentler (S-B) scaling method was employed to retain a better control over Type I error rates (Finney & Distefano, 2006; Satorra & Bentler, 1994). The S-B scaling method adjusts the $\chi^2$ output from the typical ML procedure using the following equation:

$$\text{S-B } \chi^2 = d^{-1} \text{ (ML-Based } \chi^2)$$

where d is defined as "a scaling factor that incorporates the kurtosis of the variables" (Finney & DiStefano, 2006, p. 289).

Figure 14. LVPA measurement model

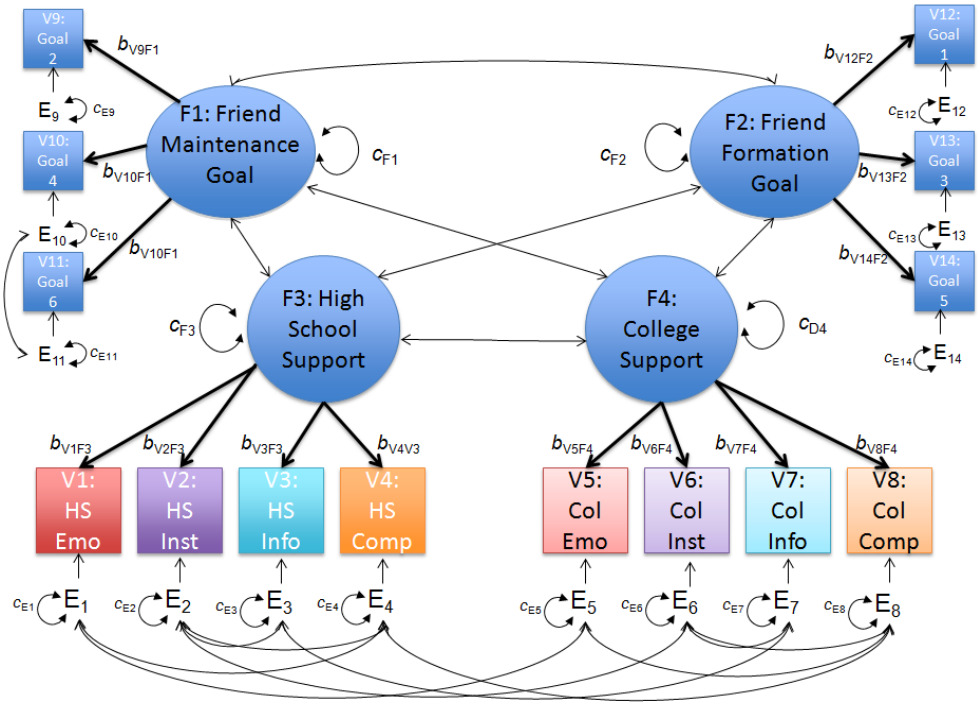



Table 39 presents the covariance matrix for all variables in the model, and Table 40 presents the factor loadings for each of the measured variables in the measurement model model. In summary, with one exception, the measured variables load highly on the latent constructs they represent. There was one friendship maintenance item that did not load onto the latent friendship maintenance factor ("move away from my hometown best friend"). Furthermore, based on two indices of model fit, chi-square and RMSEA, the measurement model displayed good fit ($\chi^2$ = 10.15; RMSEA = .00) and it was deemed reasonable to continue to the structural phase of the path analysis (MacCallum, Browne, & Sugawara, 1996).

Table 39. Covariance matrix for LVPA measurement model.

| Variable | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. T4 HS Emotional | 56.51 | - | | | | | | | | | | | | |
| 2. T4 HS Instrumental | 51.45 | 53.12 | - | | | | | | | | | | | |
| 3. T4 HS Informational | 54.36 | 53.62 | 56.45 | - | | | | | | | | | | |
| 4. T4 HS Companionship | 51.38 | 50.32 | 51.85 | 55.66 | - | | | | | | | | | |
| 5. T4 College Emotional | 33.03 | 29.53 | 30.97 | 27.04 | 41.75 | - | | | | | | | | |
| 6. T4 College Instrumental | 31.61 | 31.59 | 31.96 | 27.42 | 38.66 | 40.99 | - | | | | | | | |
| 7. T4 College Informational | 32.65 | 32.21 | 33.22 | 28.60 | 39.32 | 40.62 | 41.49 | - | | | | | | |
| 8. T4 College Companionship | 32.55 | 29.53 | 30.92 | 28.30 | 38.44 | 37.09 | 37.72 | 39.86 | - | | | | | |
| 9. T1 Goal Item 1 | 1.69 | 1.31 | 1.59 | 1.61 | 1.41 | .79 | 1.15 | 1.20 | .52 | - | | | | |
| 10. T1 Goal Item 2 | 2.41 | 2.15 | 2.38 | 2.45 | 1.69 | 1.54 | 1.64 | 1.56 | .23 | .84 | - | | | |
| 11. T1 Goal Item 3 | 1.72 | 1.81 | 1.80 | 1.39 | .63 | .54 | .59 | .54 | .30 | .18 | .75 | - | | |
| 12. T1 Goal Item 4 | -.79 | -.70 | -.73 | -.65 | -.54 | -.50 | -.58 | -.57 | -.05 | .33 | .00 | 1.45 | - | |
| 13. T1 Goal Item 5 | 2.65 | 2.62 | 2.63 | 2.34 | 1.53 | 1.33 | 1.56 | 1.69 | .36 | .21 | .39 | -.01 | .80 | - |
| 14. T1 Goal Item 6 | 0.36 | 0.52 | 0.50 | .06 | .57 | .31 | .22 | .12 | .06 | .18 | .11 | .50 | .06 | 1.01 |

Table 40. Factor loading for unstandardized LVPA measurement model.

| Variable | Maintenance Goal (Standardized Values) | Formation Goal (Standardized Values) | High School Support (Standardized Values) | College Support (Standardized Values) |
|---|---|---|---|---|
| T1 Goal Item 2 | .01 (.19)** | | | |
| T1 Goal Item 4 | 1.00 (1.00)ł | | | |
| T1 Goal Item 6 | .41 (1.00) | | | |
| T1 Goal Item 1 | | 1.00 (.90)ł | | |
| T1 Goal Item 3 | | 1.12 (.90)** | | |
| T1 Goal Item 5 | | 1.39 (.92)** | | |
| T4 HS Emo | | | 1.01 (.97)** | |
| T4 HS Inst | | | 1.00 (.97)ł | |
| T4 HS Info | | | 1.05 (.97)** | |
| T4 HS Comp | | | .96 (.96)** | |
| T4 Col Emo | | | | .95 (.94)** |
| T4 Col Inst | | | | 1.00 (.96)ł |
| T4 Col Info | | | | 1.02 (.96)** |
| T4 Col Comp | | | | .94 (.96)** |

ł Loading set to 1 for scale.

*$p$ < .05. **$p$ < .01.

Figures 15 and 16 present the full hypothesized model and the structural model, respectively. Model fit indices showed that the hypothesized model had bordeline fit ($\chi^2$ = 131.81; RMSEA = .08) but the hypothesized pathways from Friendship Maintenance Goal to High School Support ($b_{F3F1}$ = -.01, $p$ > .05) and from Friendship Formation Goal to College Support ($b_{F3F1}$ = -.43, $p$ > .05) were not significant, as presented in Table 41 and Figure 17.

Figure 15. LVPA full model.

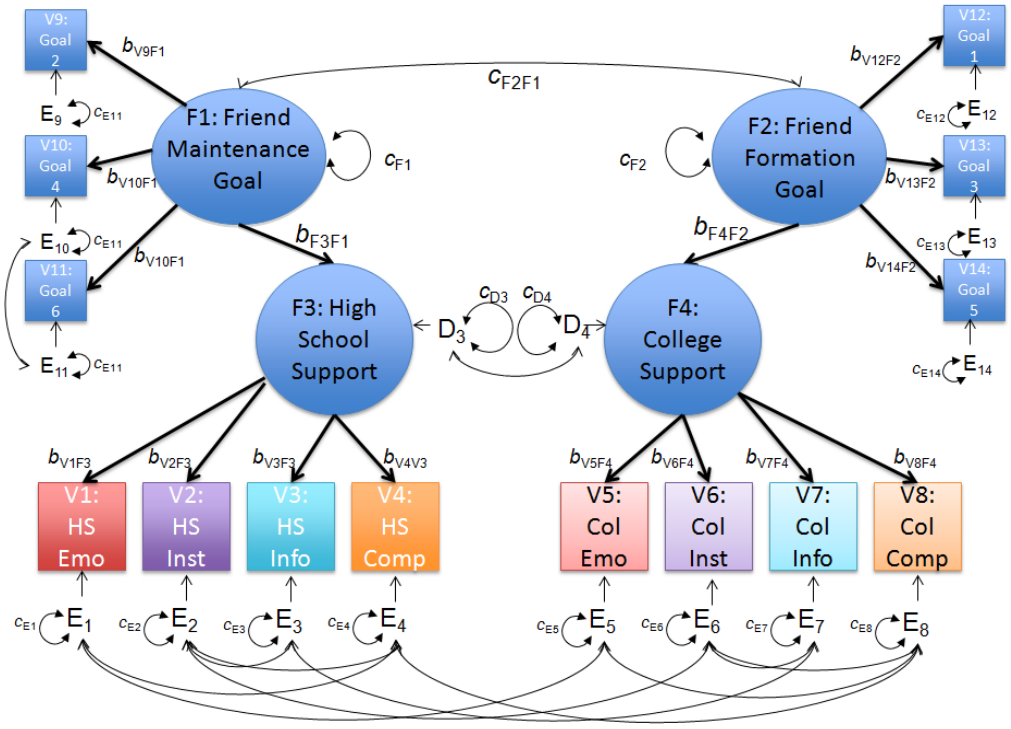


Figure 16. LVPA structural model.

