

THE EFFECT OF ADOLESCENT PERCEPTIONS OF RELATEDNESS TO
PARENTS AND PEERS ON PERCEIVED ACADEMIC COMPETENCE

by

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Doctor of Philosophy of Education at George Mason University

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Dedication

This work is dedicated to my father, Jarron Frye, who taught me the meaning and value of a real education.

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I would like to thank all of those who provided support in this endeavor. I could not have made it to the finish line without the love and support of my wife, Linda, my parents, my family, and my friends. I would also like to thank my wonderful colleagues at Abt Associates and, previously, at RMC Research for their guidance, support, and patience while I juggled school and work. Finally, I would like to thank my fellow students and fantastic professors at George Mason University, especially my committee members—Dimitar Dimitrov, Anastasia Kitsantas, and Sheri Berkeley. You have made the program a truly fruitful experience.

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Abstract

THE EFFECT OF ADOLESCENT PERCEPTIONS OF RELATEDNESS TO PARENTS AND PEERS ON PERCEIVED ACADEMIC COMPETENCE

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The relationships that students have with their parents and peers permeate their lives both inside and outside of the classroom. The purpose of the present exploratory study is to assess (a) the psychometric quality of measures gauging the latent variables of adolescents' perceptions of their relatedness to both parents and peers and (b) the effects that these latent variables have on each other and on student-perceived academic competence. The nationally representative study sample consists of 8,607 students in Grades 6 to 10 who responded to the Health Behavior in School-Aged Children survey. The survey data were obtained from an extant, publically available data set. The data were used to build targeted latent variables measuring sense of relatedness to parents, sense of relatedness to peers, and students' perceived academic competence. The student responses to survey items serve as observed indicators of the latent variables of interest (relatedness to parents, relatedness to peers, and perceived academic competence). These

items were used to build the scales measuring perceived relatedness to parents, perceived relatedness to peers, and perceived academic competence. Results of the confirmatory factor analysis indicated that the constructed scales are structurally valid—that is, good model fit was demonstrated. Reliability analysis indicated acceptable reliability for the perceived relatedness to parents scale, but lower reliability estimates for the perceived relatedness to peers and perceived academic competence scales. Path analysis conducted within a structural equation modeling framework was used to estimate the direct and indirect effects of perceived relatedness to parents and perceived relatedness to peers on perceived academic competence, controlling for differences in socioeconomic status, gender, age, and minority status. Results indicate that both perceived relatedness to parents and perceived relatedness to peers have a positive and statistically significant effect on perceived academic competence. The analysis also yielded a positive and significant indirect effect of perceived relatedness to parents on perceived academic competence via perceived relatedness to peers. Findings on validity and reliability can be used to inform methodological decisions in similar research on testing for validity and reliability of variables gauging relatedness and relationships as well as to assess the effect these variables have on perceived academic competence, achievement, and success in general.

Chapter One

Individuals' motivations drive the behaviors and actions that shape their lives.

But what drives motivation: how is it shaped by factors both intrinsic and extrinsic to the individual? This is the question that is explored in depth by Deci and Ryan (1985) and addressed by the theory of self-determination. According to the tenets of this theory, the three innate psychological needs are relatedness, autonomy, and competence (Deci & Ryan, 1985; Ryan & Deci, 2000). The purpose of this study is to explore the interrelationships among these three needs for adolescent students. Specifically, relatedness will be considered in two dimensions: students' relatedness to parents, coupled with parents' support for autonomy, and students' relatedness to peers. The effects these dimensions have on the student's self-perceived competence in the academic setting will be explored.

The psychological need of primary interest in this study is relatedness.

Relatedness is (a) the extent to which individuals perceive the relationships they have with others as secure, supportive, and satisfying and (b) individuals' feelings of self-worth and capacity to engage in affectionate relationships, constructed from the perceptions of these relationships (Connell, 1990). Thus, adolescents' sense of relatedness is formed by the qualities of the relationships they have with others, particularly, those that are the most influential: parents, peers, and teachers (Connell,

1990). The intention of this study is to assess the effect that students' relatedness to parents and to peers has on the student's perception of his or her academic competence. The main variables involved in the examination of pertinent statistical relationships are defined here as follows:

- Perceived relatedness to parents: This variable measures the extent to which the child–parent relationship is perceived by the adolescent as secure and supportive and fostering his or her sense of autonomy.
- Perceived relatedness to peers: This variable measures the extent to which the adolescent feels integrated into a social network of friends and is prosocially engaged in the classroom setting.
- Perceived academic competence: This variable measures the adolescent student's perception of his or her own ability to handle the academic workload, comprehend material, and perform at the level of teacher expectations in the context of the school.

The focus on adolescent students stems from several characteristics of this stage of life. Adolescence is a time in a person's life when development is occurring in cognitive, social, and physiological domains (Anderman, 2012). This development in adolescence leads to a growing importance of relationships with both parents and peers and an increased level of complexity of these relationships (Allen, 2008; Baumrind, 1991a; Collins & Laursen, 2004; McElhaney, Allen, Stephenson, & Hare, 2009). Other environmental factors occurring during adolescence include transitions to middle school and high school, which can present developmental disruptions (Anderman, 2012; Isakson

& Jarvis, 1999; Lord, Eccles, & McCarthy, 1994). Adolescence is, therefore, a volatile period for many individuals when we can expect their developed sense of relatedness to have impacts on a myriad of outcomes, including academic competence.

Background and Justification

A child's learning and growth is influenced heavily by three primary contexts: the family, the school, and the community (Epstein, Coates, Salinas, Sanders, & Simon, 1997). The influence of these contexts, defined as spheres of influence by Epstein, et al. (1997), stems from the relationships that the child has within these contexts. The benefits extracted from these spheres can be conceptualized as social capital or the norms, social networks, and values individuals gain from their closest relationships in the family and community (Coleman, 1987). Components of social capital include trusting relationships, building obligations and expectations, information flow between connected individuals (e.g., family members), and shared values and norms (Coleman, 1988). Social capital is an essential contributor to a child's academic success (Coleman, 1987, 1988).

The influences of the spheres are not mutually exclusive; they, and the influences of the relationships that exist within them, overlap considerably to contribute to the learning and growth of the child (Epstein et al., 1997). The influence of a child's relationships plays a major role in adolescence, when transformations are occurring in cognitive, social, and physiological domains (Anderman, 2012). Concurrent changes are happening in the relationships that adolescents have with parents, peers, and teachers (Allen, 2008; Baumrind, 1991a; Collins & Laursen, 2004; McElhaney et al., 2009). The

overlapping influences of these relationships highlight the critical importance of empirical studies that analyze these influences jointly and with credibility.

The theoretical framework that guides this study focuses on the three previously defined variables: perceived relatedness to parents, perceived relatedness to peers, and perceived academic competence. Statistical methods were used to test the overlapping influences that these variables have on one another. Differential effects based on students' characteristics—socioeconomic status, gender, age, and minority status—are also included in the theoretical framework. Correlations between academic performance and these characteristic variables are well established (e.g., Dee, 2007; Ferguson, 2007; Sirin, 2005). Therefore, controlling for these characteristics in the analytic model tested in this study refined the estimated effects that perceived relatedness to parents, perceived relatedness to peers, and perceived academic competence have on one another. The relationship between these variables and the components that make up these variables are represented in the theoretical model depicted in Figure 1.

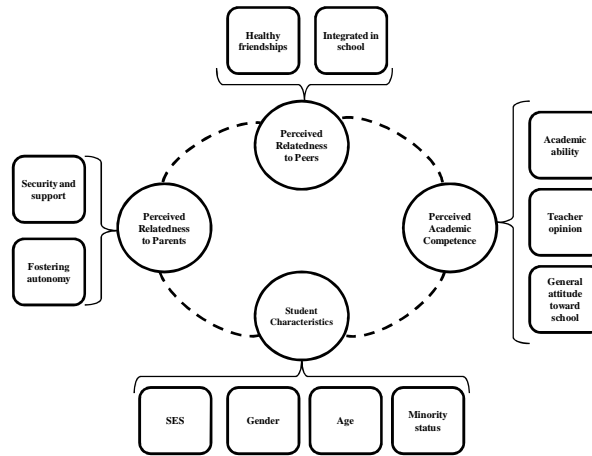


Figure 1. Theoretical framework of the interrelationships between variables. SES = socioeconomic status.

As described previously, perceived relatedness to parents and perceived relatedness to peers are treated as separate variables in this study and are informed by the nature of relationships with parents or peers, respectively. Perceived relatedness to parents is defined, in the context of this study, as the extent to which adolescents perceive their relationships with parents as secure, supportive, and fostering a sense of autonomy. Contributors to a secure and supportive relationship between the parent and adolescent include sensitivity of the parent to the child's needs (Allen, 2008) and trust built on the

sharing of information and feelings between parent and child (Hartup & Laursen, 1991; Kerr, Stattin, & Trost, 1999). Autonomy, one of the three innate psychological needs within the framework of self-determination theory, is the degree to which individuals can make choices and take action to effectively pursue their goals (Deci & Ryan, 1985). Autonomy leads people to be more proactive in seeking new opportunities, more productive in their current setting, and more resilient when faced with adverse challenges (Deci & Ryan, 1985). Parents can foster autonomy by allowing for bilateral agreements on certain aspects of the adolescent's life and by being supportive of the child's decision-making (Allen, 2008; McElhaney et al., 2009). Empirical research on the positive effects of secure and supportive parent-child relationships that foster autonomy on outcomes in adolescence is explored in Chapter 2.

Perceived relatedness to peers is defined in the context of this study as the extent to which adolescents perceive themselves to be integrated into a social network of friends and prosocially engaged in the classroom setting. Adolescents are influenced by the peers they associate with and who tend to share similar attitudes (Anderman, 2012). It is with these peers that they form friendships. The formation of friendships in adolescence is critical to the child's development, and these friendships will prove to influence the development of behaviors, tastes, and attitudes (Berndt, 1982; Buhrmester, 1990). These friendships can have beneficial effects on the adolescent when characterized by positive attributes such as trust, loyalty, respect, and companionship (Berndt & Keefe, 1995). In addition to the formation of close friendships, a sense of connectedness to peers at schools is also an important component of relatedness to peers. School is the setting in

which children learn from their peers what social interactions and behaviors are valued and appropriate (Epstein & Karweit, 1983). Integrating into a network of peers in the school is the primary contributor to children's sense of belonging in school, which is critical to the development of their sense of relatedness (Hamm & Faircloth, 2005). Relatedness to peers, therefore, is a multifaceted construct that children build from their experiences with close friends and also with a broader network of peers that they are associated with.

Competence, in addition to relatedness and autonomy, is an innate psychological need according to self-determination theory (Deci & Ryan, 1985). Competence, in general, is defined as the individual's capacity for success, constituted by the explorations, lessons learned, and adaptations accumulated in his or her environment (Deci & Ryan, 1985). In the academic context, the environment is the school; the capacity for success focuses on academic achievement, the ability to handle academic workload and stresses related to school, and positive attitudes toward education. This capacity for success is defined for this study as academic competence. While perceived academic competence is this study's outcome of interest, we consider findings from empirical research that focus on a variety of outcomes that could be related to academic success, including academic achievement; level of engagement in school; and goal, mastery, and performance-approach orientations.

Social capital, constructed largely from the relationships that one has with others, is a key contributor to academic success (Coleman, 1987). During adolescence, this success is impacted both by relatedness to parents (e.g., Anderman, 2012; Baumrind,

1991b; Deci, Vallerand, Pelletier, & Ryan, 1991; Epstein et al., 1997; Hill et al., 2004; Lamborn & Steinberg, 1993) and by relatedness to peers (e.g., Berndt & Keefe, 1995; Connell & Wellborn, 1991; Cook, Deng, & Morgano, 2007; Epstein, 1983). The inferences made regarding the effects that relatedness to parents and relatedness to peers have on academic outcomes hinge on the integrity of the methods used to measure these variables and their effects. It is, therefore, critical to have methodological studies that demonstrate the effective (or ineffective) ways in which reliable and valid measures gauging relatedness and competence variables are constructed as well as the impacts that these variables have on each other.

Purpose and Research Questions

Adolescence is a period of transitions and development when we can expect a child's developed sense of relatedness to have a profound influence on, among other things, success in school. The purpose of this study is to take a two-pronged approach to assessing these effects by (a) evaluating the factor structure and reliability of variables gauging adolescent students' perceived relatedness to parents and to peers and (b) determining the direct and indirect effects that adolescents' perceived relatedness to parents and peers have on their perception of academic competence, while controlling for differences in socioeconomic status, gender, age, and minority status. The pertinent research questions addressed in this study are as follows:

- Research Question 1: Do the scales constructed by the researcher measuring the targeted constructs of perceived relatedness to parents, perceived relatedness to

peers, and perceived academic competence demonstrate structural validity and reliability?

- Research Question 2: What are the direct and indirect effects of perceived relatedness to parents and perceived relatedness to peers on perceived academic competence, controlling for differences in socioeconomic status, gender, age, and minority status?

The variables of interest in this study are latent in nature. That is, perceived relatedness to parents, perceived relatedness to peers, and perceived academic competence cannot be directly observed; they must be gauged using other proxy variables that are observable (e.g., survey items). In the literature on latent variable modeling, the observable variables are referred to as *indicators* of the latent variables (or latent factors). Chapter 3 describes methods and procedures for the assessment of validity and reliability of the indicators of latent factors used in this study as well as the direct and indirect relationships among these variables.

The observed indicators of latent variables (constructs) related to the child's relatedness to parents and peers are data generated from items of the Health Behavior in School-Aged Children (HBSC) survey (U.S. Department of Health and Human Services, Substance Abuse and Mental Health Services Administration, Office of Applied Studies, 2012). The purpose of the HBSC survey is to capture a wide range of health-related behaviors and lifestyle issues for students in the midadolescent grade range. Among the topics covered by items on the HBSC survey are topics related to the variables of interest

in this study, including family issues such as members in the household and perception of parental involvement, perceptions of school and academic performance, and peer influence. More than 9,000 students in Grades 6 to 10 from schools across the nation responded to the survey.

This is an exploratory study intended to inform how perceived relatedness to parents and perceived relatedness to peers influence (separately and in interaction) adolescent students' perceptions of their academic competence. The study findings are not intended to imply causal relationships between the variables. Rather, the study deals with the assessment of statistical effects of the adolescent students' perceived relatedness to parents and peers on their perceived academic competence. In this context, the relationships among the latent factors represent the structural part of the study design. An intermediate task in this effort is to assess the structural validity and reliability of the observed indicators of the respective latent factors, which represents the measurement part of the study design.

To adequately address the measurement component of this study, both statistical and substantive assessments were made on the quality of the survey items used to tap into the latent variables of interest. The validity of these items is determined by the degree to which they measure what they are purported to measure (Dimitrov, 2011). To adequately assess this validity, multiple aspects of validity must be considered, including the aspects of structural validity, content validity, and criterion validity under the unified construct-based conception of validity (Messick, 1989). The validity assessment entailed substantive review of all items for content representativeness, as well as the use of

confirmatory factor analysis on data generated from the items for structural validation of targeted latent variables (Dimitrov, 2011).

The reliability of the scales is also important to assess because the reliability of measures is a necessary condition for their validity as indicators of the latent variables of interest. Reliability of scales (or measures) indicates the degree to which the scale is accurate, consistent, and replicable. Reliability estimates are some of the principal indicators of psychometric quality related to measures of all kinds; they are designed to capture anything from literacy skills to behavioral dispositions. Interpretations from findings generated by these measures are only credible if there is proof that the measure accurately captures what it purports to capture (Dimitrov, 2011). In this study, reliability estimates for internal consistency were calculated for the measures of relatedness to parents, relatedness to peers, and perceived academic competence with a latent variable modeling (LVM) approach.

This study treated perceived relatedness to parents and perceived relatedness to peers as separate variables because of the stark differences between relationships that adolescents have with their parents and those that they have with their peers. However, the influences that these dimensions of relatedness have on the adolescent must be considered jointly.

Classical analytic techniques, such as linear regression, could not capture the complexities of the relationships among the latent variables used in this study because of the likelihood of mediated associations between these relationships. For example, the effects that peer relationships have on students' academic success may be significant, but

those effects may also be heavily influenced by the relationships with their parents. Mediation models can help account for such effects by estimating the direct effect that parent relationships have on student academic success and the indirect effect that parent relationships have on student academic success through the mediation of peer relationships (Baron & Kenny, 1986).

Mediation models can be a powerful tool to explore relationships among latent variables. SEM is a commonly used method that analyzes relationships between latent variables and can be used to estimate mediating effects. SEM is an appropriate technique for investigating relationships among latent variables such as perceived parental involvement, peer relationships, drug use, and perception of school. Relationships among such latent variables can then be explored in ways similar to the ways that explanatory relationships and correlations are established between measurable variables (Raykov & Marcoulides, 2006).