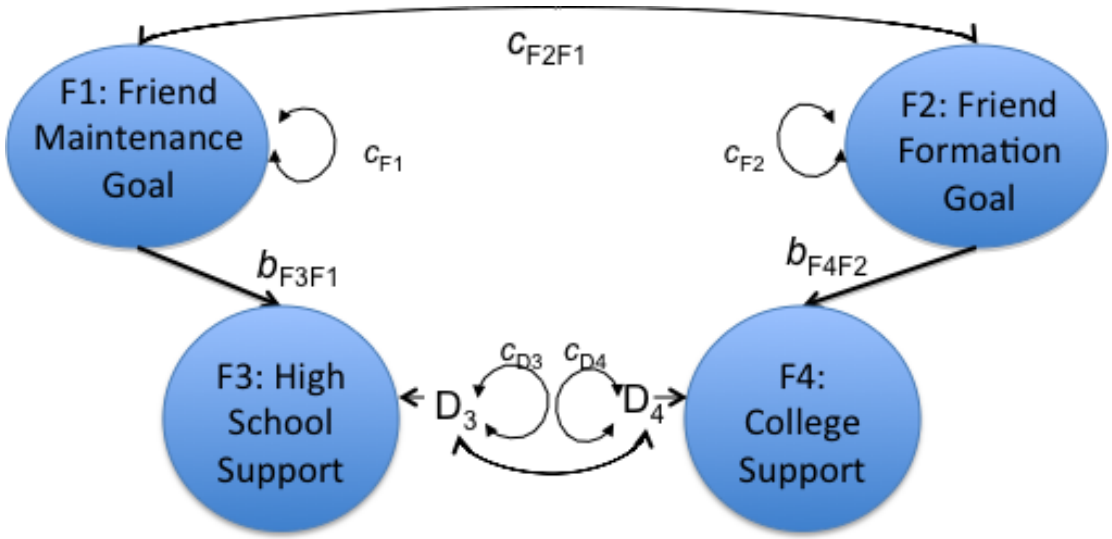
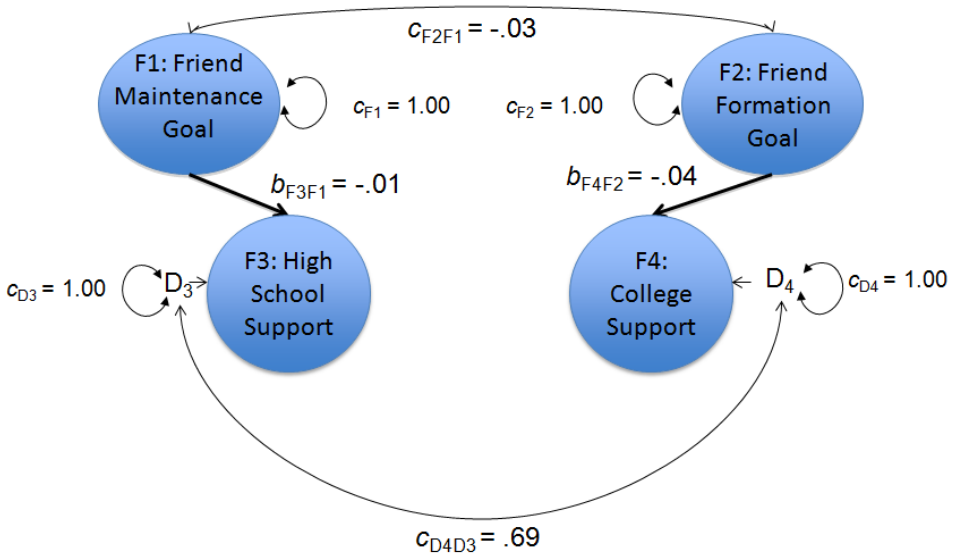


Table 41. Structural paths for LVPA structural model.

| Endogenous Factor | Maintenance Goal (Standardized Value) | Formation Goal (Standardized Value) |
|---|---|---|
| HS Support | -.01 (-.01) | |
| College Support | | -.43 (-.04) |

Note: The pathways were not significant, p > .05

Figure 17. LVPA standardized solution.




**Summary.** Based on the strong hypothesized model fit and the significant paths from goals to supports, I conclude that these data do not provide evidence that precollege friendship goals significantly predict support from high school friends and college friends at the beginning of the second semester.

## Summary of Findings

In summary, this study provides support for the notion that while support from high school friends decreases over time, support from college friends remains stable from the first two weeks of the semester. These first two weeks that determine college friend support levels may be vital, as findings indicate that the support transitioning college students perceive that they receive from their new college friend has a direct effect on college belongingness.

However, not all of the hypothesized relations were realized. There was not support that the context change aggregate predicted any outcomes. Moreover, there was no evidence that support moderates the relation between stress and school outcomes. Furthermore, there was no evidence in these data that transitioning college students' friendship formation goals had a direct effect on later support from college friends, or that friendship maintenance goals had a direct effect on later support from high school friends. These findings and their implications will be discussed in the following chapter.

## Chapter 5: Discussion

The transition from high school to college provides a unique context for research. Developmentally, this transition occurs at the end of adolescence, when friendships become more prominent in students' lives (Tanner, 2006). Contextually, students may maintain their high school friendships, or face the need to form new relationships. The current study examined the role of support from precollege and newly formed friendships during the transition from high school to college. First, it described mean changes in stress, support, and belonging over four time points: (T1) precollege, (T2) the beginning of the first semester, (T3) the end of the first semester, and (T4) the beginning of the second semester. Second, it examined the relations between cumulative context change, and school outcomes. Third, a potential mediation pathway of stress on the relation between context change and school outcomes was explored. Fourth, a potential moderating pathway of social support on the relation between stress and school outcome was analyzed. Finally, it examined the predictive role of friendship goals on friendship support.

This chapter will begin with a discussion and interpretation of the findings from the preliminary analyses of changes in variables over time and each of the four research questions. Next, I present a synthesis of general findings and the overall conclusions of the project. Finally, directions for future work on friendship during school transitions are discussed.

## Discussion of Findings

### Change over time.

This section describes the results of a series of ANOVAs and post-hoc contrasts that compared mean differences of stress, high school support, college support, and belonging over the four time points.

**Stress.** In preliminary analysis, the stress ratings from the section leaders were not strongly related to the stress rating by the students themselves. Although this was not expected, one possible explanation is that the section leaders were not able to appropriately judge students' stress because stress is largely an internal experience. With regard to the sample, Gemstone students' stress may not result in missed assignments and attendance, behaviors the section leaders could notice, as these students are all high academic achievers and may be well equipped to perform academically in the face of stress. Another possibility is that the section leaders felt uncomfortable making judgments of their students; even though they were assured that their ratings would be kept confidential, perhaps section leaders underestimated stress to be polite.

Stress changed over the four time points in a cubic pattern. Stress began at its highest point at T1, and significantly decreased at T2, increased at T3 to a level similar to T1 and then decreased again at T4. Perhaps an explanation for this pattern of change is found in a consideration of the context at each time point. At T1, the students were preparing for the beginning of college – a new, unknown situation that likely induced higher stress (Cohen & Wills, 1985). This finding would replicate previous research that has demonstrated that school transitions create stressful

contexts for students (Fenzel, 2000; Rudolph, Lambert, Clark, & Kurlakowsky, 2001). Similarly, at T3 the students were in the midst of their first exposure to final exams. The sample consisted of high academic achievers, who were likely motivated to perform highly on their exams. That desire to succeed can be stressful (Arthur & Hayward, 1997), and so it is understandable that students reported higher stress at that time point. Conversely, at T2 and T4 there was not a school-level challenge faced by the bulk of students. T2 was a few weeks into college, perhaps after the initial stress of starting college had subsided, and T4 was at the beginning of the second semester, perhaps before coursework would be too demanding. The effect size for the change in mean stress was relatively large, which indicates that there are likely meaningful differences in stress during the transition to college. Future researchers should take these fluctuations into account when planning future studies.

**High School Support.** Each of the four high school supports (i.e., emotional, instrumental, informational, companionship) significantly decreased across the four time points. This finding extends previous work (Oswald & Clark, 2003; Swenson, Nordstrom, & Hiester, 2008) that found that support from high school friends is more effective at the beginning of the semester than the end of the semester. I failed to find significant changes in high school emotional support until T4, which was significantly lower than each of the other time points. High school instrumental support significantly declined at each of the four time points. High school informational support had gradual declines, and the change became significant at T3 and T4. Finally, high school companionship declined significantly and steeply between T1 and T2 and then remained stable. The companionship pattern makes

sense, as many students become physically separated from their high school friends, and have few opportunities to spend time together.

These patterns of mean change indicate that on average, support from high school friends declines during the transitions from high school to college. Effect sizes were moderate to large. Assuming that students still have a fundamental need for social support (McClellend, 1985; Sullivan, 1953), the decrease in social support from high school friends will create a deficit. One potential way for students to meet their needs for support would be to form new, supportive friendships with other students on campus.

**College Support.** College support (i.e., emotional, instrumental, informational, companionship) was examined at the three college time points: T2, T3, and T4. In the analysis of mean change over time, college support remained stable across all three time points; there were no significant differences in reported emotional, instrumental, informational or companionship support. Therefore, mean levels of perceived support at the beginning of the college experience remain statistically equivalent to the first semester and into the second semester. This finding is somewhat contrary to the notion that friendships develop slowly over time (Berndt & McCandless, 2009), since students did not start with low levels of support from college friends, and gradually increase over time. This pattern may indicate that if students are able to quickly form friendships within the first two weeks of college, they will continue to reap benefits for months. However, it is also possible that if students do not form friendships within that two-week window, it may be very difficult to recover the lost support from weakened high school relationships.