The intention of this study is to use the methods described above to effectively measure adolescent students' sense of relatedness to parents and relatedness to peers. We will explore the interactions between these two relatedness variables and the statistical effects that they have on adolescent students' perceptions about their academic competence, while controlling for differences based on socioeconomic status, gender, age, and minority status. The latent variables of interest in this study are measured by HBSC survey items gauging the following:

- Perceived relatedness to parents, which is measured by items gauging an adolescent student's perceived quality of communication with parents, support

received from parents, and parental awareness of the child's social life and performance at school. Parent is used globally to refer to the child's mother, father, guardian, or other individual(s) that the child perceives as filling the parent role.

- Perceived relatedness to peers, which is measured by items gauging the adolescent student's perception of acceptance by peers, support from peers, and frequency of social interactions with friends.
- Perceived academic competence, which is measured by items gauging the adolescent student's perception of their ability to handle the school workload, teacher's opinion of the student's performance, and the student's overall feelings about school.

Findings from this study will be useful in similar research with methodological decisions on testing for validity and reliability of variables gauging relatedness and relationships as well as in research assessing the effects these variables have on perceived academic competence, achievement, and success in general. Further, it is critically important for policymakers and school leaders to consider findings from the type of research described in this paper when crafting policies intended to increase parental involvement, foster relationships between peers within the schools, and provide students with the social capital that they may or may not be getting at home.

Glossary

- Minority status: Includes all students except those who are White and whose ethnicity is not Hispanic

- Observed indicators: Measured items, such as survey or test questions, that are substantively related to latent variables of interest
- Perceived academic competence: Student's perceived ability to handle the academic workload, comprehend material, and perform at the level of teacher expectations.
- Perceived relatedness to parents: Extent to which the child–parent relationship supports the adolescent in a way that enables the child to feel secure and autonomous. Dimensions of sense of relatedness to parents include:
 - Autonomy: Ability of the individual to use the information and resources at hand to make decisions regarding self-selected goals.
 - Secure and supportive relationships: Relationships characterized by feelings of trust and compassion and open communication.
- Perceived relatedness to peers: Extent to which the child feels integrated into a social network and is prosocially engaged in the classroom setting. Dimensions of sense of relatedness to peers include:
 - Forming of healthy friendships: Extent to which the adolescent feels integrated into a social network of friends.
 - Integration in school: Child's sense of belonging in school, characterized by perceived acceptance by the peers at school, formation of friendships with these peers, and a sense of fitting into the school social sphere.
- Reliability: Degree to which a scale, test, or measure is accurate, consistent, and replicable.

- Social network: Connections between an individual and the others this individual interacts with. Examples range from small networks, such as two to three close friends or student–teacher relationships, to large networks, such as the peers connected through a classroom or a school.
- Socioeconomic status: The adolescent's perception of the family's economic and social position
- Validity: Degree to which a scale, test, or measure captures the information that it purports to capture.

Chapter Two

Adolescence is a time in a person's life when there are concurrent transformations in cognitive, social, and physiological domains (Anderman, 2012). The ways in which these transformations shape the lives of adolescents are influenced heavily by the relationships they have with parents and peers, among other environmental factors. These relationships with parents and peers, and also with teachers, form the adolescent's sense of relatedness (Connell, 1990). Other environmental factors occurring during adolescence include transitions to middle school and high school, which can present developmental disruptions (Anderman, 2012; Isakson & Jarvis, 1999; Lord et al., 1994). The focus on adolescents in this review stems from the importance that their sense of relatedness to parents and peers has during this volatile phase of life.

In this chapter, findings are synthesized from studies that explore the nature of adolescents' relatedness on dimensions with parents and peers and the effects that adolescents' relatedness to parents and peers have on their perceived academic competence. One's sense of relatedness is constructed largely from the relationships one has with others (Connell 1990; Ryan & Deci, 2000) so this literature review will focus on research exploring different aspects of relationships that adolescents have with their parents and peers. Similarly, academic competence is made up of several dimensions including the extent to which adolescents value learning and education and perceived

ability to succeed academically. These dimensions are latent in nature; that is, they cannot be directly observed. Therefore, other proxy variables related to academic competence—academic engagement, self-efficacy, and academic performance in general—are included in this review.

Importance of Relatedness

Relatedness is defined by two components. First, it is the extent to which people perceive the relationships they have with others as secure and supportive; second, it is the perception of the self as worthy and capable of affectionate relationships. The second perception is constructed from the perceived quality of the first component (Connell, 1990). Taken together, these components form the sense of relatedness, which is an innate psychological need (Ryan & Deci, 2000). A strong sense of relatedness is associated with a variety of positive outcomes, such as affect (Véronneau, Koestner, & Abela, 2005), enhanced motivation, and mental health (Ryan & Deci, 2000).

The importance of relatedness to parents is highlighted by the reliance of children on their family to prepare them for education. Coleman (1987) referred to the resources provided to children by those in their social sphere, such as the family, as social capital. Social capital is essential to the child's academic success, and a lack of achievement in the school may reflect an inability of the family to effectively prepare their children for education (Coleman, 1987). It has been shown that the social capital provided at home is more influential than the social capital provided at school and can affect a variety of domains such as academic achievement and behavior (Dufur, Parcel, & Troutman, 2013).

The influence of parents is qualitatively different for adolescents than for younger children. As adolescents mature, they develop a need for more reciprocity in the relationship they have with parents. This need stems from an increased ability of adolescents to differentiate between legitimate and illegitimate authority; this new ability is used to justify an increase in the number of decisions they are allowed to make (Baumrind, 1991a). Parents who are reluctant to allow them this increase in decision-making may foster conflict in the parent–child relationship (Collins & Laursen, 2004). A parent prohibiting a child from having any kind of decision-making authority in adolescence can create tension between the parent and child. Therefore, it is important that the parents foster children’s autonomy by allowing them to independently make decisions about certain aspects of their lives.

The increased ability to objectively evaluate the positive and negative aspects of authority, the nature of the parent–child relationship, and the importance of decision-making in adolescence are congruent with the adolescent child’s increased need for autonomy (Allen, 2008). Autonomy is an individual’s ability to use the information and resources at hand to make decisions regarding self-selected goals (Deci & Ryan, 1985). The ways in which the parent influences the development of autonomy in adolescence are of particular interest to this study.

The child’s increased need for autonomy in adolescence does not imply that detachment from the parent is favorable. Rather, the transformation of the relationship into one where the parent facilitates autonomy by being responsive and supportive is optimal (McElhaney et al., 2009). The presence of a responsive parent who is sensitive

to the needs of the adolescent and is accordingly supportive will lead to the child feeling autonomous and secure (Allen, 2008).

Children become more attuned to both the similarities with and differences between their relationship with parents and their relationships with peers during adolescence. The significance of relationships with peers grows in adolescence as children transfer aspects of dependency from the relationships they have with parents to relationships with peers during this period (Allen, 2008). Adolescents are most influenced by the peers they associate with who tend to share similar attitudes (Anderman, 2012). The ways in which this influence is defined and the effects it has on the adolescent's academic success will be explored in this chapter.

The importance of research on these variables stems from the critical importance of having a developed sense of relatedness (Ryan & Deci, 2000). As mentioned earlier, this sense of relatedness is largely dependent on the relationships the individual has with others (Connell, 1990). The purpose of this review is to synthesize findings that explore both the nature of relatedness and relationships in adolescence and the ways in which these factors influence adolescents' academic outcomes. The review also considers policies and programs that are intended to improve the nature of relationships within the schools.

The review of research focused on the theoretical frameworks exploring the importance of relationships in the lives of adolescents and empirical evidence on the impact that these relationships have on academic outcomes. Targeted theoretical research included peer-reviewed journal articles, volume chapters, and books. Literature on this

topic was located by database searches with a variety of relevant keywords. The list of keywords includes adolescents, relatedness, competence, autonomy, academic competence, relationships, parents, peers, engagement, achievement, and self-efficacy. The studies generated by the keyword search were used to iteratively search the literature by searching the reference list in each source for additional relevant studies.

Empirical studies included in this review had a topic area focus on the influence of relatedness (or relationships) with parents and peers on school related outcomes, particularly engagement and valuing of education. Studies considering other specific behavioral-related outcomes, such as depression; pregnancy; and drug, tobacco, and alcohol use, were excluded. However, studies that focus on developmental outcomes in addition to academic outcomes were included. Samples of interest include students in middle and high school grades; studies were excluded if they focused on younger children or postsecondary students. Targeted empirical studies, as compared with theoretical research, were more focused on peer-reviewed journal articles that describe the use of quantitative measurement techniques. The process used to identify this literature was similar to the process used for theoretical research. Descriptions in study abstracts were screened to identify the use of empirical methods of interest by flagging studies that mention study elements such as sample, experimental design, and quantitative analytic techniques. In addition to findings, this review provides descriptions of study details— such as sample, setting, design, and purpose—for empirical studies. Findings from theoretical research papers are reported in brief.

Review of Existing Research

This chapter is divided into a section on the focus on relatedness to parents or parental relationships and a section on relatedness to peers or peer relationships. Each section begins with a definition of relevant concepts, followed by a discussion of existing research on the ways in which relationships influence the extent to which adolescents value learning and education. This is followed by a discussion of the measurement techniques utilized in the studies reviewed. The review of measurement techniques includes consideration of the ways in which researchers use quantitative measurement techniques that effectively explore relationships in light of their latent nature and the complex ways in which relationships with different individuals have overlapping influence. After the review of research, implications are discussed. The chapter concludes by highlighting some of the key findings from the synthesis of existing research as well as implications for the purpose of this study.

Relatedness to parents: Exploring the relationships. The experiences that children have in their relationships with parents form a set of expectations for the interactions they have with others. Children construct a sense of self around these expectations, which is called their sense of relatedness (Furrer & Skinner, 2003). Adolescents' sense of relatedness is therefore dependent on the perceptions they have of their relationships. To delve into these perceptions, we must understand the characteristics of the relationships that most heavily influence them.

The relationship between any two individuals can be characterized by the ways in which the individuals interact. The nature of the parent-child relationship during

adolescence is complicated by the fact that these interactions are transforming. During adolescence, the closeness between the parent and child transforms from being defined by high levels of intimacy and interaction in childhood to being defined by the parent's support of the child through sharing of information and feelings (Hartup & Laursen, 1991). The child's autonomy develops as the parent and child engage in these reciprocal exchanges. In these exchanges, decision-making is shared by the child and the parents rather than being unilateral. However, as reciprocity grows in the decision-making process around certain aspects of the child's life, the parent still has influence over major life choices (Collins & Laursen, 2004). In this study, we focus on two dimensions of the parent-child relationship that are critical to the development of the adolescent. The first is the degree to which the parent-child relationship is secure and supportive, and the second is the degree to which the parent-child relationship allows the adolescent to develop a sense of autonomy.

The degree to which the parent-child relationship leads the child to feel secure and supported contributes to the child's sense of relatedness to parents (Connell, 1990). For adolescents, a major component of their relatedness to parents is the ability of the parent to be highly sensitive to their emotional states (Allen, 2008). This sensitivity facilitates conversations in which information is exchanged and feelings are expressed, a defining characteristic of close parent-child relationships in adolescence (Hartup & Laursen, 1991). Feelings of trust are built largely on this sharing of sensitive information. Kerr et al. (1999) conducted a study in which they administered questionnaires to parents and 14-year-old children that gauge the sharing of information

related to past child delinquency, the child's feelings and concerns, and the child's daily actions. Findings have shown that a child's disclosure of this information led to trust between the parent and child (Kerr et al., 1999). When adolescent children and parents engage in these types of interactions, relationships form that are secure and supportive. Adolescents form a set of expectations regarding interactions with others from the nature of the relationships that they had with their parents. Thus, secure and supportive relationships with parents can foster the adolescent's exploration outside of the family and the formation of healthy relationships with peers and adults other than parents (Collins & Laursen, 2004).

The adolescent child's academic socialization is constructed from the parents' beliefs regarding the utility and value of education, the degree to which they foster educational aspirations, their support of educational lessons by the emphasis of learning strategies and the contextualization of the material learned in school, and the communication of their educational expectations (Hill & Tyson, 2009). The parents' educational expectations for adolescent children are typically operationalized as how far the parents expect their child to go in school; that is, do they expect their child to complete high school or college or to attain a graduate level degree (Seginer, 1983)? The level of academic socialization influences the child's educational aspirations and future plans (Hill & Tyson, 2009). The importance of open and supportive communication in the parent-child relationship is highlighted by the importance of parents conveying their expectations, fostering aspirations, and reinforcing lessons learned at school.

Autonomy is defined as the degree to which an individual can use "available information to make choices and regulate themselves in pursuit of self-selected goals" (Deci & Ryan, 1985, p. 154). It is a beneficial characteristic that leads the individual to be more proactive in seeking new opportunities, be more productive in their current setting, and be more resilient when faced with adverse challenges (Deci & Ryan, 1985). The development of autonomy in adolescence entails changes to the parent–child relationship as adolescents start to differentiate between legitimate and illegitimate authority and to use these distinctions to justify increased participation in decisions affecting their lives (Baumrind, 1991a). Changes happen during adolescence that have implications for the growth of autonomy: adolescent children experience an increase in unsupervised time, expectations for them to take ownership of their education, and self-selected exposure to media (Steinberg & Silk, 2002). It follows that adolescents typically try to expand the scope of their decision-making by taking ownership of decisions that were previously up to the parent, such as what to wear, who to spend time with, what music to listen to, and what movies and television shows to watch (Smetana & Villalobos, 2009). It is critical that the parent allows for the development of autonomy by, for instance, handling conflicts by engaging in productive bilateral conversations in which the child has a say (Allen, 2008). By being responsive and supportive, parents can facilitate autonomy and the development of a relationship with their adolescent that is characterized by transformation, rather than detachment (McElhaney et al., 2009). This trajectory is typical of the parent–child relationship through adolescence; that is, children abandon the conception that parental authority is absolute and unquestionably valid while

continuing to adopt many of the values instilled in them by their parents (Baumrind, 1991a).

These two dimensions of the relationship between a parent and an adolescent, taken together, give the adolescent feelings of security and support while facilitating autonomy. Feelings of security, support, and autonomy lead adolescents to operate independently with confidence in realms such as education, and they leverage the relationships they have with others for help when needed (McElhaney et al., 2009). More generally, an adolescent's feelings of security and support in relationships with parents (or relatedness to parents) and sense of autonomy will foster self-motivation and mental health (Ryan & Deci, 2000).

Adolescents' feelings of security and support and the development of autonomy will be guided by their parents' parenting styles. Parenting styles are often defined along three dimensions: authoritative, authoritarian, and permissive (Baumrind, 1971). Authoritative style parenting is demanding of children, but also responsive to their emotional needs. Authoritarian style parenting is demanding, but less responsive. Permissive parenting styles are responsive, but less demanding. Parenting styles that are neither responsive nor demanding are referred to as nonconforming. Authoritative parenting styles can lead to positive outcomes in adolescents, such as a variety of competence-related behaviors (Baumrind, 1991b), and the development of transformational leadership skills (Kudo, Longhofer, & Floersch, 2012). Parents who exhibit authoritative characteristics of involvement and support of autonomy have more academically motivated children (Deci et al., 1991). Nonconforming parenting styles, on

the other hand, can have adverse effects on adolescents, such as impairments in social development and negative health behaviors (Repetti, Taylor, & Seeman, 2002).

The likelihood of asynchrony in the parent–child relationship increases as these issues of control and autonomy are restructured in adolescence (Eccles et al., 1993). As discussed previously, adolescence is a time when children develop their perception of authority (Baumrind, 1991a) and expand the scope of the decisions they make in their day-to-day lives (Smetana & Villalobos, 2009). Despite the potential for these changes to act as stressors on the parent–child relationship in adolescence, the transformation of this relationship during adolescence does not typically result in a deterioration of the relationship (McElhaney et al., 2009). More commonly, adolescents' sense of individualization increases as they continue to be overseen and supported by their parents. Parental involvement evolves into a more peer-like relationship during adolescence rather than the vertical relationship structure present during childhood (Paikoff & Brooks-Gunn, 1991). The decline of parental involvement is due to the combination of the adolescent child taking on more mature roles and the *deidealization* of the parent (that is, the parent is viewed as less of a model for character and action) in the eyes of the child (Collins, 1995). However, as youth progress through adolescence and their dependence on their parents declines, the parent–child relationship remains strong (Collins & Laursen, 2004). Thus, relationships between parents and adolescents that are supportive and facilitate autonomy are fundamentally different from relationships between parents and younger children but are not necessarily characterized by detachment (McElhaney et al., 2009).

Relatedness, in the framework of self-determination theory, is regarded as an innate psychological need (Ryan & Deci, 2000). In this section the focus was on relatedness to parents, formed largely by the relationships that adolescents have with their parents (Connell, 1990). Adolescence is a time when relationships with parents are changing (Baumrind, 1991a; Eccles et al., 1993; McElhaney et al., 2009). The two critical dimensions of the parent–child relationship in adolescence considered are the degree to which the child feels secure and supported in the relationship and the ways in which the parent fosters the child's sense of autonomy. Parent–child relationships that are secure and supportive are characterized by trust and communication (Allen, 2008; Hartup & Laursen, 1991; Kerr et al., 1999). These types of relationships foster adolescent children's ability to form healthy relationships with peers and other adults (Collins & Laursen, 2004). With respect to the autonomy dimension, parents can foster autonomy by allowing for bilateral agreements in certain aspects of children's lives and by being supportive in their decision-making (Allen, 2008; McElhaney et al., 2009). A strong sense of autonomy can lead to adolescents being more proactive in seeking new opportunities, being more productive in their current setting, and being more resilient when faced with adverse challenges (Deci & Ryan, 1985). This study defines the extent to which adolescents perceive relatedness to their parents along the dimensions of security and support and the fostering of autonomy.

Relatedness to parents: Impacts on academic outcomes. While parental involvement typically declines as children grow older, into adolescence, the positive impacts that healthy parent–child relationships have on competence and academic

success remain strong (Anderman, 2012; Baumrind, 1991b; Epstein et al., 1997). The following discussion explores empirical findings on the influence that parent–child relationships in adolescence, particularly those that are secure and supportive and that facilitate the child's autonomy, have on academic achievement and other positive academic indicators.

A critical contributor to an adolescent's relatedness to parents is, as discussed, the degree to which the relationship with the parent leads the child to feel secure and supported (Connell, 1990; McElhaney et al., 2009). Empirical evidence suggests that parenting characteristics that contribute to a child's feeling secure and supported have a positive impact on academic outcomes. Ability to communicate is a critical parenting characteristic, with open communication between parents and their adolescent children leading to children being better students, as evidenced by their attendance and grades (Epstein & Sanders, 2002). In an analysis of longitudinal data gathered by the National Center of Education Statistics, Easton (2010) found supporting evidence that communication between the parent and adolescent child has a positive influence on academics. The sample data for this study were gathered from an extant data set of the National Center of Education Statistics containing results from a longitudinal survey study in which approximately 15,000 adolescent students were surveyed in Grades 10 and 12. Parents were also surveyed. Easton used these data to analyze the relationship between parental involvement and academic outcomes. Parental involvement was defined along six dimensions: parent–child communication as perceived by the child, parent–child communication as perceived by the parent, parent assistance with and

monitoring of homework and setting of rules, parents' communication with school staff, parent involvement in school-related organizations, and parental expectations. Findings showed that parent–child communication and parental expectations positively influence the academic achievement of high school students, while parents monitoring homework and setting rules are negatively correlated with achievement (Easton, 2010). These trends have also been demonstrated in younger students in the early stages of adolescence. Lee and Bowen (2006) conducted a survey study for which they sampled 415 third-, fourth-, and fifth-grade students in seven public schools in the southeast region of the United States. The survey used in this study assessed parental involvement on five dimensions: discussing educational topics with the child, helping with homework, managing the child's time, promoting literacy, and communicating parental expectations related to education. The authors analyzed the effects of the five types of parental involvement on academic achievement, which was measured by grades and teacher reports of reading and math performance levels. Results showed that students whose parents had higher levels of involvement and education expectations had higher levels of academic achievement; receiving parental homework help, however, was again negatively correlated with academic achievement (Lee & Bowen, 2006).

In their meta-analysis, Hill and Tyson (2009) assessed what empirical research has shown regarding the impacts of parental involvement on academic performance for adolescents. They reviewed empirical studies published between 1985 and 2006 that used quantitative measures of parental involvement and academic achievement, focused on samples of middle school (Grades 6–8) students and provided sufficient statistical

information to generate effect sizes. Results indicated that parental involvement, in general, has positive impacts on academic performance of middle school students. The impacts of academic socialization, which is constructed from the parents' beliefs regarding the utility and value of education; the degree to which parents foster educational aspirations; parents' support of educational lessons by emphasizing learning strategies and contextualizing the material learned in school; and parents' communication of educational expectations, on academic achievement are greater in magnitude than other types of parental involvement. Parental help with homework, meanwhile, can also have a negative influence on the child's academic achievement at the middle school level (Hill & Tyson, 2009). Findings showing that dimensions of parenting such as expectations and socialization have a greater influence on academic achievement than direct involvement (i.e., helping with homework) suggest that subtle aspects of parenting are more prominent contributors to a child's success than overt expressions of involvement such as homework help.

One manifestation of supportive parenting is the degree to which the parent is involved in the child's education. Children enjoy more academic success when their parents are involved in their schooling (Deci et al., 1991; Epstein et al., 1997). This principle is corroborated by findings from Hill et al.'s (2004) study in which adolescent students, their parents, and their teachers were assessed from the time students were in Grade 7 through Grade 11. This study was a component of a larger longitudinal study that started when the students were in kindergarten. Participating families were recruited from sampled schools in three sites: two in Tennessee and one in Indiana. The

researchers used a sampling frame to select schools that (a) ensured variation in the ethnic composition of students, percentage eligible for free or reduced-price lunch, and projected graduation rates and (b) targeted a representation of at-risk students, as indicated by the indicators previously listed, in the sample at one third. Researchers approached families of the kindergarten students in sampled schools to participate in the study. The initial sample included 585 students. The sample that was available for this adolescent study was made up of 463 students. Data collection for this study comprised interviews of the students and each student's mother as well as the administration of a form to evaluate parents and students, which was to be completed by the teacher. The researchers also collected data on reading and math academic measures from the schools. The purpose of Hill et al.'s adolescent study was to assess the measured impacts of parental academic involvement on behavioral problems in school, achievement, and, ultimately, aspirations for after high school. Results showed that parental involvement in seventh grade was negatively correlated with problem behaviors in eighth grade and positively correlated with college aspirations in high school (Hill et al., 2004).

The findings discussed so far demonstrate the positive impacts of parental involvement in education. Dimensions of this involvement that are particularly beneficial include level of expectation and, more generally, communication. These findings suggest that the positive effects of parental involvement reflect impacts of effective parenting strategies that go beyond presence in the school. The subtler aspects of parenting, such as expectations and communication, are more salient than more overt expressions of involvement, such as attending school functions (Jeynes, 2010). These more salient

characteristics are what this study intends to explore by using the relatedness to parents construct. It is also useful to abstract up a level from parenting behaviors and to consider parenting styles.

Parents are said to adhere to an authoritative style when they are responsive to the emotional needs of their children by making them feel secure and supported while at the same time being demanding of the children. Findings from the Family Socialization and Developmental Competence Project (FSP) explored the effects of different parenting styles. The FSP was a longitudinal study designed to explore how familial characteristics, such as parenting styles, contribute to development and competence in children through adolescence. The FSP study sample ultimately consisted of 139 families with children who were born in the 1960s. Children and parents from the sample families were surveyed, interviewed, and observed three times: when the children were four to five years old, when they were nine to 10 years old, and when they were 14 to 15 years old. Data were coded and analyzed so that the researchers could assess correlation relationships between parenting styles and developmental outcomes (Baumrind, 1991a, 1991b). Authoritative parenting practices were correlated with high achievement orientation and exhibition of independent behaviors in young children (Baumrind, 1971). These positive correlations continued into adolescence. Adolescents whose parents demonstrated authoritative parenting practices, that is, the parents were both demanding of and responsive to their children, exhibited various competent behaviors. Authoritative parenting was correlated with low levels of stress and exhibition of problem behaviors as well as high levels of academic achievement and cognitive motivation in adolescence

(Baumrind, 1991b). The FSP sample families all came from the San Francisco Bay area and were White and middle class and had above-average education levels (Baumrind, 1991b). This homogeneity should be taken into account when the generalizability of FSP findings is considered. However, other studies have demonstrated positive effects of parenting styles that are characterized as authoritative.

It is important that the demanding aspect of parents be coupled with the supportive aspect, as increased parental control during adolescence, in general, has been correlated with decreased intrinsic motivation in school (Eccles et al., 1993). Empirical studies have demonstrated the competence afforded to adolescent students by authoritative parenting styles in the academic context. For instance, Simons-Morton and Chen (2009) explored the relationships between authoritative parenting practices, friends with problem behavior, and school engagement across the middle school years. The researchers conducted a longitudinal study of adolescent students in Grades 6 and 9. The sample included almost 2,500 students from seven public middle schools. Students were assessed five times between Grades 6 and 9. The measure used was a researcher-developed questionnaire that contained survey items related to the constructs of interest. Constructs included authoritative parenting, which was operationalized by parents' establishment of high expectations; parents' monitoring of behavior; and parents being involved and supportive. Findings indicated that high instances of friends with problem behavior predicted a decrease in school engagement across middle school years. Authoritative parenting practices, meanwhile, positively predicted an increase in school engagement. The negative effects of having friends with problem behavior were partially

mediated by the authoritative parenting practices variable (Simons-Morton & Chen, 2009).

The development of autonomy in adolescence is another aspect of parenting strategies that highlights the importance of the supportive dimension of authoritative parenting styles. Adolescence is a time when the childrens' lives are affected by their sense of autonomy or independence and freedom to make decisions regarding aspects of their lives (Ryan & Deci, 2000; Smetana & Villalobos, 2009). Research on autonomy in adolescence has suggested that there are mixed effects when it comes to the ways that a child's perception of autonomy influences behavioral and academic outcomes (Silverberg & Gondoli, 1996). However, empirical studies have shown that a sense of autonomy in adolescents, when coupled with parental support, is positively correlated with academic outcomes (Lamborn & Steinberg, 1993; Noom, Deković, & Meeus, 1999). For instance, Lamborn and Steinberg (1993) used survey data gathered from a sample of about 10,000 students in Grades 9 to 12 in nine high schools in Wisconsin and California. The purpose of their study was to explore how adolescents' emotional autonomy and perceived support from parents affected developmental outcomes, including academic competence and performance. Measures used included Steinberg and Silverberg's (1986) Emotional Autonomy Scale and a researcher-developed relationship-support scale. A variety of outcomes were assessed, including academic competence and performance. Results showed that the interaction between adolescents' perception of parental support and their sense of autonomy had positive effects on academic competence (Lamborn & Steinberg, 1993). Noom et al. (1999) extended these findings by conducting a similar study in the

Netherlands. Their sample included 400 students between the ages of 12 and 18 years. Measures for this study consisted of a researcher-administered questionnaire that assessed autonomy, attachment, and the following outcomes: social competence, academic competence, self-esteem, problem behavior, and depression. The purpose of the study was to explore what combination of autonomy and attachment were most beneficial in terms of positive correlations with the outcomes. Results showed that a sense of autonomy accompanied by relationships with parents and peers that were characterized by trust and communication was correlated with academic competence in adolescents (Noom et al., 1999).

The positive effects of parental support for autonomy on academic outcomes have been demonstrated to be mediated by motivational variables. For instance, Vallerand, Fortier, and Guay (1997) conducted a study to test how support of adolescent autonomy from parents, teachers, and school leadership influenced student motivation and, ultimately, whether or not a student dropped out of high school. Their study sample included 4,537 students in Grades 9 and 10 in seven public high schools in Montreal. Participating students were administered a questionnaire that assessed perceived autonomy support from parents, teachers, and school leadership; academic motivation orientations related to perceived competence and perceived autonomy in school; and perceived sources of intrinsic and extrinsic motivation. Data were also gathered on dropout status. Findings indicated that parental support of autonomy positively influenced academic motivation and competence, which, in turn, led to decreased instances of dropping out of high school (Vallerand et al., 1997). Grolnick, Ryan, and

Deci (1991) conducted a study that examined similar effects in younger students, by exploring how perceived parental autonomy support and involvement impacted motivational constructs related to perceived understanding, competence, and autonomy, which, in turn, impact academic outcomes. Their study sample was comprised of 456 students in Grades 3 to 6 from 20 classrooms in schools in one district. The students completed questionnaires that assessed perceptions of parents, control, competence, and self-regulation. The researchers also gathered data on classroom grades and achievement test scores. Findings indicated that, as was the case with the high school students assessed by Vallerand et al. (1991), students' perception of parental involvement and support of autonomy positively affected the measured motivational constructs which, in turn, led to higher levels of academic achievement (Grolnick et al., 1991).

Children are more academically motivated when their parents are involved in their schooling and support their autonomy (Deci et al., 1991). As a corollary, it has been shown that high school students who perceive low support of their autonomy from parents, operationalized as a lack of parental knowledge and understanding, have lower levels of academic performance (Chen & Dornbusch, 1998). Chen and Dornbusch (1998) used the Steinberg and Silverberg (1986) survey data set to further explore the subscales underlying adolescents' perceptions of autonomy and support. The negative effects of a lack of parental knowledge on academic performance are mediated by susceptibility to peer pressure, educational expectations, psychological distress, and self-esteem (Chen & Dornbusch, 1998).

The transitions that adolescents experience into middle and high schools are volatile and can put children at risk for a variety of adverse effects (Anderman, 2012). Empirical studies have also explored the ways that parental relationships affect the transitions that adolescents make to middle and high school. For instance, Lord and colleagues (1994) conducted a study to explore the degree to which adolescents perceived (a) effective communication from their parents on the guidelines parents had established for them and (b) provision of decision-making opportunities from parents; they assessed how these two factors contributed to a successful transition to middle school, as evidenced by academic achievement and the child's self-perception of abilities. The researchers conducted a longitudinal study in which four waves of data were collected over Grades 6 (elementary school in the study setting) and 7 (middle school). The study sample included 1,860 students in 143 classrooms during the elementary year and 171 classrooms during the middle school year. These classrooms came from schools across 12 districts. Findings showed that the child's perception of a democratic family environment in which autonomy of the child was supported, as indicated by the parents providing the student with decision-making opportunities, contributed to a smooth transition from elementary to middle school and growth in self-esteem across the middle school years (Lord et al., 1994). The transition from middle to high school has been explored by Isakson and Jarvis (1999), who conducted a short-term longitudinal study on a small sample of adolescents. The researchers assessed how certain factors such as perceived parental support affected a successful transition to high school, as evidenced by GPA and a sense of school membership. The sample included 48 students in eighth

grade at one laboratory school who transitioned to high school (ninth grade). The sample students were homogenous in their demographic characteristics. Measures included GPA and survey scales assessing perceived school membership, daily stressors, coping strategies, autonomy, and social supports. Findings suggest that adolescents who perceived their parents to be supportive had a more successful transition from middle school, as indicated by maintenance of their GPA and sense of belonging in the school (Isakson & Jarvis, 1999).

Empirical research has demonstrated a positive influence of healthy parent–child relationships on the academic outcomes of adolescents. While parental involvement typically declines during adolescence, the positive impacts that healthy parent–child relationships have on competence and academic success remain strong (Anderman, 2012; Baumrind, 1991b; Epstein et al., 1997). Relationships between parents and their adolescent children that are secure and supportive, that is, for example, characterized by healthy communication and positive expectations, lead to higher levels of academic achievement (Easton, 2010; Epstein & Sanders, 2002; Lee & Bowen, 2006) and aspirations for college (Hill et al., 2004). This type of supportive parent–child relationship has also been shown to be positively correlated with academic outcomes when the parent fosters the child's sense of autonomy (Deci et al., 1991; Lamborn & Steinberg, 1993; Noom et al., 1999). This evidence supports the claim that positive orientations on the relatedness to parents dimension leads to higher levels of academic competence in adolescents.

Relatedness to peers: Exploring the relationships. The relationships that adolescents have with their peers serve as the developmental grounds for their identity (Zarrett & Eccles, 2006). The peer groups can range in size from a small, intimate social group (i.e., one or two best friends) to a school-wide social network. These peer groups are where friendships are formed.

As a child progresses from early childhood through adolescence, the ability to establish and maintain close friendships increases in importance (Buhrmester, 1990). The friendships that adolescents form and maintain tend to be with other adolescents with similar tastes and attitudes; similarities are due partly to the child's selection of friends and partly to the influences that the friends have on each other (Berndt, 1982). The adolescent's sense of integration into social networks and development of healthy friendships is associated with positive developmental outcomes, prosocial behaviors, and emotional well-being (Lerner, Phelps, Forman, & Bowers, 2009). This postulation has been supported by empirical studies. For instance, Brendgen, Markiewicz, Doyle, and Bukowski (2001) conducted a study to examine the link between the quality and closeness of adolescents' friendships, as perceived by the adolescent, with the behavior the adolescents engaged in with friends. Their sample consisted of 80 high school students in three schools in suburban Montreal. Participating students completed questionnaires and had conversations with a friend that were videotaped. The researchers administered the Friendship Quality Scale (Bukowski, Hoza, & Boivin 1994), which assesses the perceived quality of friendship on five dimensions: companionship, help and support, closeness, security, and conflict. The videotaped sessions were qualitatively

coded. Results showed that adolescents who perceived lower instances of criticism and conflict with friends were more likely to engage in healthy friendships characterized by positive affect and responsiveness (Brendgen et al., 2001). Newcomb, Bukowski, and Pattee (1993) conducted a meta-analysis to synthesize findings from empirical studies of behavioral differences among younger groups of children according to levels of social integration and acceptance. The researchers searched for published and unpublished studies that rated social integration and acceptance, compared children who differed on this dimension, included students in elementary to early middle school grades, and reported sufficient statistical information to contribute to findings. Findings indicated that students who were more socially integrated exhibited lower levels of aggression, withdrawal, and disruptive behavior. As a corollary, students who were less socially integrated exhibited higher levels of aggression and withdrawal and lower levels of cognitive skill (Newcomb et al., 1993).