**Belonging.** Mean belonging significantly increased from T1 (which asked about high school belongingness) to T2 at the beginning of college, and then remained stable throughout the college measures. The effect size was moderate. This pattern is somewhat contrary to previous research on school transitions that typically finds belonging decreases from one school context to the next (e.g., Chow & Healy, 2008; Simmons & Blyth, 1987) One potential explanation is that because the sample was drawn from a campus program that requires high academic achievement, it is possible that the students were more similar to their new college peer groups than they were to their high school peer groups who would likely have more variability in academic achievement. That increase in similarity could be the driving force behind the increase in belonging seen in the current results. However, it is important to recognize that these analyses do not control for external variables, such as sociability, dormitory size, and participation in extra-curricular activities that may affect the found results.

**Context change predicting school outcomes**

Research question one asked, to what extent does the change in context as examined prior to entering college during the college transition predict school-related outcomes at the beginning of the second semester of college? Context change did not significantly correlate with any of the variables in the model, nor did it significantly predict first semester college GPA or T4 college belongingness. It is possible that this finding represents the lack of a true direct effect between context change and school outcomes and that high context change does not predict GPA or school belongingness. However, there is a body of theoretical and empirical research that

indicates that greater context change does relate to worse school outcomes (Simmons & Blyth, 1987). Therefore, it may be more likely that the chosen measurement and statistical analysis were not the most appropriate to detect true differences. In particular, the context change measure that was created for this study may be flawed.

The context change measure identifies nine aspects of the student transition experience, and assigns high change (1) or low change (0) values to students' responses. For example, students were asked how far (in miles) their high school is from the university. Students who responded that their high school was farther away from the median distance score were rated as high change, and students who responded that their high school was closer than the median distance score were rated as low change. The assigned scores were summed to create an aggregate context change score. This procedure limited the students' responses to a dichotomous variable, which truncated the natural variance of the responses. Since many student scores were close to the median, perhaps there was not enough difference between high and low scores to significantly explain variance in school-related outcomes. However, none of the attempts to use individual items to predict differences in the outcome variables yielded significant results. One future strategy could be a coded interview protocol that asks students about their changes in context, which would allow for a more nuanced approach to context change measurement.

Furthermore, the selected aspects of context change may not represent the most salient aspects of the transition from high school to college. It may be that other aspects of context change (e.g., distance from parents, first generation college student status, cultural distance) would have more predictive power than the ones selected for

this study. Further recommendations for measuring context change in future research will be discussed in the future research section.

**Stress as a mediator between context change and school outcomes**

Research question two asked, to what extent do levels of stress prior to college entry, the beginning of the first semester, and the end of the first semester mediate the relationship between the change in context and school outcomes at the beginning of the second semester during the transition to college? It cannot be said that stress mediates the relation between context change and school outcomes because the direct relationship between context change and school outcomes does not exist. However, the potential direct pathways from (1) context change to stress, and (2) stress to school outcomes were also examined. The results indicate that context change does not have a predictive relationship with stress at any of the three time points. This finding is contrary to previous research that suggests stress is the outcome of changes in context with which one is unsure how to cope (Cohen & Wills, 1985). One interpretation of the current results is that students' stress is not affected by the degree of context change they experience, so that for example, students who move to college from small, out-of-state high schools will experience similar stress to students who move to college from large, in-state high schools. Another possibility is that support from friends and parents protects students from experiencing stress in the first place. However, as discussed previously it may also be the case that there was a measurement problem with the construction of the context change measure, and that a different, more valid measurement strategy would glean significant results.

Neither context change nor stress predicted T4 GPA. While this finding contradicts previous school transition research that shows consistent declines in GPA over school transitions (Barber & Olsen, 2004; Blyth, Simmons, & Bush, 1978; Benner & Graham, 2009; Larose, Bernier, & Tarabulsy, 2005), the current result might reflect a true, non-significant relation between context change and stress, and context change and GPA. However, in addition to a revision of the context change measure, different sampling strategies and GPA assessment may result in different findings. In terms of sampling, the study's sample consisted of participants in the Gemstone program, which requires high academic achievement for admission. It is likely that these students were more academically motivated than typical students and therefore more likely to earn high grades. Indeed, the T4 GPA measure (as well as many individual items) was positively skewed, and most students earned close to the maximum of the measure. Therefore, a ceiling effect may be in play and sampling students who better represent the natural, broader variance of student grades would allow for detection of a potential true relation.

In terms of the GPA measure, students were asked to select from a series of GPA ranges instead of indicating their exact GPA. This was done because students may not be sure of their exact GPA value, and the ranges may represent more accurate data. However, providing ranges truncates the natural continuum of the data, and limits the variance even further than the sampling of high academic achievers alone. Therefore, the GPA scores may be too homogenous for any predictor to explain a significant amount of variance.

As opposed to GPA, the analyses revealed that T3 stress did significantly negatively predict T4 college belongingness with a moderate effect size, although T1 and T2 stress were not significant predictors of T4 college belongingness. Again, it is important to note that T3 took place during students' first semester final examinations. Perhaps these results indicate that students' ability to remain calm during that first major academic challenge relates to college belongingness. It is also possible that students who have the resources to handle end of semester stress are also able to leverage those resources to feel like they belong on campus. For example, students with strong support from peers may feel less stress and also feel a strong sense of belonging as a result of that support.

**Social support as a moderator of stress and school outcomes**

Research question three asked, to what extent do levels of support (i.e., emotional, informational, instrumental, and companionship) from high school and college friends moderate the relations between stress and school-related outcomes among emerging adults during the transition to college? The results indicated that there were significant direct effects of college supports (i.e., emotional, instrumental, informational, and companionship) and stress on college belongingness. Effect sizes were moderate to large. Students who perceived they received more support from their new college friends at the beginning of the semester reported significantly higher college belongingness at the beginning of the second semester. College support levels did not significantly change over time and including T3 college support to the regression model did not explain significantly more variance than T2 college support alone. High school supports were not significant predictors of T4 college

belongingness. The difference in relationships suggests that the predictive power of support from college friends and high school friends are not equal when it comes to students' comfort on campus. Indeed, as predicted having emotionally close, proximal friends on campus within the first two weeks of college predicted higher reported college belongingness at the beginning of the second semester, regardless of high school support.

However, none of the support by stress interaction terms was significant in predicting T4 college belongingness. The lack of significant interaction terms signifies that there is no evidence for a moderation pathway in the data. However, theory suggests that there is a strong relation between stress and support (Cohen & Wills, 1985). Perhaps an alternative model where stress partially mediates a relationship between support and college belongingness would be a more accurate representation of the underlying relationships.

Furthermore, neither stress nor support significantly predicted T4 GPA. As mentioned earlier, this may reflect limitations in the sample and measurement technique, rather than a lack of relations among support, stress, and grades in the population.

**Friendship goals as predictors of supports from friends**

The fourth research question asked, to what extent do precollege friendship formation and maintenance goals predict social support (i.e., emotional, informational, instrumental, and companionship) from friends among emerging adults during the transition to college? A latent variable path analysis revealed that there was no evidence that students' friendship maintenance goals positively predict high

school support, or that friendship formation goals positively predict college support. The structural model was able to reach borderline fit, but the hypothesized causal pathways were not significant. Furthermore, one of the maintenance goal items did not significantly load onto the maintenance goal factor. Perhaps an alternative model that incorporates different friendship goal measurements, friend-making strategy knowledge, or sociability could be used to explain the relations between friendship goals and support. In spite the lack of significant findings, the current model is based on strong theory, and hopefully will be a starting place for future research on friendship goals.

It is important to note that there were some problems with the maintenance and formation goal measures. First, during the examination of Cronbach's alpha, one item from the formation scale was deleted to increase reliability. Furthermore, the maintenance goal scale had a very low Cronbach's alpha, indicating poor reliability. Second, one of the maintenance items did not significantly load on the maintenance goal factor. The goals scales were adapted from previous measures designed to examine precollege concern (Paul & Brier, 2001). The lack of significant findings and the problems with the scale loadings and reliability indicate that new scales should be developed to improve future work on students' goals to maintain or form friendships. Perhaps new items could be generated through student interviews, or adapted from different measures of social goals.

## Synthesis of Findings

In summation, the current study found that perceived support from high school friends significantly declines over the first semester and into the second semester while perceived support from college friends remains relatively stable from the beginning of the first semester. These concurrent patterns suggest that students who do not have supportive friends on campus by the first two weeks – a short window – will likely experience a deficit of received support by the beginning of the second semester. This is because students who depend on their distant high school friends will gradually receive less and less support, and have nothing to compensate for their loss. On the other hand, students who are able to quickly form new friendships will be able to replace their diminishing support from high school friends with new support from college friends. Moreover, as support from college friends was found to directly predict college belongingness, students who form new friendships within the first two weeks of college will likely experience higher college belongingness.

Furthermore, assuming that they have some effect on later support that was not appropriately measured in the current study, students who have high friendship maintenance goals and low friendship formation goals may be creating a risky scenario for themselves, wherein they work to rely on supports that will likely weaken over time. These students could be encouraged to increase their formation goals, while maintaining strong ties at home.

The study has several strengths that contribute to the fields of friendship, stress, and school transitions. First, it incorporates four time points across seven

months, including a precollege measure and second semester measure. Most studies on the transition to college only collect data at two time points – the beginning and end of the first college semester (e.g., Pittman & Richmond, 2008). The four time points allow for more descriptive examination of longitudinal change, similar to the work that has been done across the middle school transition (Barber & Olsen, 2004; Simmons & Blyth, 1987). For example, without all four time points the cubic stress pattern would not have been detected. The measurement time points also allow for the examination of variable relations within different contexts, for example before college entry and during final exams. Before this study, it was not empirically known whether the general declines in grades and school belongingness that exist across earlier school transitions exist during the college transition. The findings of the current study indicate that on average high academic achieving students' grades do not decrease and that contrary to the typical pattern, their sense of school belongingness increases from high school into college. As mentioned above, this could be due to the context of the Gemstone program, a built-in campus community, in which students are all high academic achievers. This similarity might lead students to feel greater belonging than in a high school with a wide range of student academic achievement.