School is the setting in which children learn from their peers what social interactions and behaviors are valued and appropriate (Epstein & Karweit, 1983). Acceptance by peers in the school and friendships with these peers is the primary contributor to a child's sense of belonging in school, which is critical to the development of a child's sense of relatedness (Hamm & Faircloth, 2005). The adolescent's sense of integration into a prosocial institution, most commonly school, is important for a youth's positive development (Lerner et al., 2009). Relationships with peers, it follows, cannot be disentangled from the school setting for adolescent children.

The potential negative impacts of adolescent peer relationships must be considered as well. The aspects of relationships that can contribute negatively to a child's development that are focused on in this study are peer pressure and peer rejection. Peer pressure is an aspect of peer relationships defined as the ways in which peers influence each other to act or behave in certain ways. In empirical studies, it can be operationalized as the correlation of behaviors (e.g., academic, disciplinary, engagement in certain activities) among friends (e.g., Santor, Messervey, & Kusumakar, 2000). Peer rejection is defined by the inability of adolescents to form friendships and meaningful relationships with their peers (Patrick, 1997).

Relatedness to peers in adolescence is formed largely by the relationships that the adolescent has with friends and peers (Connell, 1990). Adolescence is a time when relationships with peers are expanding (Anderman, 2012; Buhrmester, 1990). In adolescence, the ability to establish and maintain close friendships with peers increases in importance (Buhrmester, 1990). These relationships and friendships serve as developmental grounds for the adolescent's identity (Zarrett & Eccles, 2006). The forming of healthy friendships and a sense of integration into social networks are associated with positive developmental outcomes, prosocial behaviors, and emotional well-being in adolescents (Brendgen et al., 2001; Lerner et al., 2009; Newcomb et al., 1993). Relatedness to peers is operationalized in this study as the degree to which the student feels included in a group of friends and integrated in a network of peers in the school setting.

Relatedness to peers: Impacts on academic outcomes. The importance of peer relationships in the lives of adolescents has implications for their academic success. Acceptance by peers and, to a greater extent, friendships in the school setting are the primary contributors to a sense of belonging in the school (Hamm & Faircloth, 2005). Sense of belonging and the adolescent's extended social network have a strong influence on engagement in school and aspirations for after graduation (Connell & Wellborn, 1991; Epstein, 1983). Close and healthy friendships have similarly beneficial effects. In a study of the influence of friend's behavior and friendship features during adolescence, Berndt and Keefe (1995) surveyed 297 seventh- and eighth-grade students. The student sample was gathered from three schools. The researchers administered questionnaires to the students that asked about their behaviors, the behaviors of their friends, and their characterizations of their friendships. Data were also gathered from teachers on students' behavior and achievements. Data collection occurred in two waves separated by five months. Findings showed that friendships characterized by trust, loyalty, respect and companionship were correlated with positive attitudes toward school, better classroom behavior, and higher academic achievement (Berndt & Keefe, 1995). In another study, Ryan (2001) explored how socialization is related to intrinsic motivation, child's perceived value of school, and academic achievement in middle school students. Participants included 331 seventh graders in one middle school. The researcher collected data at the beginning and end of the school year. Measures included a motivation scale and records of academic achievement. The researcher also collected self-reported lists of friends from the participants. Social network analyses were performed on data produced

from these lists to create social groups. Results indicated that the effects of peer group motivation positively predicted middle school students' prospects for success, intrinsic value of schooling, and academic achievement (Ryan, 2001). In a similar, but older, study, Tuma and Hallinan (1979) explored how student characteristics and academic performance were correlated with formation and stability of friendships. Their sample consisted of fourth- to sixth-grade students in eighteen classrooms in three California schools. The researchers collected data on students' friend choices five times a year. They also collected performance records for standardized test scores. Findings indicated that the formation of friendships in adolescence was positively correlated with academic achievement (Tuma & Hallinan, 1979). Altermatt and Pomerantz (2005) conducted a study to examine how the influence of friends on academic achievement differed for students according to their level of academic achievement. The sample for their study was comprised of 529 fifth through seventh graders in 58 classrooms in two districts. Data measures included self-reports of friends and questionnaires assessing student self-perceptions of competence, self-esteem, and attribution style. Report card grades were used as indicators of academic performance. Data were collected in two waves during one school year. Findings showed that there were positive effects of having friends with higher levels of academic performance and competence in academic achievement and that these effects were more pronounced for low-achieving students than for high-achieving students (Altermatt & Pomerantz, 2005).

The social rules and expectations set by the peers in an adolescent's social network have been highly correlated with academic success (Wentzel, 1991). This

success can be demonstrated by, among other things, positive goal orientations. For instance, Nelson and DeBacker (2008) conducted a study of the effects of peer group influences on achievement motivation in middle and high school students. Their study sample was comprised of 253 sixth, seventh, and ninth graders in 13 science classrooms in one middle school and one high school. Measures included researcher-administered questionnaires assessing approaches to learning, classroom social goals, classmates' involvement, class belongingness, classmates' resistance to norms, friends' academic values, friends' resistance to norms, and friendship quality. Results indicated that students who perceived themselves as having a high quality of friendship with peers were more likely to report adaptive achievement motivation as indicated by mastery and performance-approach orientations and self-efficacy (Nelson & Debacker, 2008). A similar study, conducted by Urdan (1997), focused on eighth-grade students. The sample for this study was comprised of 260 students from two middle schools in Michigan. Participants in the study were administered the Patterns of Adaptive Learning Survey (Midgely, Maehr, & Urdan, 1993), which assesses achievement goal orientation and friendship orientation. The researcher also collected data on GPA. Findings demonstrated that having positively oriented friends was correlated with motivation to learn new things and take on challenging tasks, while having negatively oriented friends was correlated with being primarily motivated to avoid doing work (Urdan, 1997). At the high school level, Faircloth and Hamm (2005) examined how a sense of belonging was associated with motivation and achievement in school. Data for their study were drawn from a larger study conducted in California and Wisconsin high schools. The sample

consisted of 5,494 students in Grades 9 to 12 from seven high schools. Participating students responded to a questionnaire that assessed sense of belonging, efficacy, and valuing of school. Academic achievement was gauged with data on GPAs. Findings showed that students' sense of belonging positively influenced efficacy beliefs, valuing of school, and academic achievement (Faircloth & Hamm, 2005).

As mentioned earlier, adolescence is a time when children are experiencing transitions, such as entering middle or high school, which can present difficulties (Anderman, 2012; Isakson & Jarvis, 1999; Lord et al., 1994). Simmons, Burgeson, Carlton-Ford, and Blyth (1987) conducted a study examining the impacts that transitions in adolescence related to social contexts have on emotional and academic outcomes. This was a longitudinal study that followed students from Grades 6 through 10. The sample was ultimately comprised of 447 students. Outcome variables measured included GPA, participation in extracurricular activities, and self-esteem, assessed by the Simmons and Rosenberg Self-Esteem Scale (Simmons, Rosenberg, and Rosenberg, 1973). Measures of transition included a changing of school building; physiological indicators of pubertal change; self-reports of dating; geographic mobility (i.e., did the students move?); and indicators of family disruption including divorce, death, or remarriage. Findings showed that when adolescents experienced stresses related to coping with transitory phases, their GPA, self-esteem, and participation in extracurricular activities could suffer; findings also showed that having a stable network of friends among peers could mitigate these threats (Simmons et al., 1987). In a study looking at multiple facets of peer relationships, Cook et al. (2007) assessed how variations in four friendship constructs—friendship

groups, social behavior, school performance, and closeness with friends—affected academic performance. The study sample was comprised of 901 adolescent students in 23 schools. These students were assessed over two years. Measures included questionnaires assessing beliefs, behaviors, and mental health. Data were collected annually on student characteristics, attendance, grades, and standardized test scores. Friendship group measures consisted of student-identified friendship networks and scales related to social behavior, substance use, misbehavior, and participation in after school activities. The researchers also assessed academic performance of groups of friends and closeness of friends by aggregating outcome data across groups of friends. Findings indicated that higher levels of positive social behavior and school performance, considered jointly, contributed to higher academic success of the individual students, as indicated by higher levels of academic achievement, fewer absences, fewer instances of misbehavior and drug use, and greater participation in extracurricular activities (Cook et al., 2007).

In contrast, peer relationships can have a negative impact on the academic success of adolescents. Rejection by peers, for instance, has been associated with lower academic performance and higher instances of dropping out, as indicated in literature reviewed by Parker and Asher (1987). In the same vein, peer pressure has been negatively correlated with academic outcomes when it is associated with inappropriate behavior such as engaging in drug or alcohol use, truancy, and other problem behaviors. This correlation was demonstrated by Santor et al. (2000) in their study of the development and validation of peer pressure and peer conformity measures. As part of this study, they examined how

peer pressure and peer conformity constructs predicted academic outcomes. Their sample consisted of 145 students in Grades 11 and 12. The researchers administered questionnaires that assessed constructs related to peer pressure, popularity, peer conformity, well-being (self-esteem and dysphoria), and engagement in risk behavior. Findings indicated that peer pressure, when associated with inappropriate behavior, was predictive of lower academic success and higher instances of absences in high school (Santor et al., 2000). Further, it has been shown that peer pressure can ultimately lead to higher instances of dropping out (Hymel, Comfort, Schonert-Reichl, & McDougall, 1996).

Empirical studies have shown that peer relationships can have an impact on academic outcome in a variety of ways. For instance, having healthy (i.e., characterized by trust and respect) friendships with peers that are positively oriented has a variety of positive outcomes related to academics, including both motivation and engagement in school (Nelson & DeBacker, 2008; Urdan, 1997), higher academic achievement (Berndt & Keefe, 1995; Cook et al., 2007), and educational aspirations after high school (Connell & Wellborn, 1991; Epstein, 1983). Having a stable group of friends can also help mitigate the stresses related to coping with transitory phases, such as the movement from elementary to middle, or middle to high school (Simmons et al., 1987). Negative aspects of peer relationships can have a detrimental effect on academic outcomes. Rejection by peers and peer pressure have both been shown to negatively influence academic performance and, ultimately, graduation rate (Hymel et al., 1996; Parker & Asher, 1987; Santor et al., 2000). These findings highlight the importance of the adolescent's

integration into a network of peers that exercises healthy behavior with respect to matters such as academics.

Differences based on student characteristics. The theoretical model (see Figure 1) tested in this study includes student characteristics such as race, gender, and socioeconomic status. These characteristics were included to account for differences in the variables of interest—relatedness to parents, relatedness to peers, or perceived academic competence—that may arise because of these characteristics. While doing an extensive review of research literature on achievement gaps between students of different gender, race, and socioeconomic backgrounds is beyond the scope of this study, overarching evidence of these differences is presented here to justify the inclusion of these variables in the analysis.

The achievement gap between White and minority students has been historically demonstrated. Data from the National Assessment of Educational Progress show a long-standing gap between White students and their Black and Hispanic counterparts in English and math performance. While this gap narrowed during the 1970s and 1980s, it widened during the 1990s, and discrepancies in performance still exist (Ferguson, 2007; Haycock, 2001). Additionally, the percentage of White young adults that have completed either high school or a General Education Development program is substantially greater than that of Black or Hispanic young adults (Haycock, 2001).

The relationship between socioeconomic status and academic achievement has also been widely researched. Sirin (2005) conducted a meta-analysis of empirical studies on the influence that socioeconomic status has on academic achievement. Studies were

included that applied quantitative measures of socioeconomic status and academic achievement and that had sufficient statistical information to determine correlations between the two. Other criteria applied by the author were: samples must be comprised of students in Grades K to 12, the study must have taken place in the United States, and the study had to have been published in a professional journal between 1990 and 2000. Results showed that low socioeconomic status was negatively correlated with academic achievement. The overall effect size of individual-level socioeconomic status on academic achievement was medium, while it was large for school-level socioeconomic status (Sirin, 2005). The magnitude of the effect size for school-level socioeconomic status is evidence of the importance of the social setting in a child's education.

Gender gaps in performance in different academic subjects begin to appear when children are young. By third grade, male students are consistently performing better in math and more poorly in reading than their female counterparts. The National Assessment of Educational Progress data show that these gaps grow as the children progress through elementary and middle school. There is also a gap in science performance, with boys outperforming girls. The gaps in reading and math remain relatively consistent in the high school grades, although the gap in science performance continues to grow (Dee, 2007). Despite boys' strong performance on math and science standardized tests, research has shown that girls tend to receive higher grades than their male counterparts in all subjects; this tendency may be due in part to girls having a more disciplined approach to schooling (Duckworth & Seligman, 2006). Therefore, gender

differences should be controlled for, when possible, when statistical models are tested with general academic outcomes, such as academic competence.

Policy implications. The importance of relationships with parents and peers in the transition periods during adolescence has been reflected in policy. Programs have been put into place that are intended to improve relationships, school climate, and, by extension, academic outcomes. There are two primary approaches to these types of programs: those that focus on counseling and coaching (e.g., school counselors, who are commonly found in middle and high schools) and those that target the sociological structure of the schools (e.g., whole-school reform models) (Epstein & Karweit, 1983). Examples of the latter type of program, for which the Department of Education has provided funding, include Smaller Learning Communities and school-within-school initiatives (Bomotti & Dugan, 2005; Dynarski, Gleason, Rangarajan, & Wood, 1998). Another program that facilitates positive relationships is Success for All, a widely used whole-school reform model. The middle school model for Success for All includes cooperative learning and group reading components that are intended to improve the capacity of students to work together and get along (Slavin, Daniels, & Madden, 2005). One of the benchmarks of these types of programs is the idea that, by creating a more personal atmosphere within the schools, relationships that students have with teachers and each other will improve, and parental involvement will increase. While evaluations of these programs tend to focus on more tangible outcomes like academic achievement and dropout and graduation rates, the nature of these programs highlights the importance of measuring variables gauging relationships in a way that is scientifically sound.

Measurement strategies for studying relationships. The difficulties that arise from using quantitative techniques to research the nature and impacts of relationship are twofold:

1. Relationships are complex and latent in nature. Due to this nature, direct measure is not feasible. The quality of relationships must be gauged with numerous proxy items if it is to be measured quantitatively.
2. The impacts of relationships are complex because people have multiple relationships, and the influence of these relationships on a single outcome overlap. For this reason, classical analytic techniques (e.g., regression) are typically not appropriate methods for exploring the impacts of relationships. These methods treat the subject as independent and do not properly account for the complex interdependencies of the individuals and the overlapping influences of their relationships (Frank, 1998).

How the complexities of relationships have been measured. Surveys are commonly used to address the latency and complexity of relationships. While surveys can be effective in capturing information that cannot be observed, the quality of the information must be evaluated. Substantive and statistical assessments are used to determine the degree to which a survey is valid and reliable. These characteristics are important in determining if information gathered with the survey can be used to draw inferences or make decisions. The following descriptions cover survey instruments that have been used in empirical research to gauge adolescents' relationships with parents and peers.

In Hill et al.'s (2004) study of the longitudinal effects of parental involvement on the academic success of adolescent students, parental involvement in academics was gauged by questionnaires administered to teachers, parents, and students. The teachers were administered the 21-item Parent–Teacher Involvement Questionnaire, which was developed on a large-scale sample and has demonstrated psychometric properties. The students were administered an eight-item questionnaire, and parents were asked two questions about their participation in school activities. Reliability estimates generated for the teacher and student questionnaires were .91 and .67, respectively. The parent questionnaire had insufficient items to generate a reliability estimate (Hill et al., 2004).

Similarly, in a study of how parental involvement affects achievement of high school students, Easton (2010) administered questionnaires to parents, teachers, and students. Many survey items were duplicated across parents, teachers, and students in an effort to corroborate findings. Reliability estimates for these surveys were not reported (Easton, 2010).

In their study of the effects of different dimensions of parental involvement on academic achievement in elementary students, Lee and Bowen (2006) used parent survey instruments that assessed parental involvement on four scales (dimensions): participation in school events (asked of parents and teachers), educational discussions between parent and student, homework help, and time management. Reliability estimates were between .69 and .78 (Lee & Bowen, 2006).

In their longitudinal study of the relationships between authoritative parenting practices, friends with problem behavior, and school engagement, Simons-Morton and

Chen (2009) administered a survey instrument to the student participants. The survey was made up of researcher-developed scales, some of them adapted from previous research, on the following constructs: school engagement, peer influences, parent involvement, parental monitoring, and parental expectations. Thus, while there may have been evidence of the psychometric qualities of the researcher-developed scales gleaned from the previous research, the new scales had to demonstrate reliability, as they had been modified and were being administered in a new setting. Reported reliability estimates for these scales were between .68 and .84.