A second contribution is the friendship measurement strategy. As previously mentioned, friendship is a multidimensional construct, involving mutual liking, reciprocity, closeness, and social support (Bukowski, Motzoi, & Meyer, 2009). Across friendship dyads, friends can vary in each of those friendship elements. However, researchers tend to operationalize friendships as if they are homogenous

(Bukowski, Newcomb, & Hartup, 1996). In doing so, most researchers group all friendships together, and do not distinguish among acquaintanceships, friends, and best friends (Bukowski, Newcomb, & Hartup, 1996). Instead of asking students about their "friends" generally, the incorporated measure in this study asked for nominations of five specific high school and college friends, and asked about participants' relationships with each nominated friend. This strategy allows for the assessment of the existence of friends at all (which is a distinct matter from friendship support) and reduces the likelihood that students are responding to the scale items about their stereotypic idea of what a friend should be, as opposed to actual friends in their lives, which has been a concern in previous work (Newcomb & Hartup, 1996).

Third, the current study differentiated between two contexts of support (high school friends and college friends) in a way that is rare in the literature (for exceptions see Oswald & Clark, 2003; Swenson, Nordstrom, & Hiester, 2008). In this and other analyses, it is becoming clear that college students have multiple groups of friends, and the different groups do not serve the same purposes or provide the same support at all times. Furthermore, the measurement strategy differentiated between four types of support, instead of only examining general support. Although the results of the confirmatory factor analysis showed that the four support scales were not independent predictors, the current study provided empirical information that can be used to refine support measurement in future work.

Next, this study examined the potential moderating pathway of support from friends on the relation between stress during the college transition and school outcomes. Although theory would suggest that different combinations of stress and

support differentially predict school outcomes, that pattern was not found in our data. Instead, stress and college support each directly predicted T4 college belongingness. Again, while this finding was unexpected, it can inform future theory and research regarding the relation between stress and support.

Finally, the conceptual model designed for this project recognizes the importance of friendship goals in relation to the transition from high school to college, although significant findings were not found. Previous work has not taken individual students' friendship goals into account when examining support from friends during the transition, and future work should extend this line of research, perhaps with new, more reliable friendship goal measurement. Including goals in the measurement strategy is one way to take students' agency into account, and begin to understand the processes that drive the heterogeneity in student support.

It is important to note that this was one, correlational study, and the results have not definitively resolved questions about the nature of the relations among the variables, nor were the results designed to indicate causal relationships. Moreover, as with all research, the current study had limitations that could be addressed in future work to strengthen the field. These limitations include issues of sampling, measurement, and examination of alternative variables and models. These issues will be discussed in terms of directions for future research.

## Directions for Future Research

Areas for future work will be described in this section. I will begin with issues of sampling and differences among demographic groups that could be examined in future work. Then, the use of other measurement techniques will be discussed. Finally, I will conclude with suggestions for alternative models that may help explain the relations among support from friends, friendship goals, stress, and school outcomes over the college transition.

### Measurement

While the measures for this study were selected based on extant theoretical and empirical literature, two of the scales had problems with reliability, skew, or concurrent validity. First, the context change scale did not predict stress or school related outcomes, despite decades of research that suggest that greater degrees of context change over school transitions predict to lower grades, lower school belongingness, and higher stress (Simmons & Blyth, 1987). The context change measure created for this study, and has not been through rigorous validation procedures with multiple samples and iterations. Therefore, although there were unexpected non-significant findings, it is likely that there was a problem with the measurement of the phenomena, and the findings should not be interpreted as a dismissal of the importance of context change.

Future work could use other items (e.g., to assess whether students grew up in rural, suburban, or urban communities) or use a different method of aggregation to see if the context change measure could produce significant results. For example, instead of using a median split to divide students into low change and high change

categories across each variable, researchers could use an external cut point (e.g., distance to school that requires a flight being categorized as high change).

Second, the friendship maintenance scale had poor internal consistency ($\alpha$ =.57), and did not load onto the friendship maintenance goal factor in a coherent way. Again, because this was a new adaptation of a pre-existing scale (Paul & Brier, 2001), the friendship formation scale would benefit from further validation and revision to appropriately measure friendship formation goals. In particular, upon reflection after the study, negatively coded items 2 and 3 ("I want to move away from my hometown circle of friends"; "I want to move away from my hometown best friend") seem unlikely to garner strong responses, even from students who have a strong desire to maintain precollege friendships. Future research would benefit from the development of new measures that are originally designed to assess friendship maintenance goals, which could more validly assess the predictive path from goals to later friend support.

**Sampling to test for group differences**

Although the current study controlled for ethnicity and gender, future research could include them as a predictors in the model and formally test for group differences in stress, goals, and social support. It is important to remember that students are not a homogenous population, and many unmeasured student-variables might explain significant variance in student stress, support, and school outcomes. Furthermore, the students in this study were all part of a campus program that provided extra support during the transition though common housing, selection into the program based on shared academic success and interests, and an overnight orientation program. These supports are not typical in the college population at large,

and limit the generalizability of the findings. Therefore future work could plan to use sampling strategies designed increase external validity.

The majority of research on the college transition has focused on primarily white samples (Mounts et al. 2006; Oswald & Clark, 2003; Paul & Brier, 2001). The few studies that have focused on ethnic minorities during school transitions have found significant interactions by ethnicity (Benner & Graham, 2009; Hurtado & Carter, 1997). In one example, African-American students who moved from diverse schools to primarily white schools experienced greater declines in grades than other students (Benner & Graham, 2009). Therefore, future researchers should try to explain why these interactions might exist, and recruit diverse populations, and test for differences among these groups. The current study sampled honors students from one university, who were primarily White and Asian. However, future work can recruit broader samples to provide more generalizable findings. Specifically, I suggest efforts should be made to recruit ethnic minorities, international students, transfer students, and non-honors students from multiple universities. Furthermore, reasons to test for group differences among ethnic groups and genders are presented.

**Ethnic Minorities.** Very few studies on friendship and stress over the college school transition include samples with equal proportions of ethnic minority students. The current study primarily consists of White and Asian students, but future research should recruit more diverse samples. African-American and Latino students have historically been at higher risk for college attrition (Feldman, 2008) than White students, and it is important to examine whether support from college friends could serve to reduce that attrition.

Some previous research has indicated that ethnic minority students may experience a more difficult transition process than ethnic majority students because of perceived discrimination and societal devaluation (Huynh & Fuligni, 2012). For example, previous research has found that implicit or explicit discrimination from the university community or society at large relates to declines in academic adjustment among Latino and African-American students (Chavous et al. 2003; Hurtado & Carter, 1997; Rivas-Drake, 2011) In the case of the current study, perhaps ethnic minority students perceived that they were members of ethnic groups that have historically been "devalued" by society at large, which may have made them feel alienated from the campus community and negatively impacted their sense of college belongingness. Furthermore, it is possible that different ethnic groups have cultural differences in family expectations which could predict different transition outcomes. For example, in some cultures it is more common to expect children to contribute to household finances, which could add stress to students' lives.

**International and transfer students.** Although context change was not a significant predictor in the current analysis, perhaps there was not enough variance among the sampled students to predict the outcomes. International students, who often undergo extreme context change, may offer the diversity of experience needed to examine predictive effects. For example, international students often face new languages, cultures, and lifestyles without the security of friends and family (Andrade, 2008). Furthermore, transfer students do not follow the typical school transition trajectory, and may face different challenges than students who enter with the rest of the cohort. Future work could focus on international and transfer students

to further explore the role of context change. Although very little empirical work has been done on this topic, one study by Kaczmarek, Matlock, Merta, Ames, & Ross (1994) found that compared to a normative US student population, international students transitioning to college reported significantly lower social adjustment and institutional attachment. Likewise, the limited research on the adjustment of transfer students has suggested that they face additional challenges during the college transition, including "transfer shock" and discrimination from non-transfer students (Laanan, Starobin, & Eggleston, 2010).

**Non-honors students.** Although the literature suggests that the friendships of high academic achievers do not differ in quality and the provision of support from the friendships of average or low achievers, the current study attempted to examine friendship's impact on grades, which may differ across honors and non-honors students. For example, honors students may have developed strong coping strategies that allow them to maintain their academic achievement in the face of stress in ways that non-honors students have not. Therefore, future research should include a mix of honors and non-honors students to explore potential group differences, and extend external validity.

**Multiple universities.** As is common within the school transition literature, the current study sampled from one, large university. However, the transition to a large state university may be qualitatively different than the transition to a small liberal arts college. Perhaps small colleges help students feel a stronger sense of belonging because they are part of a close-knit community. On the other hand, perhaps it is more difficult for students to find supportive friends at small colleges

because there are fewer students to choose from. A few studies have followed students from one or more high schools to many universities, and examined differences based on whether the university was a 2-year community college, 4-year university, vocational school, technical school, or trade school (Huynh & Fuligni, 2012). However, these university characteristics were included in descriptive data only, and student-outcome group differences across university contexts were not tested.

Different university transition contexts could be assessed though the frame of stage-environment fit theory. Although the theory was developed to help explain conflict during the transition to middle school, the college population experiences similar, though less extreme, cases of mismatch. Specifically, college freshmen face much larger schools, departmentalization, new structure, and a new peer group, at a time when identities are forming, and risk behaviors are the most likely (Arnett, 2000). New college students likely vary in their ability to appropriately handle the new opportunities for autonomy afforded to them by universities, and future research could assess whether stage-environment fit provides a meaningful explanation of the college transition. Specifically, studies could be designed to measure the transition experience of students of different emotional maturity levels across different types of universities, and assess whether there are particular combinations that are helpful or detrimental.

**Gender.** Friendship formation can be thought of as a building of intimacy between peers, and there have been notable gender differences in the development of intimacy among younger students. In one example, Buhrmester and Furman (1987)

found that girls' friendships significantly increase in intimacy between second and fifth grade; boys' friendships did not change significantly. Perhaps these patterns can also be seen among older adolescents transitioning to college, and the ways in which women form friendships and become close are distinct from the ways men do.

Based on research with younger students, there also are reasons to believe that there may be gender differences in terms of school outcomes across the college transition, particularly if new college students are faced with multiple, concurrent life transitions (e.g., college entry, move to a new state, end a romantic relationship). Simmons and Blyth (1987) reported that male middle school students had significant additive effects for GPA and extracurricular activities when faced with multiple, concurrent life transitions (e.g., school transition, puberty, parent divorce). However, when female students had more than three stressful concurrent changes, the negative effects on GPA became more extreme than when male students had the same stressors. These findings indicate that particularly for girls, having multiple transitions occur at the same time can be more detrimental in the long term than experiencing the same number of transitions over multiple years, one at a time. For these reasons, using gender to moderate the pathways outlined in this study could provide important insight on the different experiences of males and females during the transition to college. Future research could also adapt the context change measurement strategy from the current study to examine the number of major life transitions that new college students are faced with, and examine gender differences on models that predict school outcomes.

**Statistical Analyses.** While the current study relied on multiple regression and latent variable path analysis, future research could employ different statistical techniques to examine friendship and the college transition. For example, growth curve modeling would allow researchers to follow students' trajectories of support and stress over time (Brandmaier, von Oertzen, McArdle, & Lindenberger, 2012), which could provide more nuanced information about students' transition processes. Furthermore, multi-level growth modeling techniques could examine the influence of context change across multiple colleges (Preacher, 2012). For example, future work could recruit transitioning college students from several universities (e.g., large state schools, small liberal arts colleges, etc) and track students' growth patterns over time to examine different, interacting influences of university and student characteristics.

**Peer Nominations and Social Network Analysis.** According to the definition discussed earlier, a friend is someone with whom a student has a reciprocal, positive relationship that fulfills social support goals and relieves distress (Bukowski, Motzoi, & Meyer, 2009). Friends can be more or less close to each other, depending on time spent together, proximity, shared interests, and communication styles. However, since none of the quantitative measures used in the literature explicitly define "friend" for the participant, students may be answering questions with peers in mind who do not meet the criteria. One way to incorporate reciprocity into friendship measurement is through peer nominations.

Peer nominations are a common method used to identify friendship dyads and measure their quality. In a procedure developed by Moreno (Hartup, 2009) to determine sociometric status, each child in a sample (e.g., a classroom, grade) is

presented with a list of all of the other children in the sample, and asked to select their friends. Each nomination is compared to find reciprocal dyads. In other words, each part of the friend pair needs to report that the other is her friend. There are several ways to vary the measure, the most common being limitations on the number of nominations (e.g., list your top three friends) or who can be nominated (e.g., same sex friends only).

Friendship can also be analyzed beyond the dyad. Robert and Beverley Cairns and their colleagues argue that a broader peer social unit, such as a cluster within a network, can provide valuable information about friendship influence (e.g., Cairns, Cairns, Neckerman, Gest, & Gariépy, 1988; Cairns, Leung, Buchanan, & Cairns, 1995). Their typical procedure involves peer nomination procedures for children and adolescents. Participants are asked to identify groups of students who spend time together, isolated students, and their own best friends. This information is used to create a map of relationships. Then further analyses are conducted using an individual's network placement and status to predict behaviors such as aggression. Their findings support the notion that competency is only relevant within a specific context. For example, sociometrically popular students might be prosocial, but they also might have other strengths valued by the peer group, such as athletic ability.

Peer nomination strategies may be difficult to employ in a college setting where friends can be dispersed throughout an entire campus. However, confined groupings of students such as in dormitories, living-learning programs, and sports teams could serve to limit the nomination population. Peer nomination methods could also be expanded to measure the reciprocal nature of resource exchange between

friends. That is, peers would rate each other not merely on whether both partners consider the other a friend, but also reciprocity in the supports each provides, which is important to friendship quality over the long term of the relationship (Aboud & Mendelson, 1996).

Another conceptual problem is that while friendships exist between specific people or within specific groups, measures tend to question friendship on a general level. This may keep students from thinking of their own, specific friendships when answering questions, and instead relying on stereotypes of friendships (Furman, 1996). One potential solution is to ask students to participate in peer nominations first or list the names of their friends, and ask about those specific relationships (Furman, 1996; Parker & Asher, 1993). This is the method used in the current study.

**Innovative Designs.** Early studies by Blyth, Simmons, and their colleagues used short-term longitudinal techniques to compare school structure, self-esteem, anonymity, GPA and extracurricular participation over the transition from elementary school to middle school. They repeatedly found decreases in self-esteem, grade point average, and participation, increases in anonymity, and moderating effects of school structure (Blyth, Simmons, & Bush, 1978; Blyth, Simmons, & Carlton-Ford, 1993; Simmons & Blyth, 1987). These findings sparked the interest in school transition research, and laid the groundwork for future studies to explore other variables such as social support from friends, and stress.

However, almost all subsequent studies have used the same short-term longitudinal designs and self-report methodologies. The studies typically measured three or four milestones along the transition (e.g., semester beginnings and ends), but

did not examine the periods between those milestones. Presumably, change either occurs gradually over those intermediary periods or suddenly just prior or following the milestones. The time periods between milestones should be measured with regard to support and stress to test assumptions of change. While short term longitudinal designs may be the most available, and are useful tools, there are other designs such as microgenetic analyses, which deeply examine small frames of change over time (Lavelli, Pantoja, Hsu, Messinger, & Fogel, 2005).

Methodologies such as diary studies (Hey, 1997) could further knowledge in the field, particularly in terms of process. Transitioning students could respond daily, or to a timed text messages and answer specific questions about their immediate experience of social support and stress. Looking at the details between the regularly measured transition milestones (i.e., school entry, semester end) may help researchers explain how and why the observed changes exist.

Additionally, future work should examine the process by which friends' support influence students' academic and psychological outcomes. Multiple studies have supported the notion that friends influence each other and become more similar over time (e.g., Epstein, 1989). One way that occurs is through the peer influence model explicated by Brown (1989). In this model, peer influence among adolescent students exists within the entire peer context, large reputation-based crowds (e.g., jocks, brains, loners, etc), as well as smaller cliques of friends. While peer influence is a lifespan phenomenon, there is an intensification of the process during adolescence, perhaps because adherence to a group provides a student with a sense of identity, stereotypic though it may be, in a time when identity development becomes

a central concern (Brown, 1989; Erikson, 1968). Brown, Baken, Ameringer, and Mahon (2008) identified 12 principles of peer influence, and provided a conceptual model to guide future research. Throughout those principles and model are an emphasis on the person-environment fit, the reciprocal nature of peer relationships, direct or indirect influence, and the peer influence as a temporal process.

**Alternative Models**

**Mediation model of social support.** Although the current study examined the potential moderating effect of social support on the relation between stress and school outcomes, it is possible that a mediation pathway may be more accurate. Perhaps instead of interacting with stress, support has a direct effect on perceived stress. For example, if a student knows she is surrounded by supportive friends who will help solve her problems, she will not experience as much stress to begin with. It is also possible that the mediation pathway will not be longitudinal in nature, but rather that support has immediate effects on stress. Specifically, perhaps it matters what a student's supports are in the moment that a stressor is perceived, and prior support levels are not particularly relevant.

Furthermore, stress and social support could hypothetically be part of bidirectional relation. Perhaps in times of stress, when students call of new friends for social support, the process of helping strengthens the friendship. This feedback loop could lower future stress, as well as increase future social support.

**Other sources of support.** There are several potential relationships that can provide students with social support during a school transition, and research should take these other sources into account. Parents, friends, siblings, significant others, and

teachers all may have roles in a student's trajectory across a transition. From an ecological perspective, beyond these one-on-one interactions, the climate of a school, or the broader cultural values may also determine the amount of social support a student receives (Bronfenbrenner, 1989).

One way to use an ecological perspective to extend current measurement tactics would be to include parent support in models predicting stress over school transitions. A secure attachment to parents has been linked to better school transitions in terms of friend-making (Parade, Leerkes, & Blankson, 2010), and socio-emotional adjustment (Holahan, Valentiner, & Moos, 1994; Larose & Boivin, 1998; Mounts, Valentiner, Anderson, & Boswell, 2006). Parental support in general has been found to negatively predict depression (Newman, Newman, Griffen, O'Connor, & Spas, 2007), and positively predict academic outcomes (Schneider, Tomada, Normand, Tonci, & de Domini, 2008) and self esteem (Seidman, Lambert, Allen & Aber, 2003) over transitions.

**Other variables.** It is also possible that friends' characteristics such as academic motivation, depression, school liking, and school participation could shape students' trajectories over the transition. For example, even if a student has highly emotionally supportive friends, if those friends do not value academics the student's grades may drop over the school transition (Kinderman, 2007; Ryan, 2001). More aspects of friendship should be studied to further understand the effect of having friends, friend characteristics, and friendship quality on stress during school transitions. Operationalizations of friendship that correspond to the complexity of the

conceptual definition might help increase the variance of student outcomes explained by friend relationships (Bukowski, Newcomb, & Hartup, 1996).

Another aspect of friendship that future research could explore comes from the theoretical perspective of Sullivan (1953). Sullivan argued that a person's notion of the self develops through interpersonal relationships, as one perceives how others view her. By the time a student reaches university, that view of the self has been built by many precollege relationships, which could have constructed a positive self concept or a negative self concept. In light of Sullivan's emphasis on the self (1953), future research could also focus more deeply on aspects of the self such as self worth. One avenue would be to perform a latent class analysis to look for profile patterns of students' personality and self constructs, and test whether students in the different profiles differently experience the college transition.