The degree to which parents support autonomy has been gauged by the Emotional Autonomy scale, developed by Steinberg and Silverberg (1986), which has been used in empirical studies considering the impact of different aspects of autonomy on outcomes in adolescence (e.g., Chen & Dornbusch, 1998; Lamborn & Steinberg, 1993). The authors built a case for the measure's validity by aligning its content with the theoretical framework of autonomy of adolescence conceptualized by Blos (1962). Reliability estimates on internal consistency are reported (Steinberg & Silverberg, 1986).

Survey instruments gauging the aspects of peer relationships include the Peer Pressure Inventory (Brown, Clasen, & Eicher, 1986). This measure was used by Santor et al. (2000) to assess perception of peer pressure in a number of domains including peer social activities, misconduct, conformity to peer norms, involvement in school, and family involvement. The measure is a validated, reliable survey consisting of 53 Likert-scale items (Santor et al., 2000).

Nelson and DeBacker (2008) measured the following constructs related to peer relationships: classroom social goals (including social responsibility, social intimacy, and social approval), classmates' involvement, class belongingness, classmates' resistance to school norms, best friend's academic valuing, best friend's resistance to school norms, and friendship quality. These scales were adapted from previously developed instruments from a variety of sources. Adaptations to the scales included the addition of new items, deletion or rewording of some existing items, and the restructuring of scales on the basis of the factor analysis results.

In addition to surveys, a common measurement tool for gauging peer relationships is social network analysis. The social networks of approximately five to 10 friends with whom an adolescent frequently interacts have been operationalized in research as the connections within these networks as defined by the adolescent (Cook et al., 2007; Faircloth & Hamm, 2005; Ryan, 2001). Peer network connections are established by having the adolescent respondent identify friends; these connections are strengthened by reciprocated friendship nominations by others in the group. Ryan (2001) carried out a study where she first had students list their friends and then conducted a social network analysis in which students were assigned to peer groups. This assignment took into account whether or not the indications of friendship were reciprocated by the listed students. A student was assigned to a peer group and also assigned to a position within that group: clique member, loose group member, dyad member, isolate, or liaison. A limitation of this study is that students could belong to only one social group. Faircloth and Hamm (2005) also used a process by which students made "friendship nominations"

and were assigned a social integration rating. This rating was used in conjunction with items gauging students' engagement in extracurricular activities and connections with teachers to create a "belonging variable."

How the effects of relationships that adolescents have with parents and peers on targeted outcomes have been measured. To consider the effects of relationships on outcomes of interest, the ways in which subjects (e.g., students) influence each other must be taken into account. Classical analytic techniques, such as ordinary least squares regression, estimate findings under the assumption that observations (e.g., students) are independent. Therefore, these techniques are typically not appropriate methods for exploring the impacts of relationships. They fail to properly account for the complex interdependencies of the individuals and the overlapping influences of their relationships (Frank, 1998).

Many of the studies considered in this review used ordinary least squares regression techniques that do not adequately account for the dependence of subjects in the study samples (e.g., Easton, 2010; Lamborn & Steinberg, 1993; Nelson & Debacker, 2008; Noom et al., 1999; Zellman & Waterman, 1998). Some studies, however, have used analytic techniques that do account for dependence of subjects. One such method is hierarchical linear modeling, which accounts for dependence by nesting subjects within clusters such as schools (Raudenbush & Bryk, 2002). Studies that used hierarchical linear modeling in research examining the effects relationships have on academic outcomes include, for example, Ryan (2001), a study in which student characteristics and clusters of students identifying as friends were used to predict academic outcomes.

Using analytic techniques that model relationships between latent variables is a strategy that can account for both the complexity of variables capturing relationships and the interdependence of these relationships. These techniques include SEM and latent growth curve analysis. Examples of studies that use these techniques include work by Chen and Dornbusch (1998), who used SEM to consider the effects of parental support of autonomy on academic outcomes. Faircloth and Hamm (2005) also used SEM to analyze the relationships between a student's sense of belonging and other latent variables related to academic outcomes. In another study, Simons-Morton and Chen (2009) used latent growth curve analysis, a longitudinal model constructed in a SEM framework, to explore the interaction of school engagement, parenting practices, and peer affiliation variables across the middle school years.

Discussion of Reviewed Research

Impacts of relatedness to parents and peers. Relatedness, in the framework of self-determination theory, is regarded as an innate psychological need (Ryan & Deci, 2000). The individual's sense of relatedness is constructed from the extent to which that individual perceives the relationships he or she has with others as secure and supportive and the perceptions of the self as worthy and capable of affectionate relationships (Connell, 1990). The focus of this study on two aspects of relatedness, relatedness to parents and relatedness to peers, stems from an interest in distinguishing how relationships with parents and peers influence the development of the adolescent. The nature of relatedness makes its development both multifaceted, in that it is influenced by a number of individuals and environmental factors, and nebulous in that the

characteristics of relationships and the way that they cultivate psychological development are not readily observed. This literature review has, therefore, synthesized theoretical research on the nature of relatedness and the ways in which relatedness to parents and peers affects academic competence.

Relatedness, autonomy, and competence are, within the framework of self-determination theory, three innate psychological needs that, when satisfied, foster self-motivation and increased mental health (Ryan & Deci, 2000). Relatedness is formed largely by the relationships that one has with others (Connell, 1990). Adolescence is a time when relationships with parents are changing (Baumrind, 1991a; Eccles et al., 1993; McElhaney et al., 2009) and relationships with peers are expanding (Anderman, 2012; Buhrmester, 1990). Due to the stark differences between relationships that adolescents have with their parents and those that they have with their peers, this study distinguishes relatedness to parents and relatedness to peers. However, the influences that these relationships have on the adolescent must be considered jointly.

The two critical dimensions of the parent–child relationship in adolescence considered in this review are the degree to which the child feels secure and supported in the relationship and the ways in which the parent fosters the child's sense of autonomy. Parent–child relationships that are secure and supportive are characterized by trust and communication (Allen, 2008; Hartup & Laursen, 1991; Kerr et al., 1999). These types of relationships foster adolescent children's ability to form healthy relationships with peers and other adults (Collins & Laursen, 2004). With respect to the autonomy dimension, parents can foster autonomy by allowing bilateral agreements on certain aspects of the

adolescent's life and by being supportive of the child's decision-making (Allen, 2008; McElhaney et al., 2009). A strong sense of autonomy can lead to adolescents being more proactive in seeking new opportunities, being more productive in their current settings, and being more resilient when faced with adverse challenges (Deci & Ryan, 1985). This study explores aspects of relatedness focusing on these two dimensions.

Empirical research has demonstrated that a healthy parent-child relationship has a positive influence on an adolescent's academic outcome. While parental involvement typically declines during adolescence, the positive impacts that healthy parent-child relationships have on competence and academic success remain strong (Anderman, 2012; Baumrind, 1991a; Collins, 1995; Epstein et al., 1997). Relationships between parents and their adolescent children that are secure and supportive, that is, for example, characterized by healthy communication and positive expectations, lead to higher levels of academic achievement (Easton, 2010; Epstein & Sanders, 2002; Lee & Bowen, 2006) and aspirations for college (Hill et al., 2004). This type of supportive parent-child relationship has also been shown to be positively correlated with academic outcomes when the parent fosters the child's sense of autonomy (Deci et al., 1991; Lamborn & Steinberg, 1993; Noom et al., 1999).

The focus on relatedness to parents in this study targets the more subtle aspects of parenting that support the adolescent's feelings of security and support and sense of autonomy. It has been suggested that these aspects are the more salient influences on the academic outcomes of children when compared with more overt expressions of academic involvement, such as a parental presence in the schools (Jeynes, 2010; Zellman &

Waterman, 1998) or parental help with homework (Easton, 2010; Lee & Bowen, 2006). Therefore, this study explored the nature of relatedness to parents by gauging the adolescent's perception of a relationship that is characterized by open communication and is supportive and stable.

In adolescence, the ability to establish and maintain close friendships with peers increases in importance (Buhrmester, 1990). These friendships and other relationships serve as developmental grounds for the adolescent's identity (Zarrett & Eccles, 2006). The forming of healthy friendships and a sense of integration into social networks are associated with positive developmental outcomes, prosocial behaviors, and emotional well-being in adolescents (Brendgen et al., 2001; Lerner et al., 2009; Newcomb et al., 1993). Relatedness to peers is operationalized in this study as the degree to which students feel that they are included in a group of friends and integrated in a network of peers in the school setting.

Empirical studies have shown that peer relationships can have an impact on academic outcome in a variety of ways. For instance, having healthy (i.e., characterized by trust and respect) friendships with peers that have positive goal orientation has a variety of positive outcomes related to academics, including both motivation and engagement in school (Nelson & DeBacker, 2008; Urdan, 1997), higher academic achievement (Berndt & Keefe, 1995; Cook et al., 2007), and educational aspirations after high school (Connell & Wellborn, 1991; Epstein, 1983). Having a stable group of friends can also help mitigate the stresses related to coping with transitory phases, such as the movement from elementary to middle or middle to high school (Simmons et al., 1987).

Negative aspects of peer relationships can have a detrimental effect on academic outcomes. Rejection by peers and peer pressure have both been shown to negatively influence academic performance and, ultimately, graduation rate (Hymel et al., 1996; Parker & Asher, 1987; Santor et al., 2000). These findings highlight the importance of the adolescent's integration into a network of peers that exercises healthy behavior in areas such as academics.

The potentially negative influences that peers have on academic success may, however, be offset by effective parenting practices (Simons-Morton & Chen, 2009). Thus it is critical to consider jointly the effects of relatedness to parents and relatedness to peers. This study explored the ways in which these two variables influence academic competence both directly and via interaction with each other.

The findings highlight how important the qualities of relationships that adolescent children have with their parents and peers are for their educational success. Although it is difficult to create policies and practices that directly affect parental involvement and peer relationships, policy makers and educators should always be cognizant of the profound impacts that these factors have when working in schools where these positive relationships are lacking. Further research should explore how the benefits produced by adolescents' positive sense of relatedness to both parents and peers could potentially be reproduced by using the resources that educators have at their disposal. Educators may be better able to act on the implications that these findings have on the relatedness to peers dimension for policy and practice than on the implications for relatedness to parents because interactions between peer groups generally occur in schools. Although there are

obvious difficulties to implementing practices that influence with whom and how adolescents interact, programs that target healthy socialization among middle and high school students may have a positive impact on the quality of peer group relationships and thus on academic success.

Measurement issues regarding relationships. In the areas of the nature and impacts of relationships this literature review covers, the ways in which researchers use quantitative measurement techniques that effectively explore relationships in light of their latent nature and the complex ways in which relationships with different individuals have overlapping influence. Survey instruments are a common tool used to capture information on relationships that adolescents have with their parents and peers. In some empirical studies (e.g., Easton, 2010; Hill et al., 2004) surveys have been administered to multiple parties (i.e., parents, teachers, and students) in an attempt to triangulate the information reported by respondents.

A number of empirical studies included in this review have used researcher-developed instruments with demonstrated psychometric properties. For instance, the Emotional Autonomy Scale (Steinberg & Silverberg, 1986) was used by Chen and Dornbusch, (1998) and Lamborn and Steinberg (1993) in studies considering the impact of different aspects of autonomy on outcomes in adolescence. Also, the Peer Pressure Inventory (Brown et al., 1986) was used by Santor et al. (2000) to assess perception of peer pressure in a number of domains.

Rather than researcher-developed instruments, a number of studies included in this review relied on instruments that were developed by adapting existing scales. For

example, Nelson and DeBacker (2008) measured constructs related to peer relationships using scales that were adapted from previously developed instruments. Similarly, Simons-Morton and Chen (2009) used a survey instrument comprised of multiple scales, some of them adapted from previous research, to measure constructs related to relationships and engagement. These examples highlight the need for survey instruments to be adaptable. While using instruments with demonstrated psychometric properties lends credibility to findings, that validity is limited to the substantive areas covered by the developed instrument. That is, while demonstrated psychometrics of an instrument are attractive on paper, a researcher using this instrument will need to add supplemental items if any of the substance the researcher hopes to address lies outside the scope of the instrument as designed. Although adding items jeopardizes the existing reliability and validity of the instrument, the psychometric properties of the instrument can still be demonstrated after the necessary adjustments have been made to cover the topics of interest.

Measurement of peer groups frequently relies on peer network analyses in which student respondents nominate friends, and the responses are used to create peer groups (Cook et al., 2007; Faircloth & Hamm, 2005; Ryan, 2001). This technique allows researchers not only to inspect what peer groups adolescents form but also to analyze what attributes are shared by members of the groups. The use of peer network analyses has been used in conjunction with survey instruments to inform how members of peer groups share similar characteristics and dispositions. For instance, Santor et al. (2000) used the Peer Pressure Inventory (Brown et al., 1986) with peer network analyses. Other

researchers (e.g., Cook et al., 2007; Nelson and DeBacker, 2008; Ryan, 2001) used survey instruments developed specifically for their studies in conjunction with peer network analyses.

While verification of the structure of the peer networks by the members of the networks themselves lends validity to findings drawn from data on the networks and their impacts on outcomes, this technique is limited to scenarios where researchers are able to collect sufficient information to construct accurate data on these networks (i.e., they can verify the network connections endorsed by students by identifying each student). While this approach is certainly feasible in studies at the classroom or school level, for a scaled-up study (i.e., surveying students across a district or from a national sample) this method would pose three main difficulties: (a) building an accurate peer network would entail getting information from all individuals within that network, making a sampling frame impractical; (b) building accurate peer networks that span schools, districts, or even states would require a substantial amount of resources; and (c) identifying students so that network connections could be verified would require gathering information that would enable identification of each student; such data for a large sample would be both overwhelming in quantity and probably viewed as too sensitive.

Conclusions and Research Questions

The existing research discussed in this chapter illustrates the profound impact that relatedness, gauged as the qualities of parental and peer relationships, has on academic outcomes for adolescent students. Relatedness is an integral piece of adolescent development and educational success. The findings should highlight the kinds of support

that adolescent students receive from their parents and peers. With further research and application, it may be possible to craft policies and practices that can provide students with similar support.

The issues surrounding measurement are indicative of the need to refine the instruments that are used to study these relationships. Findings produced in existing studies, however, are not without merit. They have demonstrated the benefits of positive parental and peer relationships while also providing evidence of reliability and rigor. These kinds of findings showcase the possibility of studying latent factors like relationships in a standardized way on large samples. That is the purpose of this study: to conduct an examination of latent factors measuring how a child's sense of relatedness to parents and peers has effects on academic competence. This purpose was achieved by taking a two-pronged approach to assessing such effects by: (a) evaluating the factor structure and reliability of variables gauging adolescent students' perceived relatedness to parents and to peers and (b) determining the quantitative estimates of the effects that adolescents' perceived relatedness to parents and to peers have on these students' perceptions of academic competence, while controlling for differences in race, socioeconomic status, and gender. The pertinent research questions addressed in this study are as follows:

- Research Question 1: Do the scales constructed by the researcher measuring the targeted constructs of perceived relatedness to parents, perceived relatedness to peers, and perceived academic competence have demonstrated structural validity and reliability?

- Research Question 2: What are the direct and indirect effects of perceived relatedness to parents and perceived relatedness to peers on perceived academic competence, controlling for differences in socioeconomic status, gender, age, and minority status?

Chapter Three

This is an exploratory study that was intended to assess (a) the psychometric quality of measures gauging the latent variables of adolescents' perceptions of their relatedness to both parents and peers and (b) the effects that these latent variables have on each other and on perceived academic competence. Survey data from an extant, publically available data set were used to build targeted latent variables measuring the following: perceived relatedness to parents, perceived relatedness to peers, and perceived academic competence. These data were generated from student responses to items on the survey and served as the observed indicators of the latent variables of interest. The measurement quality of these observed indicators of targeted latent variables was assessed through substantive considerations and statistical techniques.

The distinction between observed indicators and the targeted latent variables is of critical importance. The targeted latent variables are the variables of interest: relatedness to parents, relatedness to peers, and perceived academic competence. These variables are latent in nature because they are not directly measureable in the way that characteristics such as weight or height are. Observed indicators are measured items, such as survey questions, that are substantively related to the latent variables of interest. Evidence of the validity of the observed variables as measures of the targeted latent variables (constructs) is based on both substantive and statistical considerations. Once a satisfactory level of

validity and reliability of the measures of targeted latent variables has been established, relationships between these variables can be explored. SEM is the analytic technique best suited to handle such explorations (Raykov & Marcoulides, 2006). SEM analyses will be used to examine statistical effects that may signal causal relationships between the latent variables gauging relatedness to parents, relatedness to peers, and perceived academic competence.