Finally, the availability influence of social networking and other media are likely to be important factors in the study of the college transition. In many regards, the experience of a modern-day college freshman is qualitatively different from experiences of students who transitioned before the turn of the 21st century. In particular, the advent of Facebook, Twitter, and other social networking websites allow students to maintain ties and communicate across great distances in ways that only a few years ago would have been impossible. While use of social media during class has been related to lower perceptions of campus support (National Survey of Student Engagement, 2012), other recent work has begun to assess the role of social media on intimacy formulation (Manago, Taylor, & Greenfield, 2012), and suggest that social networking can help adolescents and young adults fulfill their needs for

emotional self-disclosure and intimacy. However, Facebook is used more often to maintain and build upon pre-existing ties, rather than form new friendships (Ellison, Steinfield, & Lampe, 2011; Manago, Taylor, & Greenfiled, 2012); students on college campuses form friendships in the real world before connecting to them on social media. Therefore, more research is needed to understand how students use social media as they navigate the college transition. For example, while college is traditionally a time for personal reinvention, and change from high school norms, does having an extant Facebook profile limit possibilities for identity exploration, since new friends are immediately able to see posts from precollege friends? Does the public knowledge of who a student's friends were in high school limit friendship formation possibilities in college? These and other questions should be further explored.

**Interventions and Policy**

The findings of the current study could be used to argue for systemic policy practices that help students form supportive friendships on campus. For example, more housing scholarships could be provided to students in addition to tuition funds so that students are able to live on campus so that they have the proximity necessary to form friendships. Also, small-group orientation programs can be designed and enhanced across campuses to help students form the beginnings of friendships. Since stress was found to negatively predict campus belonging, university-level change could also be implemented to reduce student stress, such as staggering final exam periods so that students do not become overwhelmed by concurrent deadlines.

Recent results from the National Survey of Student Engagement (2012) indicate that service learning may be a way to improve students' perceptions that their campus environment is supportive. Students who participated in service learning were showed significantly higher mean levels of perceptions that their campus is supportive, compared to students who did not participate although effect sizes were small.

## Conclusion

Overall, this study provides evidence that supportive college friendships afford students with protection from the stresses of the college transition. Furthermore, although many of the findings were not significant, the study provided a new examination of friendship formation and maintenance goals. However, it is important to recognize that these findings are preliminary, and that future work with more diverse samples and different statistical techniques are needed before firm conclusions can be drawn. This study was an important first step in understanding college students' needs for support, and how friend making can ease a potentially difficult transition.

## Appendix A: Measures

### Context Change

**Developed for this study**

1. Approximately how large was your high school?
2. Approximately how many people from your high school class are now attending the University of Maryland?
3. Approximately how many of your close friends from high school are now attending the University of Maryland?
4. How many miles is this college from your permanent home?
5. Are you currently in a committed romantic relationship with someone from your high school?
6. Does your romantic partner attend the University of Maryland?
7. In the last month, have you experienced the end of a romantic relationship?
8. Does your very best friend attend the University of Maryland?
9. In the last month, have you experienced a relationship-ending altercation with your very best friend?

**Social Support**

**Network of Relationships Inventory (Furman & Buhrmester, 2009)**

Please list your five closest friends from high school, and your five closest friends from college. Respond to the questions below (1 = *Little or none*, 6 = *the Most*).

*Subscale: Seeks safe haven*

1. How much do you seek out this person when you're upset?
2. How much do you turn to this person for comfort and support when you are troubled about something?
3. How much do you turn to this person when you're worried about something?

*Subscale: Seeks secure base*

1. How much does this person encourage you to try new things that you'd like to do but are nervous about?
2. How much does this person encourage you to pursue your goals and future plans?
3. How much does this person show support for your activities?

*Subscale: Companionship*

1. How much do you and this person spend free time together?
2. How often do you and this person go places and do enjoyable things together?
3. How much do you and this person play around and have fun?

**Social Support**

**Child & Adolescent Social Support Scale – Level 2 (CASSS; Malecki & Demaray, 2002)**

How often does each of your close friends do the following things? (1 = *Never*, 6 =*Always*).

*Subscale: Instrumental Support*

My close friend…

1. helps me solve my problems
2. shares his or her things with me
3. helps me when I need it
4. helps me with projects in [for] class

*Subscale: Informational Support*

My close friend…

1. explains things when I'm confused
2. gives me advice
3. make suggestions when I need help
4. ask me for suggestions or ideas

**Friendship Goals**

**Precollege Concerns Questionnaire – Revised (Paul & Brier, 2001)**

How much do you want to do the following things? (1 = *I do not want to do this at all*, 6 = *Definitely want to do this*)

*Subscale: New friend goal*

1. Make new friends
2. Find someone at college I can be really close to
3. Find a social life at college
4. Become popular in college

*Subscale: Precollege maintenance goal*

1. Keep in touch with my hometown friends
2. Move away from my hometown circle of friends
3. Move away from my hometown best friend

**Stress**

**Perceived Stress Scale (Cohen, Kamarck, & Mermelstein, 1983).**

In the last month, how often have you… (0 = *Never*, 5 = *Very Often*).

1. Been upset because of something that happened unexpectedly?
2. Felt that you were unable to control the important things in your life?
3. Felt nervous and "stressed"?
4. Dealt successfully with irritating life hassles? (neg)
5. Felt that you were effectively coping with important changes that were occurring in your life? (neg)
6. Felt confident about your ability to handle your personal problems? (neg)
7. Felt that things were going your way? (neg)
8. Found that you could not cope with all the things that you had to do?
9. Been able to control irritations in your life? (neg)
10. Felt you were on top of things? (neg)
11. Been angered because of things that happened that were outside of your control?
12. Found yourself thinking about all the things that you have to accomplish?
13. Been able to control the way you spend your time? (neg)
14. Felt difficulties were piling up so high that you could not overcome them?

**Section Leader Ratings of Stress**

**Adapted Perceived Stress Scale (Cohen, Kamarack, & Mermelstein, 1983).**

1. In the last month, how often has this student appeared nervous and "stressed?"
2. In the last month, how often has this student appeared on top of things? (neg)
3. In the last month, how often has this student appeared he/she could not cope with all the things he/she has to do?

**Campus Belongingness**

**Revised Psychological Sense of School Membership Scale (PSSM) (Goodenow, 1993; Freeman, Anderman, & Jensen 2007).**

Please rate whether the following statements are true for you. (1 = *not at all true of me*, 6 = *completely true of me*)

1. It is hard for people like me to be accepted here (neg)
2. Sometimes I feel as if I don't belong at this university (neg)
3. People at this university are friendly to me
4. I am included in lots of activities at this university
5. I am treated with as much respect as other students at this university
6. I feel very different from most other students here (neg)
7. I can really be myself at this school
8. I wish I were at a different university (neg)
9. I feel proud of belonging to this university's community
10. Other students here like me the way I am

## Appendix B: Supplementary Tables & Figures

### Models with context change predicting school related outcomes and stress.

Figure 18. Histogram of T3 college belonging residuals

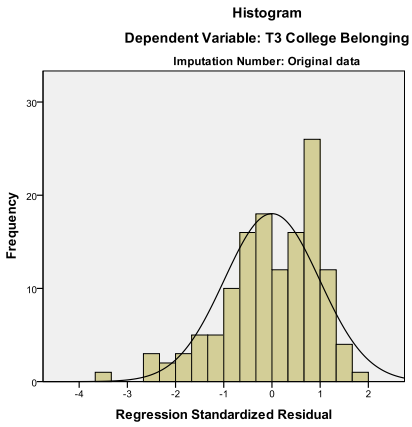



Figure 19. Histogram of T4 college GPA residuals

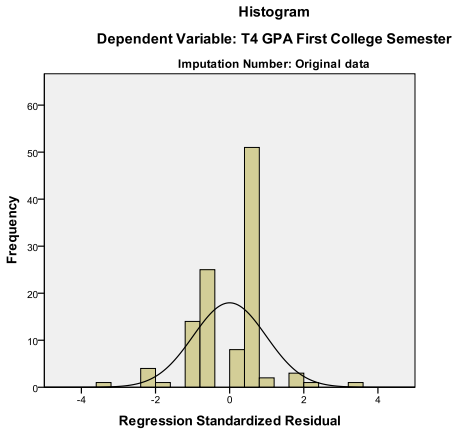


Figure 20. Histogram of T2 stress residuals

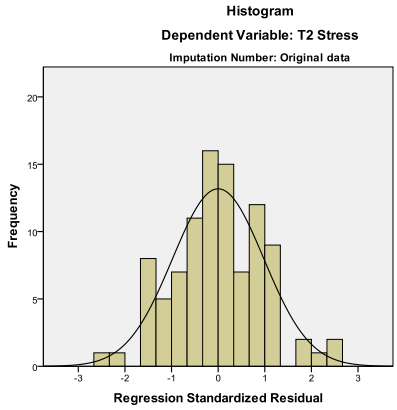



Figure 21. Histogram of T3 stress residuals

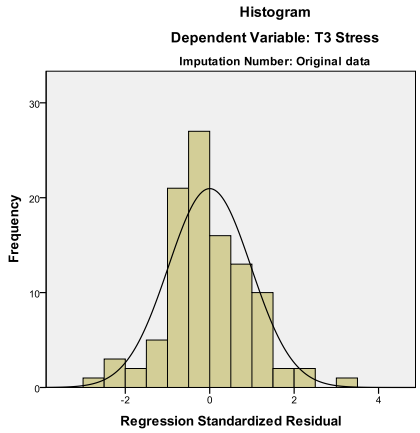



Figure 22. Histogram of T4 college belongingness residuals

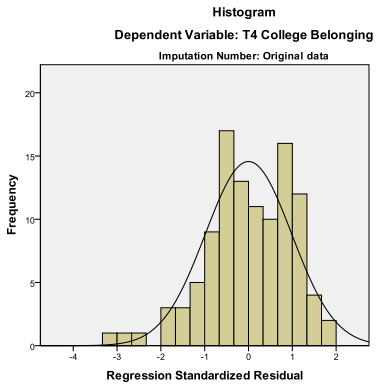
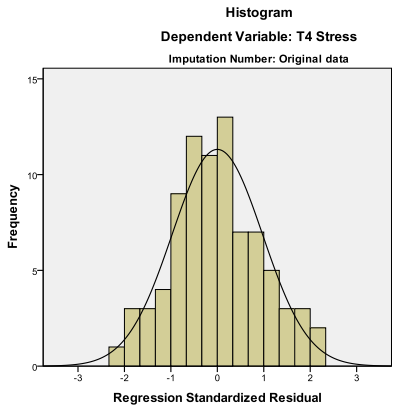


Figure 23. Histogram of T4 stress residuals




**Models with stress and support predicting school related outcomes.**

Figure 24. Histogram of T4 GPA residuals

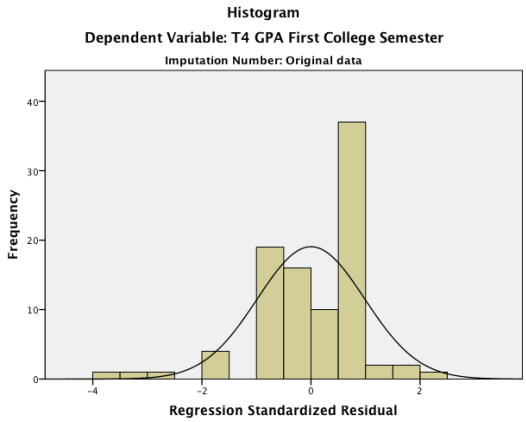


Figure 25. Histogram of T4 college belongingness residuals

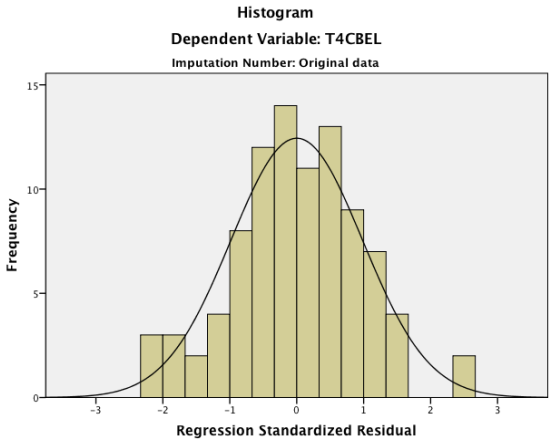



Figure 26. Histogram of T4 college belongingness residuals

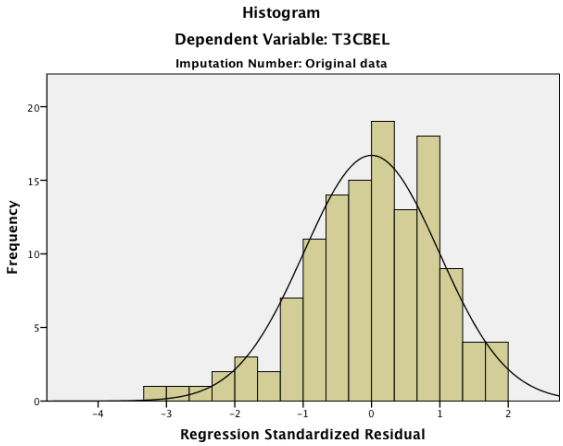


Table 42. Summary of multiple regression analysis for stress and emotional support predicting T4 college belongingness with pooled multiple imputation data.

| Variable | *B* | *SE B* | $\Delta R^2$ |
|---|---|---|---|
| Model 1 | | | .08* |
| Gender | .11 | .15 | |
| Ethnicity | .44** | .16 | |
| Model 2 | | | .05 |
| Gender | .10 | .15 | |
| Ethnicity | .39* | .16 | |
| T1 Stress | -.18 | .12 | |
| T1 HS Emo | .02 | .02 | |
| Model 3 | | | .23** |
| Gender | .12 | .15 | |
| Ethnicity | .39* | .15 | |
| T1 Stress | -.10 | .13 | |
| T1 HS Emo | .01 | .02 | |
| T2 Stress | -.15 | .02 | |
| T2 HS Emo | -.02 | .02 | |
| T2 Col Emo | .06** | .02 | |
| Model 4 | | | .06 |
| Gender | .20 | .14 | |
| Ethnicity | .44** | .15 | |
| T1 Stress | -.01 | .13 | |
| T1 HS Emo | .01 | .02 | |
| T2 Stress | .16 | .16 | |
| T2 HS Emo | -.02 | .02 | |
| T2 Col Emo | .06** | .02 | |
| T3 Stress | -.45** | .13 | |
| T3 HS Emo | -.00 | .02 | |
| T3 Col Emo | -.00 | .02 | |

*Note.* $R^2$ values were calculated using original data. HS = high school; Col = college; Emo = emotional support.
*$p < .05$. **$p < .01$

Original n = 74
Pooled n = 107

Table 43. Summary of multiple regression analysis for stress and instrumental support predicting T4 college belongingness with pooled multiple imputation data.

| Variable | *B* | *SE B* | $\Delta R^2$ |
|---|---|---|---|
| Model 1 | | | .07 |
| Gender | .11 | .15 | |
| Ethnicity | .44** | .16 | |
| Model 2 | | | .07 |
| Gender | .06 | .16 | |
| Ethnicity | .41* | .16 | |
| T1 Stress | -.17 | .12 | |
| T1 HS Inst | .03 | .02 | |
| Model 3 | | | .25** |
| Gender | .12 | .15 | |
| Ethnicity | .43** | .15 | |
| T1 Stress | -.12 | .13 | |
| T1 HS Inst | .02 | .02 | |
| T2 Stress | -.13 | .15 | |
| T2 HS Inst | -.02 | .02 | |
| T2 Col Inst | .06** | .02 | |
| Model 4 | | | .07 |
| Gender | .19 | .14 | |
| Ethnicity | .49** | .14 | |
| T1 Stress | -.02 | .13 | |
| T1 HS Inst | .03 | .02 | |
| T2 Stress | .21 | .15 | |
| T2 HS Inst | -.02 | .02 | |
| T2 Col Inst | .08** | .02 | |
| T3 Stress | -.49** | .13 | |
| T3 HS Inst | -.01 | .02 | |
| T3 Col Inst | -.01 | .02 | |

*Note.* $R^2$ values were calculated using original data. HS = high school; Col = college; Inst = instrumental support.
*$p$ < .05. **$p$ < .01.
Original n = 72
Pooled n = 107

Table 44. Summary of multiple regression analysis for stress and informational support predicting T4 college belongingness with pooled multiple imputation data.

| Variable | *B* | *SE B* | $\Delta R^2$ |
|---|---|---|---|
| Model 1 | | | .06 |
| Gender | .11 | .16 | |
| Ethnicity | .44** | .16 | |
| Model 2 | | | .07 |
| Gender | .07 | .16 | |
| Ethnicity | .38* | .16 | |
| T1 Stress | -.22 | .12 | |
| T1 HS Info | .03 | .02 | |
| Model 3 | | | .26** |
| Gender | .15 | .15 | |
| Ethnicity | .38* | .15 | |
| T1 Stress | -.17 | .14 | |
| T1 HS Info | .02 | .02 | |
| T2 Stress | -.15 | .15 | |
| T2 HS Info | -.03 | .02 | |
| T2 Col Info | .06** | .02 | |
| Model 4 | | | .09* |
| Gender | .24 | .14 | |
| Ethnicity | .46** | .14 | |
| T1 Stress | -.04 | .14 | |
| T1 HS Info | .03 | .02 | |
| T2 Stress | .22 | .16 | |
| T2 HS Info | -.03 | .02 | |
| T2 Col Info | .08** | .02 | |
| T3 Stress | -.54** | .14 | |
| T3 HS Info | -.01 | .02 | |
| T3 Col Info | -.02 | .02 | |

*Note.* $R^2$ values were calculated using original data. HS = high school; Col = college; Info = informational support.
*$p$ < .05. **$p$ < .01.
Original n = 71
Pooled n = 102

Table 45. Summary of multiple regression analysis for stress and companionship support predicting T4 college belongingness with pooled multiple imputation data.

| Variable | *B* | *SE B* | $\Delta R^2$ |
|---|---|---|---|
| Model 1 | | | .13** |
| Gender | .11 | .16 | |
| Ethnicity | .44** | .16 | |
| Model 2 | | | .01 |
| Gender | .12 | .16 | |
| Ethnicity | .37* | .16 | |
| T1 Stress | -.19 | .12 | |
| T1 HS Comp | .02 | .02 | |
| Model 3 | | | .24** |
| Gender | .15 | .15 | |
| Ethnicity | .35* | .15 | |
| T1 Stress | -.09 | .13 | |
| T1 HS Comp | .02 | .02 | |
| T2 Stress | -.19 | .15 | |
| T2 HS Comp | -.01 | .01 | |
| T2 Col Comp | .05** | .01 | |
| Model 4 | | | .07 |
| Gender | .21 | .14 | |
| Ethnicity | .41** | .15 | |
| T1 Stress | .01 | .13 | |
| T1 HS Comp | .03 | .02 | |
| T2 Stress | .15 | .15 | |
| T2 HS Comp | -.01 | .02 | |
| T2 Col Comp | .06** | .02 | |
| T3 Stress | -.49** | .13 | |
| T3 HS Comp | -.01 | .01 | |
| T3 Col Comp | -.00 | .02 | |

*Note.* $R^2$ values were calculated using original data. Comp = companionship support.
*$p < .05$. **$p < .01$.
Original n = 73
Pooled n = 107

Table 46. Number of nominated friends at each time point.

| **Number of Nominations** | **T1** | **T2** | **T3** | **T4** |
|---|---|---|---|---|
| Zero high school friends | 1 | 1 | 4 | 3 |
| One high school friend | 2 | 4 | 7 | 4 |
| Two high school friends | 3 | 9 | 15 | 16 |
| Three high school friends | 16 | 21 | 26 | 30 |
| Four high school friends | 14 | 20 | 14 | 15 |
| Five high school friends | 90 | 80 | 59 | 84 |
| Zero college friends | - | 0 | 1 | 1 |
| One college friend | - | 2 | 3 | 4 |
| Two college friends | - | 7 | 7 | 7 |
| Three college friends | - | 16 | 21 | 17 |
| Four college friends | - | 11 | 16 | 20 |
| Five college friends | - | 100 | 104 | 76 |