Data Source

The HBSC survey was administered in the United States during the 2005–2006 school year as part of an international collaboration with the World Health Organization (U.S. Department of Health and Human Services, Substance Abuse and Mental Health Services Administration, Office of Applied Studies, 2012). In addition to the US, 41 other nations participated, including Finland, Norway, and Great Britain, where the study was initiated. This study used survey data gathered in the US. The purpose of the survey was to capture a wide range of health-related behaviors and lifestyle issues for students in the midadolescent grade range. Items addressed by the survey included, but were not limited to

- family issues, such as members in the household and perception of parental involvement;
- diet and exercise habits;
- prevalence of general health ailments (i.e., headaches, stomachaches, asthma);
- perception of body and self;
- perception of school;

- peer influence;
- alcohol, tobacco, and drug use; and
- demographic information.

See Appendix A for the complete HBSC survey. Selected survey items related to these topics were used in this study. The items were selected on the basis of their relevance to the variables of interest: perceived relatedness to parents, perceived relatedness to peers, and perceived academic competence.

Students in Grades 6 through 10 in private and public schools in 50 states and the District of Columbia were eligible for the sample. The sampling was conducted in three tiers: district, school, and classroom. Schools within participating districts were stratified by urban categorization in an effort to ensure that urban schools were adequately represented. The entire HBSC survey sample was ultimately comprised of 9,227 students in randomly selected classrooms from 227 schools (U.S. Department of Health and Human Services, Substance Abuse and Mental Health Services Administration, Office of Applied Studies, 2012).

Study Sample

Student-level data from the HBSC survey were acquired from the Substance Abuse and Mental Health Data Archive (U.S. Department of Health and Human Services, Substance Abuse and Mental Health Services Administration, Office of Applied Studies, 2012). This study focuses on adolescent students in Grades 6 through 10. A subset of students was administered an appended version of the survey that did not include certain

items related to peer relationships, so these students were excluded from the study. The resulting sample size for this study is 8,607 students. Data from selected HBSC survey items that these students completed were used to address our research questions. Descriptive information on the student sample is presented in Table 1.

Table 1

Descriptive Information on Student Sample

Variable	Category	Percentage
Gender	Male	48.4
	Female	51.6
Grade	6	26.1
	7	20.4
	8	19.8
	9	16.1
	10	17.6
Race	Black or African American	18.6
	White	44.4
	Asian	2.9
	Other	34.0
Ethnicity	Hispanic or Latino	26.3
	Not Hispanic or Latino	73.7

Note. The "other" race category includes the following: American Indian, Alaska native, native Hawaiian and other Pacific Islander, other, and two or more races.

The student sample used in the study is split relatively evenly between male and female. The student sample is also distributed fairly evenly across the five participating grades, Grades 6 through 10. The most frequently identified race was White (44%). About a quarter (26%) of the sample identified as being of Hispanic or Latino ethnic

origin. The mean age of student respondents was 13.9 years, with ages ranging from 11 to 17.3 years across all respondents.

Missing data were not imputed. Students who were missing data required to build the latent variables were removed from the analysis. That is, case-wise deletion was used to exclude students with any missing data records. The two drawbacks of using case-wise deletion, or complete case analysis, are that the loss of data can decrease statistical power and introduce bias to impact estimates (Puma, Olsen, Bell, & Price, 2009). However, neither of these was a concern in this study. The sample is sufficiently large that students lost because of missing data did not decrease the ability to detect effects. With respect to bias estimates, these are more of a concern in experimental studies that are trying to determine the impact of a randomized condition. This study did not employ experimental or quasiexperimental designs and was not intended to establish causal effects of any of the study variables.

Measures

The constructs of interest—perceived relatedness to parents, perceived relatedness to peers, and perceived academic competence—were measured via survey items from the HBSC survey. These observed indicators were selected for use in the study due to their inclusion in HBSC sections deemed relevant to the dimensions of the constructs of interest. The relevant sections of the HBSC survey were: demographics and characteristics, family affluence, family and friend relationships, and school experiences. Items from these sections were included if they were gauging the extent to which the respondent perceives the relationship with their parent(s) as enabling them to feel secure

and autonomous, the extent to which the respondent feels integrated into a social network and is prosocially engaged in the classroom setting, or the respondent's perceived ability to handle academic workload, comprehend material, and perform at the level of teacher expectations. The parent-child relationship is addressed by items that ask generally about the parent/guardian. Items that ask specifically about the mother or father were excluded. This was done so that the perceived relatedness to parents variable was constructed from items addressing the relationship that the respondent has with the individual that they identify as their parent/guardian, rather than constraining these items to a biological mother or father. The items that prospectively measure the constructs of interest are listed in Table 2. The dimensions that they measure are further explored in this section.

Measures of student characteristics. Certain characteristics of the sample students were controlled for when the effects of sense of relatedness to parents and sense of relatedness to peers on perceived academic competence were measured. These variables include age; gender, indicated as male or female; and minority status, indicated as Black, Asian, American Indian or Alaskan native, native Hawaiian or other Pacific Islander, other, or Hispanic ethnicity. Socioeconomic status was addressed by the following questions: "Is your family well off?" "How many computers does your family own?" "Do you have your own bedroom?" "Does your family own a vehicle?" "How many vacations has your family taken in the past 12 months?"

Table 2

Items from HBSC Survey

Factor	Item
Perceived relatedness to parents	My parent/guardian helps me as much as I need.
	My parent/guardian lets me do things I like doing.
	My parent/guardian is loving.
	My parent/guardian understands my problems.
	My parent/guardian likes me to make own decisions.
	My parent/guardian tried to control things I do.
	My parent/guardian treats me like a baby.
	My parent/guardian makes me feel better when upset.
Perceived relatedness to peers	I am satisfied with family relationships.
	Number of close male friends
	Number of close female friends
	Days per week spend with friends after school
	Nights per week spend with friends
	How often call/text friends
	Group of friends accepted by your parents
	Students in my class enjoy being together
Perceived academic competence	Students in my class are kind and helpful
	Students in my class accept me as I am
	Teacher's opinion of your school performance
	Present feelings about school
	Amount of pressure from school work

Measures of perceived relatedness to parents. A dimension of perceived relatedness to parents addressed by the observed indicators is the degree to which the child feels secure and supported. Relatedness to parents has been defined as the degree to

which the parent–child relationship makes the child feel secure, supported, and satisfied (Connell, 1990). Contributors to these kinds of relationships include sensitivity of the parent to the child's needs (Allen, 2008) and trust built on the sharing of information and feelings between parent and child (Hartup & Laursen, 1991; Kerr et al., 1999). Several survey items associated with the relatedness to parents variable gauge the adolescent's perceptions of these characteristics. Survey items included “My parent/guardian helps me as much as I need,” “My parent/guardian is loving,” and “My parent/guardian understands my problems.” These items were measured on a 3-point scale with the following response options: *almost never*, *sometimes*, and *almost always*. All measures were assessed for reliability, which was addressed by latent variable modeling estimates of internal consistency, and validity.

Another dimension of perceived relatedness to parents is the degree to which the child's sense of autonomy is fostered. For adolescents, the parent's ability to be highly sensitive to their emotional states and also to allow for development of autonomy (e.g., handling conflicts by engaging in productive bilateral conversations) are key contributors to a healthy parent–child relationship (Allen, 2008). Regarding autonomy, adolescents typically try to expand the scope of their decision-making by taking ownership over things that were previously up to the parent, such as what to wear, who to spend time with, what music to listen to, and what movies and television shows to watch (Smetana & Villalobos, 2009). The aspects of a parent's sensitivity were gauged by the following items: “My parent/guardian helps me as much as I need,” “My parent/guardian is loving,” “My parent/guardian understands my problems,” and “My parent/guardian makes me feel

better when I'm upset." Survey items that gauged the parent's allowance for autonomy included "My parent/guardian helps me as much as I need," "My parent/guardian lets me do things I like doing," "My parent/guardian likes me to make my own decisions," "My parent guardian tries to control things I do," and "My parent/guardian treats me like a baby." Note that the latter two items gauge a disposition of the parents that is counter to development of autonomy in the adolescent. These items were measured on a 3-point scale with the following response options: *almost never*, *sometimes*, and *almost always*. All measures were assessed for reliability, which was addressed by latent variable modeling estimates of internal consistency, and validity.

Authoritative parenting styles are related to both the secure and supported and autonomy dimensions. Authoritative parenting has been defined as the combination of supportive and demanding parenting styles (Baumrind, 1971). Children exposed to authoritative parenting styles enjoy a variety of positive outcomes (Baumrind, 1971; Deci et al., 1991; Kudo et al., 2012). The relatedness to parents survey items typically align with the supportive dimension of authoritative parenting, with items such as "My parent/guardian helps me as much as I need" and "My parent/guardian understands my problems." One item, "My parent/guardian likes me to make my own decisions," aligned with the demanding dimension. The demanding dimension could have benefited from additional survey items. Note that these items have been listed as aligning with previous dimensions, but their association with authoritative parenting styles is worth highlighting.

The HBSC items that are used to measure perceived relatedness to parents ask the adolescent about their parent/guardian. Therefore, the parent may represent a mother, father, grandparent, or other individual filling the parent/guardian role for the child.

Measures of perceived relatedness to peers. A dimension of perceived relatedness to peers addressed by the observed indicators is the formation of friendships. Relatedness to peers is defined as the degree to which the child has developed friendships with peers and a sense of integration into a network of peers at the school. The formation of friendships in adolescence is critical to the child's development, and these friendships will prove to be influential on the development of behaviors, tastes, and attitudes (Berndt, 1982; Buhrmester, 1990). Close friendships characterized by trust, loyalty, respect, and companionship, have similarly beneficial effects that are correlated with positive attitudes toward school, better classroom behavior, and higher academic achievement (Berndt & Keefe, 1995). Thus, it is important that items associated with the relatedness to peers variable gauge the existence of close relationships that the respondent has with friends. Survey items that gauged this included "Number of close male/female friends," "days per week spend with friends after school," "nights per week spend with friends," and "how often call/text friends." Response options for the first item were *none, one, two, three or more*. Response options for the second item ranged from *0 days* to *6 days*. Response options for the third item ranged from *0 evenings* to *7 evenings*. Response options for the fourth item included *rarely or never, 1 or 2 days a week, 3 or 4 days a week, 5 or 6 days a week*, and *every day*. All measures were assessed for reliability, which was addressed by latent variable modeling estimates of internal consistency, and validity.

In addition to the formation of close friendships, a sense of connectedness to peers at schools is an important dimension of perceived relatedness to peers that was addressed by study measures. School is the setting in which children learn from their peers what social interactions and behaviors are valued and appropriate (Epstein & Karweit, 1983). Integration into a network of peers in the school is the primary contributor to a child's sense of belonging in school, which is critical to the development of a sense of relatedness (Hamm & Faircloth, 2005). Survey items that address relationships with peers at school and the values that these peers share included "Students in my class enjoy being together," "Students in my class are kind and helpful," and "Students in my class accept me as I am." These items were measured on a 5-point Likert scale with response options ranging from *strongly disagree* to *strongly agree*. All measures were assessed for reliability, which was addressed by latent variable modeling estimates of internal consistency, and validity.

While these items effectively gauge whether or not the adolescent has formed friendships with peers, they do not address the qualities of these friendships. This problem may be loosely addressed by the item: "group of friends accepted by your parents." However, the overall construct of relatedness to peers would have benefited from more specific survey questions about the levels of perceived characteristics such as trust, respect, and companionship shared by friends. These characteristics, when shared by friends, have been shown to be positively correlated with academic outcomes (Berndt & Keefe, 1995), as discussed previously.

Measures of perceived academic competence. Perceived academic competence is the outcome of interest in this study, with dimensions related to the adolescent's perception of his or her own academic ability, the child's perception of the teacher's opinion of him or her, and the child's general attitude toward school. Competence, in general, is defined as people's capacity for success, constituted by the explorations, lessons learned, and adaptations accumulated in their environment (Deci & Ryan, 1985). In the academic context, the environment is the school, and the capacity for success is focused on academic achievement. The children's perception of their own academic competence has been operationalized as their perception of their ability to execute their schoolwork and comprehend material (Harter, 1982), which was gauged by the following survey items used in this study: "teacher's opinion of your school performance," "present feelings about school," and "amount of pressure from schoolwork." Response options for the first item were *below average, average, good, very good*. Response options for the second item were *I don't like it at all, I don't like it very much, I like it a bit, I like it a lot*. Response options for the third item were *a lot, some, a little, and not at all*. All measures were assessed for reliability, which was addressed by latent variable modeling estimates of internal consistency, and validity.

The measures and analytic approaches used are depicted in Table 3. They are associated with the research questions they address, the scales on which they were measured, and analytic approaches that were used to address the relevant questions. The analytic approaches are discussed at length later in this chapter.

Table 3

Measures and Analytic Approaches Associated with Research Questions

Variable	Observed Indicator Measure	Scale
Research Question 1 (Analytic approaches: confirmatory factor analysis and latent variable modeling estimation of internal consistency)		
Perceived Relatedness to Parents	My parent/guardian ...helps me as much as I need. ...lets me do things I like doing. ...is loving. ...understands my problems ...likes me to make own decisions. ...tried to control things I do. ...treats me like a baby. ...makes me feel better when upset. I am satisfied with family relationships.	1 (<i>almost never</i>) to 3 (<i>almost always</i>) 0 (<i>We have very bad relationships in our family</i>) to 10 (<i>We have very good relationships in our family</i>)
Perceived Relatedness to Peers	Number of close male friends Number of close female friends Days per week spend with friends after school Nights per week spend with friends How often call/text friends Group of friends accepted by your parents Students in my class. ...enjoy being together ...are kind and helpful. ...accept me as I am.	1 (<i>none</i>) to 4 (<i>three or more</i>) 0 (<i>0 days</i>) to 6 (<i>6 days</i>) 0 (<i>0 evenings</i>) to 7 (<i>7 evenings</i>) 1 (<i>rarely or never</i>) to 5 (<i>every day</i>) 1 (<i>almost always</i>) to 4 (<i>They have not met your group of friends</i>) 1 (<i>strongly agree</i>) to 5 (<i>strongly disagree</i>)
Perceived Academic Competence	Teacher's opinion of your school performance Present feelings about school Amount of pressure from school work	1 (<i>very good</i>) to 4 (<i>below average</i>) 1 (<i>I like it a lot</i>) to 4 (<i>I don't like it at all</i>) 1 (<i>not at all</i>) to 4 (<i>a lot</i>)
Research Question 2 (Analytic approach: structural equation modeling)		
Relatedness to Parents		
Relatedness to Peers		Latent variables measured on a continuous scale
Academic Competence		

Design

This exploratory study is designed to achieve two purposes: (a) to demonstrate the psychometric quality of the measures of parental and peer relationships and (b) to assess the effects that parental and peer relationships have on perceptions of academic success (namely, statistical effects that may signal causal relationships). These two purposes are addressed with analyses related to the measurement and structural components of the research model, respectively. The results are intended to inform measurement practices in studies focusing on the measurement quality of indicators of the latent variables of interest and structural relationships between these variables.

Analysis

After a substantive consideration of the HBSC survey was carried out, a list was generated of survey items that are prospective measures of the following constructs of interest: perceived relatedness to parents, perceived relatedness to peers, and perceived academic competence. This chapter assesses the substantive alignment of these items and the variables of interest. Initial steps of the data analysis included performing confirmatory factor analysis on data generated from these items to build the targeted latent variables. The construction of these latent variables comprises the measurement piece of the study.

Defining validity. The validity of a measure is the degree to which it captures the information that it purports to capture. Validity is, therefore, an important characteristic of academic and behavioral measures. Outcomes in the academic (e.g., literacy,

mathematical ability) and behavioral (e.g., perceptions of self-worth or relationships) fields are difficult to observe directly. The validity of instruments designed to measure these constructs is essential if test results are to be meaningful. Validity models assess the quality of measures by integrating judgments on the basis of empirical evidence and theoretical rationales (Messick, 1989). A multifaceted construct uses pieces of evidence for the measure's credibility to build an argument for validity. This study focuses primarily on structural validity.

Content validity is the degree to which a measure relevantly and technically covers the substance of the domain that it intends to capture; a measure is assessed by experts who can determine that its content is relevant to the purpose and that it is comprised of items that are appropriate and fair (Dimitrov, 2011). While performing a content validity analysis is beyond the scope of this study, a substantive review that assessed the relevance of the items to the constructs of interest was conducted. The substantive review consisted of supporting the use of survey items with evidence from existing research.

Structural validity relies on statistical evidence rather than on substantive consideration. It is the degree to which the interrelationships of the items used reflect the theoretical constructs of interest (Messick, 1995). The structural validity of the items used in this study was assessed by using confirmatory factor analysis.

Substantive review of the survey items was used to inform the appropriateness of the observed indicators for forming the latent variables. Substantive considerations of the observed indicators were framed around the following questions:

- Is the survey item (observed indicator) substantively related to the nature of the latent variable? The items used in this study are substantively related to the nature of the relevant latent variables, as indicated by existing research.
- Is the survey item worded in a way that may cause confusion or uncertainty as to how to respond?
- Does the survey item generate information that is overly aligned with information generated by another survey item (i.e., two survey items asking essentially the same question)?

The substantive review informed the initial construction of the targeted latent variables with a list of prespecified items related to each construct of interest—relatedness to parents, relatedness to peers, and perceived academic competence. Justification of item use gleaned from the substantive review is an important piece in building an argument for acceptable validity of scales (Dimitrov, 2011).

Structural validity assessment: Confirmatory factor analysis. Confirmatory factor analysis was used to assess the strength of the targeted latent variables—relatedness to parents, relatedness to peers, and perceived academic competence—after their initial construction. Results from this analysis included multiple goodness-of-fit indices that were used to evaluate the data fit. Chi-square tests of model fit are commonly used; this value, however, increases with an increase in sample size (Satorra & Bentler, 1994). Given that this study used a large sample (approximately 8,600), it was expected that the inflated chi-square test might artificially reject model fit.

Therefore, data fit was informed by the joint examination of the following goodness-of-fit indices:

- The comparative fit index (CFI): a ratio of improvement from a null model to a hypothesized confirmatory model. A CFI greater than 0.95 is considered to indicate a close model fit (Hu & Bentler, 1999). However, a less stringent criterion, a CFI greater than 0.90, indicates acceptable fit (Marsh, Hau, & Wen, 2004).
- The Tucker-Lewis index (TLI): an index similar to the CFI that penalizes the model for superfluous freely estimated parameters that do not improve fit. A TLI greater than 0.95 is considered to indicate a close model fit (Hu & Bentler, 1999). However, a less stringent criterion, a TLI greater than 0.90, indicates acceptable fit (Marsh et al., 2004).
- The standardized root mean square residual (SRMR): an index calculated as the standardized difference between observed covariance and predicted covariance. Similar to mean square residuals in regression, the closer this value is to zero, the better. A SRMR index less than 0.08 is indicative of good model fit.
- The root mean square error of approximation (RMSEA): an index calculated as a function of the chi-square value, the degrees of freedom, and the sample size. This fit index is similar to the SRMR but is less prone to variation based on the number of latent variables in the model or the number of items loading onto those latent variables. A RMSEA index less than .06 is indicative of good model fit.

However, a less stringent criterion, a RMSEA less than .08, indicates acceptable fit (Marsh et al., 2004).

Given the results of the goodness-of-fit tests, it may be necessary to reevaluate the observed indicators used to build the targeted latent variables. This reevaluation would entail inspection of modification indices, which estimate for each parameter the drop in chi-square value if that parameter is freely estimated (Dimitrov, 2011). The inspection of modification indices should be complemented with additional substantive considerations similar to those used in the initial construction of latent variables. Thus, the building of the targeted latent variables may entail multiple reiterations before acceptable data fit is attained.

Substantive review. As adolescents develop, their sense of autonomy grows; it is this sense of autonomy that allows them to evaluate the qualities of those around them more objectively (Allen, 2008). They develop their sense of the positive and negative qualities of their parents, peers, teachers, and others. It is this sense that lends credibility to the HBSC survey as a meaningful measure of the perceptions of adolescent students. While the HBSC survey items were previously developed, they have been adopted for this study due to their substantive alignment with the variables of interest: relatedness to parents, relatedness to peers, and academic competence.

Reliability analysis. The purpose of the measurement components of the study design was to generate latent variables that meaningfully and accurately captured the latent variables of interest: perceived relatedness to parents, perceived relatedness to peers, and perceived academic competence. These latent variables can be represented as

scales, calculated by summing the numeric responses from all scale items that are selected for inclusion on the basis of findings from the previous steps, that is, the substantive consideration of items and confirmatory factor analyses. The reliability of the scales is also important to assess because the reliability of measures is a necessary condition for their validity as indicators of the latent variables of interest.

Reliability of scales (or measures) is the degree to which scales are accurate, consistent, and replicable. Reliability estimates are some of the principal indicators of psychometric quality related to measures of all kinds, designed to capture anything from literacy skills to behavioral dispositions. Reliability estimates have this importance because interpretations from findings generated by these various measures are only credible if it can be justified that the measure accurately captures what it purports to capture (Dimitrov, 2011). Thus, reliability of measures is imperative when these measure scores have implications for decision-making in education, counseling, or other fields.

Different types of reliability are used to inform the accuracy, consistency, and replicability of different types of measures. Each type has unique methods for generating reliability estimates. The appropriate type of reliability is dictated by the nature of the measure. There are four primary types of reliability (Dimitrov, 2011):

1. Internal consistency: estimates reliability as the correlation of items within a given measure; this is an appropriate reliability estimate for standardized tests or behavioral–cognitive scales.

2. Test-retest: estimates reliability as the correlation across multiple administrations of the same measure; this is an appropriate reliability estimate for standardized tests or behavioral–cognitive scales.
3. Criterion-referenced: estimates reliability by correlating the measure with a well-established outcome as the criterion; this is an appropriate reliability estimate for a measure of aspirations to attend college that used ex post facto attendance in college as the reference point.
4. Inter-rater: estimates reliability by assessing the strength of alignment of scores assigned by multiple test administrators; this reliability estimate is especially useful for teacher-administered measures in which the teachers rate their students on a given dimension.

In this study, reliability estimates for internal consistency were calculated for the measures of relatedness to parents, relatedness to peers, and perceived academic competence. The estimation of internal consistency reliability is appropriate for the scales used in this study, as the scale items gauge specific constructs of interest, and should thus be correlated. Specifically, an LVM approach to estimation of scale reliability was used to avoid the assumption of essentially tau-equivalent measures; this assumption is required by the traditionally used Cronbach's coefficient alpha for internal consistency reliability. Under the LVM approach, the reliability of a scale X (denoted ρ_{XX}) is estimated within the framework of a one-factor confirmatory model of the latent variable that underlies n measures on X (e.g., n survey items) by using the following formula (e.g., Dimitrov, 2011,):

$$\rho_{XX} = \frac{(\lambda_1 + \dots + \lambda_n)^2}{(\lambda_1 + \dots + \lambda_n)^2 + \text{VAR}(E_1) + \dots + \text{VAR}(E_n)} \quad (1)$$

where $\lambda_1, \dots, \lambda_n$ are the factor loadings and $\text{VAR}(E_1), \dots, \text{VAR}(E_n)$ are error variances associated with the n indicators (survey items) of the latent variable of interest. The computations with Equation 1 are performed by using the computer program Mplus (Muthén & Muthén, 2010) with the Mplus syntax provided by Dimitrov (2011).

The demonstration of the psychometric quality of the measures of perceived relatedness to parents, perceived relatedness to peers, and perceived academic competence comprises the measurement component of this study. Psychometric evidence was used to support (or discredit) the hypothesized measurement model. The hypothesized measurement model can be conceptualized as the formation of the variables of interest in this study by using the observed indicators. This measurement model is depicted in Figure 2, where $X_1, \dots, X_9, Z_1, \dots, Z_9$ and Y_1, \dots, Y_3 represent the observed indicator measures for sense of relatedness to parents, sense of relatedness to peers, and perceived academic competence, respectively. The observed indicator measures are listed in Table 3.

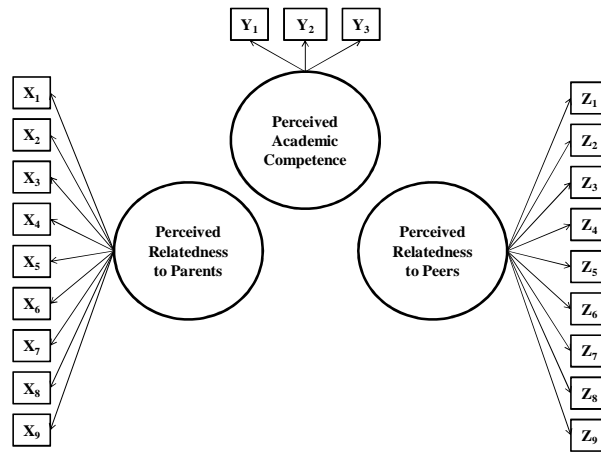


Figure 2. Hypothesized measurement model of the association between latent variables and observed indicators.

Structural equation modeling. The three latent variables used in this study are related in a structural model to reflect the targeted relationships among relatedness to parents, relatedness to peers, and perceived academic competence. It is worth distinguishing the latent variables measuring relatedness to parents, relatedness to peers, and perceived academic competence from the scales measuring the same variables that reliability estimates are calculated on. The reliability estimates are calculated on the scales to inform the accuracy, consistency, and replicable nature of scale scores

comprised of the items used to measure these variables. These scale scores will have measurement error. However, the scores on the latent variables are considered true scores; that is, there is no measurement error (Dimitrov, 2008). The pertinent SEM is depicted in Figure 1, where the effect of relatedness to parents on academic competence is mediated by relatedness to peers.

The statistical effects of socioeconomic status, gender, age, and minority status were controlled for in this analysis. The purpose of the inclusion of these characteristic variables was to refine the precision of the estimated effects of perceived relatedness to parents and perceived relatedness to peers on perceived academic competence by accounting for variation in these variables introduced by characteristic differences.

SEM is a commonly used method that analyzes relationships between latent variables, such as those that are of interest in this study. The SEM method is favored for testing this conceptual model over classical linear modeling approaches such as regression, analysis of covariance, analysis of covariance, and multivariate analysis of variance. The advantage of SEM is highlighted by the following characteristics. First, the models are conceived to examine the interrelationships between constructs that are not directly measureable. Second, the models account for measurement error of all variables, whereas classical models typically do not assume measurement error in independent variables. SEM can test for relationships between variance in measurement error of one variable and other parameters in the model. Finally, SEM, in addition to being well suited to analyze direct effects between latent variables, can also be used to

estimate indirect effects, such as mediating relationships between variables (Raykov & Marcoulides, 2006).

The complexities related to the analysis component of the study arise due to the influence that parent and peer relationships likely have on each other. Using traditional statistical models (i.e., regression) with measurements of parent and peer entered as independent variables to predict a student outcome may not be appropriate because of the likelihood of mediated associations between these relationship variables. For instance, the effect that perceived relatedness to peers has on a student's perceived academic competence may be significant, but may also be heavily influenced by perceived relatedness to parents. Therefore, this study employed analytic techniques in the framework of SEM that explored the mediating relationship between variables of interest. The hypothesized mediating relationship in this study is that perceived relatedness to parents influences perceived relatedness to peers, which in turn, influences perceived academic competence. Mediation models can effectively accomplish testing this hypothesis by estimating (a) the direct effect that independent variable X_1 has on dependent variable Y and (b) the indirect effect that X_1 has on Y through independent variable X_2 (Baron & Kenny, 1986). The analytic techniques outlined by Baron and Kenny (1986) continue to be widely used, particularly in psychological research, to analyze the ways in which antecedent relationships of multiple independent variables affect outcomes of interest (MacKinnon, Fairchild, & Fritz, 2007).

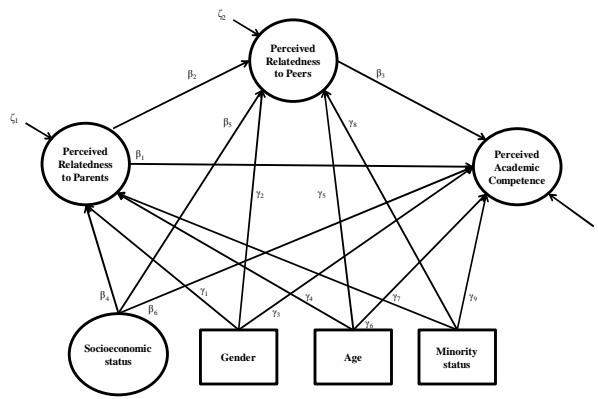


Figure 3. Structural model of the interrelationships between variables.

This study used SEM and mediation model techniques to explore the significance of the relationships illustrated in Figure 3. That is, analyses were carried out to estimate the degree to which perceived relatedness to parents and perceived relatedness to peers each directly influence academic competence. In addition, the indirect effect that relatedness to parents has through perceived relatedness to peers on perceived academic competence informed the degree to which this effect depends on that student's perception of relatedness to his or her parents. Direct, indirect, and total effects of certain student characteristics were also included. The purpose of including student characteristic variables in the analyses was to control for differences in perceived relatedness to

parents, perceived relatedness to peers, or perceived academic competence that might arise due to characteristics such as gender or socioeconomic status. The statistical significance of all effects is reported at the .05 level.

Chapter Four

Results are presented that inform answers to the study's two research questions. They are organized by analysis type. The first research question is: Do the scales constructed by the researcher measuring the targeted constructs of relatedness to parents, relatedness to peers, and perceived academic competence have demonstrated structural validity and reliability? Analyses related to Research Question 1 include substantive review of survey items, confirmatory factor analysis, and reliability analysis. The second research question is: What are the direct and indirect effects of relatedness to parents and relatedness to peers on perceived academic competence, controlling for differences on race, socioeconomic status, and gender? This research question was addressed by using path analysis conducted within a structural equation modeling framework. This path analysis enabled the estimation of both direct and indirect effects. All statistical analyses—confirmatory factor analysis, reliability analysis, structural equation modeling, and path analysis—were conducted with MPlus (Muthén & Muthén, 2010), unless noted otherwise. Analyses were conducted on the sample of 8,607 students. Case-wise deletion was used to handle missing data; that is, any student with missing records for any analysis variable was excluded.

Structural Validity

Confirmatory factor analysis was used to assess the structural validity of the model that measures relatedness to parents, relatedness to peers, and perceived academic competence. The results, as seen in Table 4, indicate a good model fit. The chi-square to degrees of freedom ratio ($\chi^2/df = 19.82$) indicates a lack of model fit (Bollen, 1989). However, the chi-square estimate is inflated with the larger sample size, so it is expected that this ratio would be large given the sample of 8,607 students. CFI and TLI values (.92 and .91, respectively) indicate a close model fit (Hu & Bentler, 1999).

The confidence interval for the RMSEA is less than .05; this result also indicates a strong model fit (Browne & Cudeck, 1993).

Table 4

Fit Statistics for the Measurement Model

χ^2	<i>df</i>	CFI	TLI	RMSEA	90% CI for RMSEA	
					LL	UL
5,014.63	253	0.92	0.91	.05	.05	.05

Note. CI = confidence interval; CFI = comparative fit index; TLI = Tucker-Lewis index; RMSEA = root mean square error of approximation; LL = lower limit; UL = upper limit.

The final measurement model was determined by inspecting the results of the iterations of the confirmatory factor analysis to determine which survey items to adjust for improved model fit. Specifically, the modification indices were inspected to inform what items should be removed or what additional estimations should be included in the

model. The values for the modification indices estimate how much the chi-square value will drop after the corresponding parameter is estimated in the model. Modification indices that fell above a set threshold are listed for items by latent variable, with larger indices indicating more problematic items (see the Model Modification Indices section in Appendix B). Large modification indices flagged the following perceived relatedness to peers items as problematic: “days per week spend with friends after school,” “nights per week spend with friends,” and “how often call/text friends.” It is reasonable to assume that these items duplicate information as they all gauge a level of interaction that the student has with friends. These items were selected for removal in a stepwise fashion according to the highest modification index. After two of the three were removed, the remaining item was “days per week spend with friends after school.”

The resulting list of scale items is presented in Table 5. Standardized factor loadings, which were generated with a metric that is uniform across all items, are presented as well. The advantage of the standardized estimates is that the uniform metric allows for the assessment of the relative importance of each item in measuring the underlying construct (Raykov & Marcoulides, 2006). The greater the magnitude of the standardized loading, the more that item contributes to the measurement of the corresponding construct.

Table 5

Standardized Factor Loadings for Survey Items

Factor	Item	Factor Loading
Relatedness to Parents	My parent/guardian helps me as much as I need.	.82
	My parent/guardian lets me do things I like doing.	.61
	My parent/guardian is loving.	.83
	My parent/guardian understands my problems.	.81
	My parent/guardian likes me to make own decisions.	.58
	My parent/guardian tried to control things I do.	.44
	My parent/guardian treats me like a baby.	.36
	My parent/guardian makes me feel better when upset.	.75
	I am satisfied with family relationships.	.70
Relatedness to Peers	Number of close friends	.21
	Days per week spend with friends after school	.14
	Students in my class enjoy being together.	.54
	Students in my class are kind and helpful.	.66
	Students in my class accept me as I am.	.72
Perceived Academic Competence	Teacher's opinion of your school performance	.54
	Present feelings about school	.64
	Amount of pressure from school work	.32

Note. $p < .001$ for all factor loadings.