Table 47. Full correlation matrix

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. HS Size | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2. HS Friends Attend | .39** | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3. HS Close Friends | -.01 | -.10 | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4. HS Close Friends Attend | .02 | .14 | .45** | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5. T1 Stress | .03 | .03 | -.11 | -.05 | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6. T2 Stress | -.06 | -.04 | -.06 | -.03 | .41** | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7. T3 Stress | -.03 | -.05 | -.11 | -.03 | .46** | .60** | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8. T4 Stress | -.08 | -.9 | -.05 | -.03 | .44** | .43** | .54** | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 9. T1 Formation Goal | -.05 | -.3 | -.07 | -.12 | .03 | -.01 | .07 | .02 | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10. T1 Maintenance Goal | .04 | -.05 | .01 | -.07 | .06 | -.14 | -.04 | -.11 | .12 | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 11. T2 College Belonging | -.05 | -.04 | .05 | .02 | -.29* | -.47** | -.33** | -.30** | .07 | .15 | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 12. T3 College Belonging | .04 | -.07 | -.00 | -.01 | -.29* | -.35** | -.35** | -.40** | .13 | .20* | .74** | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 13. T4 College Belonging | -.12 | -.04 | .01 | .04 | -.27* | -.25* | -.39** | -.37** | .07 | .09 | .67** | .78** | 1 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 14. T4 GPA | -.15 | -.11 | .14 | -.11 | -.03 | .01 | -.08 | -.06 | .20 | .10 | .05 | .16 | .07 | 1 | | | | | | | | | | | | | | | | | | | | | | | |
| 15. T2 HS EMO SSB | -.06 | -.07 | .17* | .04 | -.17 | -.14 | -.22** | -.14 | .20 | .21* | .19* | .24** | .17 | .20* | 1 | | | | | | | | | | | | | | | | | | | | | | | |
| 16. T2 HS INST | -.05 | -.01 | .11 | .03 | -.14 | -.10 | -.14 | -.14 | .12 | .19* | .11 | .18 | .12 | .14 | .86** | 1 | | | | | | | | | | | | | | | | | | | | | | |
| 17. T2 HS INFO | -.04 | -.01 | .10 | .02 | -.15 | -.10 | -.14 | -.16* | .13 | .21* | .13 | .19 | .12 | .14 | .90** | .97** | 1 | | | | | | | | | | | | | | | | | | | | |
| 18. T2 HS Comp | -.09 | -.05 | .15 | .06 | -.03 | -.06 | -.09 | -.03 | .08 | .17 | -.04 | .02 | .03 | .14 | .62** | .72** | .68** | 1 | | | | | | | | | | | | | | | | | | | |
| 19. T3 HS Emo SSB | -.12 | -.01 | .18* | .08 | -.25** | -.12 | -.26** | -.18 | .18 | .17 | .11 | .18* | .19* | .19* | .67** | .61** | .62** | .38** | 1 | | | | | | | | | | | | | | | | | | |
| 20. T3 HS Inst | -.10 | .02 | .12 | .08 | -.18 | -.11 | -.17 | -.09 | .17 | .15 | .07 | .13 | .14 | .15 | .62** | .68** | .64** | .47** | .91** | 1 | | | | | | | | | | | | | | | | | |
| 21. T3 HS Info | -.09 | .04 | .13 | .09 | -.23* | -.12 | -.20* | -.14 | .18 | .14 | .11 | .15 | .15 | .17 | .65** | .67** | .67** | .42** | .93** | .97** | 1 | | | | | | | | | | | | | | | | |
| 22. T3 HS Comp | -.10 | -.03 | .17* | .07 | -.19* | -.10 | -.14 | -.07 | .14 | .12 | .07 | .06 | .10 | .08 | .53** | .56** | .53** | .56** | .81** | .83** | .80** | 1 | | | | | | | | | | | | | | | |
| 23. T4 HS Emo | -.19* | -.13 | .08 | -.07 | -.25* | -.16 | -.21 | -.25** | .27* | .17 | .32** | .18 | .20 | .15 | .63** | .59** | .60** | .46** | .78** | .75** | .75** | .74** | 1 | | | | | | | | | | | | | | |
| 24. T4 HS Inst | -.08 | -.06 | -.00 | -.09 | -.21* | -.12 | -.14 | -.22* | .25* | .16 | .24* | .13 | .14 | .10 | .60** | .63** | .62** | .47** | .78** | .82** | .79** | .78** | .94** | 1 | | | | | | | | | | | | |
| 25. T4 HS Info | -.12 | -.04 | .01 | -.10 | -.24* | -.13 | -.16 | -.25** | .25* | .15 | .25* | .14 | .16 | .11 | .61** | .63** | .64** | .47** | .79** | .80** | .80** | .76** | .96** | .98** | 1 | | | | | | | | | | | |
| 26. T4 HS Comp | -.11 | .07 | .14 | .03 | -.16 | -.15 | -.15 | -.16 | .20 | .18 | .07 | .16 | .17 | .10 | .52** | .50** | .49** | .47** | .67** | .69** | .66** | .76** | .92** | .93** | .93** | 1 | | | | | | | | | | |
| 27. T2 C Emo | .01 | .07 | -.01 | .10 | -.11 | -.14 | -.14 | -.15 | .12 | .17 | .32** | .31** | .29** | .12 | .48** | .37** | .41** | .15 | .37** | .32** | .36** | .21* | .31** | .24* | .26** | .25* | 1 | | | | | | | | | |
| 28. T2 C Inst | .10 | .10 | -.02 | .14 | -.04 | -.11 | -.04 | -.10 | -.01 | .12 | .24* | .15 | .17* | -.06 | .39** | .42** | .42** | .23* | .28** | .33** | .33** | .21* | .24* | .21* | .21* | .21* | .82** | 1 | | | | | | | | |
| 29. T2 C Info | .07 | .10 | -.00 | .14 | -.04 | -.09 | -.04 | -.11 | .01 | .13 | .26** | .19* | .18* | -.00 | .42** | .43** | .45** | .26** | .33** | .37** | .39** | .26** | .29** | .26* | .27* | .27* | .85** | .95** | 1 | | | | | | | |
| 30. T2 C Comp | -.07 | .00 | .07 | .08 | -.08 | -.09 | -.04 | -.06 | .10 | .11 | .31** | .19 | .23 | .16 | .42** | .34** | .36** | .27* | .26** | .24** | .26** | .25** | .25* | .17 | .19 | .23* | .76** | .67** | .70** | 1 | | | | | | |
| 31. T3 C Emo | -.14 | .06 | .13 | .20* | -.15 | -.07 | -.22** | -.09 | .14 | .15 | .23** | .35** | .28** | .12 | .56** | .48** | .47** | .29** | .60** | .54** | .56** | .42** | .48** | .44** | .44** | .38** | .57** | .44** | .48** | .45** | 1 | | | | | |
| 32. T3 C Inst | -.12 | .09 | .08 | .19* | -.09 | -.06 | -.17* | -.06 | .07 | .13 | .20* | .28** | .22* | .06 | .50** | .51** | .48** | .30** | .56** | .58** | .58** | .44** | .44** | .46** | .45** | .38** | .53** | .49** | .51** | .42** | .91** | 1 | | | | |
| 33. T3 C Info | -.12 | .10 | .10 | .22** | -.15 | -.10 | -.20* | -.10 | .10 | .14 | .21 | .29** | .22* | .09 | .51** | .50** | .49** | .32** | .57** | .57** | .60** | .45** | .46** | .46** | .46** | .39** | .55** | .49 | .53** | .45** | .92** | .97** | 1 | | | |
| 34. T3 C Comp | -.20* | .04 | .15* | .19* | -.20 | -.09 | -.22* | -.11 | .12 | .12 | .25** | .31** | .27** | .09 | .49** | .44** | .44** | .35** | .55** | .50** | .54** | .47** | .50** | .46** | .47** | .42** | .53** | .40** | .46** | .55** | .86** | .82** | .85** | 1 | | |
| 35. T4 C Emo | -.14 | -.06 | .10 | .11 | -.19 | -.19 | -.25* | -.25* | .07 | .21 | .24* | .34** | .34** | .12 | .51** | .48** | .49** | .30** | .59** | .55** | .57** | .47** | .67** | .62** | .63** | .50** | .52** | .40** | .45** | .36** | .67** | .63** | .64** | .65** | 1 | |
| 36. T4 C Inst | -.13 | -.07 | .04 | .09 | -.16 | -.16 | -.19 | -.24* | .13 | .19 | .25* | .34** | .35** | .11 | .56** | .61** | .59** | .39** | .64** | .66** | .66** | .54** | .67** | .68** | .67** | .58** | .49** | .44** | .49** | .36** | .67** | .70** | .69** | .65** | .94** | 1 | |
| 37. T4 C Info | -.11 | -.05 | .03 | .09 | -.13 | -.13 | -.16 | -.22* | .16 | .19 | .23* | .33** | .34** | .07 | .58** | .61** | .60** | .39** | .66** | .66** | .68** | .55** | .68** | .69** | .69** | .60** | .50** | .43** | .48** | .36** | .68** | .69** | .69** | .65** | .95** | .99** | |
| 38. T4 C Comp | -.16 | -.05 | .10 | .10 | -.16 | -.16 | -.21 | -.19 | .11 | .17 | .20* | .29* | .33** | .12 | .50** | .49** | .48** | .33** | .57** | .54** | .56** | .51** | .67** | .64** | .65** | .54** | .45** | .37** | .41** | .41** | .61** | .59** | .59** | .67** | .93** | .92** | .93** | 1 |

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