The confirmatory factor analysis results were also reviewed for the existence of correlated error variance among items. While item pairs or groups might not duplicate information, they might still have correlated errors due to substantive similarities. In some cases, the model fit could be improved by estimating the correlation of error variances between these pairs. The improvement in the model was approximated by modification indices given for item pairs (see the Model Modification Indices section in Appendix B). Inspection of the modification indices from the initial confirmatory factor

analyses indicated that correlations of error variances between the following items should be estimated:

- “My parent/guardian lets me do things I like doing” with “My parent/guardian likes me to make own decisions.”
- “My parent/guardian understands my problems” with “My parent/guardian makes me feel better when upset.”
- “My parent/guardian tried to control things I do” with “My parent/guardian treats me like a baby.”
- “Students in my class enjoy being together” with “Students in my class are kind and helpful.”
- “Number of close friends” with “days per week spend with friends after school.”

The confirmatory model is presented in Figure 4. This model includes all standardized factor loadings and estimated correlated error variances for the pairs of items listed previously.

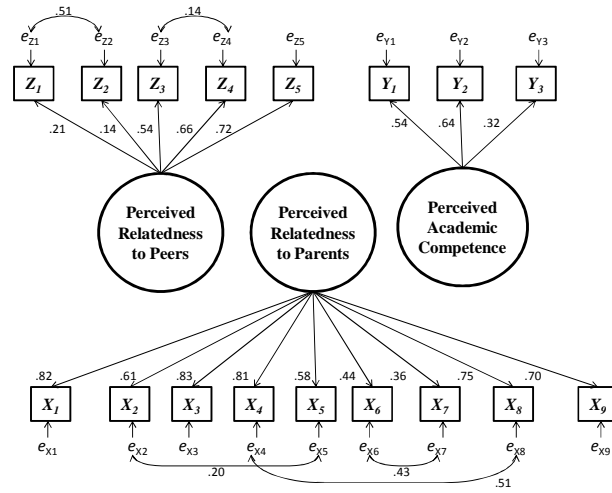


Figure 4. Confirmatory model with estimated factor loadings and correlated error variances.

Factor loadings for perceived relatedness to parents items range from .36 to .83. Items on the higher end of this range include “My parent/guardian is loving” (X₃, factor loading = .83), “My parent/guardian helps me as much as I need” (X₁, factor loading = .82), and “My parent/guardian understands my problems” (X₄, factor loading = .81). Items on the lower end of this range include “My parent/guardian treats me like a baby” (X₇, factor loading = .36) and “My parent/guardian likes to control things I do” (X₆, factor

loading = .44). In addition to the low factor loadings, these two items had significantly correlated error variances.

Factor loadings for perceived relatedness to peers items range from .14 to .72. Items on the higher end of this range include “Students in my class accept me as who I am” (Z_5 , factor loading = .72) and “Students in my class are kind and helpful” (Z_4 , factor loading = .66). Items on the lower end of this range include “days per week spend with friends after school” (Z_2 , factor loading = .14) and “number of close friends” (Z_1 , factor loading = .21). In addition to the low factor loadings, Z_2 and Z_1 had significantly correlated error variances.

Factor loadings for perceived academic competence items range from .32 to .64. The three items from this scale include “present feelings about school” (Y_2 , factor loading = .64), “teacher's opinion about school performance” (Y_1 , factor loading = .54), and “amount of pressure from school work” (Y_3 , factor loading = .32).

Reliability

The degree to which the scales that have been created to measure perceived relatedness to parents, perceived relatedness to peers, and perceived academic competence are accurate, consistent, and replicable was addressed by estimating reliability. Two internal consistency estimates are reported in this study: an LVM estimate (ρ_{XX}) and Cronbach's alpha (α). Both estimates are reported because Cronbach's α is a generally more familiar reliability estimate. However, Cronbach's α is appropriate only if there are no correlated error variances between scale items and the scale items are essentially tau-equivalent. As discussed previously, there are correlated error variances

between scale items in this study. Therefore, the LVM estimate of reliability is more appropriate for the perceived relatedness to parents, perceived relatedness to peers, and perceived academic competence scales. LVM and Cronbach's α reliability estimates are presented in Table 6. LVM estimates were calculated in MPLus (Muthén & Muthén, 2010), while Cronbach's α estimates were calculated in SPSS (IBM SPSS Statistics for Windows, Version 22.0).

Table 6

Reliability of Scales

Scale	Reliability Measure	
	LVM Estimate (ρ_{xx})	Cronbach's α
Perceived Relatedness to Parents	.80	.94
Perceived Relatedness to Peers	.50	.75
Perceived Academic Competence	.49	.73

Note. LVM = latent variable modeling.

The LVM reliability estimate indicates acceptable internal consistency for the perceived relatedness to parents scale ($\rho_{xx} = .80$). However, the LVM estimates for perceived relatedness to peers ($\rho_{xx} = .50$) and perceived academic competence ($\rho_{xx} = .49$) both indicate low reliability for these scales. The Cronbach's α estimates of internal consistency are higher for all scales, indicating acceptable reliability. The higher Cronbach's α estimates are due to correlated error variance of items, particularly between items measuring perceived relatedness to peers, and perceived academic competence. Due to these correlated errors, the Cronbach's α estimates are inflated for these scales.

Structural Equation Modeling

Path analysis conducted within a structural equation modeling framework was used to address the second research question: What are the direct and indirect effects latent variables measuring relatedness to parents and relatedness to peers on perceived academic competence, controlling for differences on race, socioeconomic status, and gender? The pertinent SEM, with regression coefficients for the estimated direct effects, is depicted in Figure 5. Note that the direct effects only inform one dimension of Research Question 2 as the indirect effects are also of interest in this study.

This structural model presents the effect of perceived relatedness to parents on perceived academic competence ($\beta_1 = .39$), perceived relatedness to parents on perceived relatedness to peers ($\beta_2 = .38$), and perceived relatedness to peers on perceived academic competence ($\beta_3 = .23$). Coefficients for β_1 , β_2 , and β_3 are all statistically significant at $\alpha = .001$. Also presented are the direct statistical effects of socioeconomic status (β_{4-7}), gender (γ_{1-3}), age (γ_{4-6}), and minority status (γ_{7-9}) on perceived relatedness to parents, perceived relatedness to peers, and perceived academic competence. The characteristic variables, socioeconomic status, gender, age, and minority status were included to refine the precision of the estimated effects of perceived relatedness to parents and perceived relatedness to peers on perceived academic competence. All coefficients are statistically significant at $\alpha = .05$ except for the effect of gender on perceived relatedness to peers (γ_2 , $p = .51$).

The residual values for perceived relatedness to parents, perceived relatedness to peers, and perceived academic competence are represented in Figure 5 by ζ_1 , ζ_2 , and ζ_3 ,

respectively. Residuals are calculated for every endogenous variable, or every variable that is predicted by at least one other variable. The variance of this residual indicates the percentage of the variation in the endogenous variable not explained by the independent variables. This value is also referred to as the *disturbance variance* (Dimitrov, 2008). The residual variance is $\widehat{VAR}(\zeta_1) = .75$ ($p < .001$) for perceived relatedness to parents, $\widehat{VAR}(\zeta_2) = .78$ ($p < .001$) for perceived relatedness to peers, and $\widehat{VAR}(\zeta_3) = .60$ ($p < .001$) for perceived academic competence.

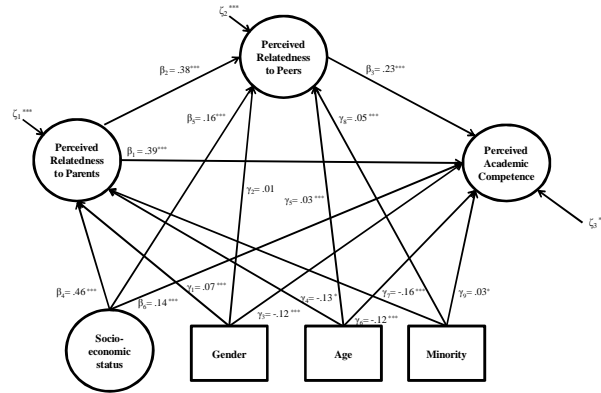


Figure 5. Structural model with direct effect regression coefficients.
^{*} $p < .05$. ^{**} $p < .01$. ^{***} $p < .001$.

The effects of perceived relatedness to parents, perceived relatedness to peers, socioeconomic status, gender, age, and minority status on perceived academic competence are decomposed into direct and indirect effects in Table 7. The purpose of estimating direct and indirect effects is to assess the mediating relationships between the variables of interest. These direct and indirect effects were estimated by conducting a path analysis within a structural modeling framework, using MPlus (Muthén & Muthén, 2010). For details on the path analysis specification and output of results, see Appendix B.

Estimates of effects in Table 7 are grouped by each exogenous and endogenous variable pair. For instance, the first exogenous–endogenous pair is perceived relatedness to parents and perceived academic competence. The latter variable is the only endogenous pair in this analysis. Direct, specific indirect, total indirect, and total effects are presented for each exogenous–endogenous pair. The specific indirect effects indicate the effect of the exogenous variable via the mediating pathway of the other labeled variable(s). Specific indirect effect estimates were calculated for each pathway specified in the analysis. For instance, the only indirect pathway specified for the effect of perceived relatedness to parents on perceived academic competence is through perceived relatedness to peers; hence, this is the only specific indirect effect presented under the perceived relatedness to parents and perceived academic competence pair. The total indirect effect is the sum of all specific indirect effects. In cases where only one indirect path is specified, the specific indirect effect equals the total indirect effect. The total effect is the sum of the direct effect and total indirect effect.

Table 7

Standardized Direct, Indirect, and Total Effects

Direct and Indirect Paths	Effect (Standard Error)			
	Direct	Specific Indirect	Total Indirect	Total
Parents → Academic competence	.39*** (.02)		.09*** (.01)	.47*** (.02)
Parents → Peers → Academic competence		.09*** (.01)		
Peers → Academic competence	.23*** (.02)			.23*** (.02)
SES → Academic competence	.14*** (.02)		.25*** (.01)	.40*** (.02)
SES → Parents → Academic competence		.18*** (.01)		
SES → Peers → Academic competence		.04*** (.01)		
SES → Parents → Peers → Academic competence		.04*** (.00)		
Male → Academic competence	-.12*** (.01)		.03*** (.01)	-.08*** (.01)
Male → Parents → Academic competence		.03*** (.01)		
Male → Peers → Academic competence		.00 (.00)		
Male → Parents → Peers → Academic competence		.01*** (.00)		
Age → Academic competence	-.12*** (.01)		-.05*** (.01)	-.17*** (.01)
Age → Parents → Academic competence		-.05*** (.01)		
Age → Peers → Academic competence		.01* (.00)		
Age → Parents → Peers → Academic competence		-.01*** (.00)		
Min → Academic competence	.03*** (.01)		-.07*** (.01)	-.04*** (.02)
Min → Parents → Academic competence		-.06*** (.00)		
Min → Peers → Academic competence		.01** (.00)		
Min → Parents → Peers → Academic competence		-.01*** (.00)		

Note. The following shorthand was used in this table for variables: Parents = perceived relatedness to parents; Peers = perceived relatedness to peers; Academic competence = perceived academic competence. SES = socioeconomic status; Min = minority status. * $p < .05$. [†] $p < .01$. ^{††} $p < .001$.

Standardized estimates of all direct and indirect effects are presented in Table 7.

Similar to the interpretation of factor loadings, described earlier, the magnitude of the standardized estimates can be interpreted as the relative importance of the item in predicting variation in the endogenous variable (perceived academic competence). Results show that perceived relatedness to parents had the greatest direct effect (.39) on perceived academic competence. The indirect effect of perceived relatedness to parents on perceived academic competence via perceived relatedness to peers (.09) is smaller, but still statistically significant. The direct effect of perceived relatedness to peers on perceived academic competence (.23) is smaller than that of perceived relatedness to parents, but still significant.

The direct and indirect effects of student characteristics, socioeconomic status, gender, age, and minority status, are also estimated. Socioeconomic status had a significant direct effect on perceived academic competence (.14) and a stronger total indirect effect (.25). Socioeconomic status is a latent variable constructed from the following HBSC items: “Is your family well off?” “How many computers does your family own?” “Do you have your own bedroom?” “Does your family own a vehicle?” “How many vacations has your family taken in the past 12 months?” Higher values on this latent variable were correlated with higher values on the perceived academic competence variable. The specific indirect effects between perceived relatedness to parents and perceived relatedness to peers are all significant. Gender had a significant

direct effect on perceived academic competence ($-.12$). Gender is coded as male = 1 and female = 0, so male students, on average, score lower than females on perceived academic competence. The total indirect effect of gender on perceived academic competence is significant (.03). The specific indirect effect of gender on perceived academic competence via perceived relatedness to peers (.00) is the only non-significant effect estimated in the model. The direct effect ($-.12$) and the total indirect effect ($-.05$) of age on perceived academic competence are both significant. Similarly, the direct effect (.03) and the total indirect effect ($-.07$) of minority status on perceived academic competence are both significant. Minority status is coded as minority (race is not white or ethnicity is Hispanic or Latino) = 1 and non-minority (white and non-Hispanic) = 0.

Chapter Five

Individuals' sense of relatedness is comprised of the extent to which they perceive their relationships with others as secure, supportive, and satisfying as well as their feelings of self-worth and perceived capacity to engage in affectionate relationships (Connell, 1990). Relationships are essentially the key factor in developing a sense of relatedness. During adolescence, relationships grow in complexity, with relationships with parents changing (Baumrind, 1991a; Eccles et al., 1993; McElhaney et al., 2009) and relationships with peers expanding (Anderman, 2012; Buhrmester, 1990). Thus, the adolescent years are formative in developing a sense of relatedness.

Addressing the Research Questions

The intention of this study is to use items gauging adolescents' perceptions of two dimensions of relatedness—relatedness to parents and relatedness to peers—to assess the effect that these perceptions of relatedness have on the student's self-perceived academic competence. Specifically, the findings produced in this study were intended to accomplish two objectives: (a) to produce scales of the variables of interest—perceived relatedness to parents, perceived relatedness to peers, and perceived academic competence—and to evaluate the factor structure and reliability of these scales (Research Question 1) and (b) to provide quantitative assessments of the direct and indirect effects that adolescent students' perception of their relatedness to parents and to peers have on

the perception they have of their own academic competence (Research Question 2). The first research question was tackled by considering three characteristics of the perceived relatedness to parents, perceived relatedness to peers, and perceived academic competence scales: structural validity, substantive coverage of the items, and reliability. The second was addressed by using results generated from a path analysis conducted within a structural equation modeling framework.

Structural validity. The first component of Research Question 1 was answered by evaluating the factor structure of the scales measuring perceived relatedness to parents, perceived relatedness to peers, and perceived academic competence. The set of items comprising these scales make up the measurement model. The fit of this model was tested by using confirmatory factor analysis. Correlated error variances were estimated between pairs of related items. Item pairs from the perceived relatedness to parents scale include “My parent/guardian lets me do things I like doing” with “My parent/guardian likes me to make own decisions,” “My parent/guardian understands my problems” with “My parent/guardian makes me feel better when upset,” and “My parent/guardian tries to control things I do” with “My parent/guardian treats me like a baby.” Item pairs from the perceived relatedness to peers scale include “Students in my class enjoy being together” with “Students in my class are kind and helpful” and “number of close friends” with “days per week spend with friends after school.” After the estimation of these correlated error variances had been adjusted for the confirmatory factor analysis produced results indicating an acceptable model fit.

Standardized factor loadings were inspected to explore which items contributed more to the measurement of the underlying construct. Factor loadings of the perceived relatedness to parents items revealed relatively strong contribution across numerous items; standardized factor loadings ranged from .36 to .83 across nine items, with seven of the nine items having factor loadings greater than .50. The perceived relatedness to peers scale was measured by a smaller number (five) of items, with three items having standardized factor loadings greater than .50 and the other two having loadings of .21 and .14. The perceived academic competence scale items had standardized factor loadings of .64, .54, and .32.

The small number of items and the low factor loadings of a selection of these items suggest thin substantive coverage of the perceived relatedness to peers and perceived academic competence scales. It should be noted when results are interpreted that these variables reflect, more narrowly, the content gleaned from a small number of items. For instance, the perceived relatedness to peers items with factor loadings greater than .50 were “Students in my class enjoy being together,” “Students in my class are kind and helpful,” and “Students in my class accept me as I am.” As discussed previously, this finding suggests that the perceived relatedness to peers scale more narrowly covers perceptions of healthy integration into a network of peers at school. While this is a critical aspect of a sense of relatedness to peers (Hamm & Faircloth, 2005), it does not cover the perceived characteristics of relationships that adolescents have with their friends. Survey instruments used in existing studies to measure adolescents' perceptions of their relationships with peers have demonstrated the need for a greater number of

items. For instance, in their study of relationships between authoritative parenting practices, friends with problem behavior, and school engagement Simons-Morton and Chen (2009) used an instrument with a peer influence scale comprised of seven items. In a study assessing adolescent perceptions of peer pressure in a number of domains, Santor et al. (2000) used the Peer Pressure Inventory, developed by Brown et al., (1986). This survey, comprising 40 items, is a more comprehensive measure of peer influence, covering conformity, popularity, peer pressure, and peer conformity (Brown et al., 1986).

Similarly, the perceived academic competence items with factor loadings greater than .50 were “teacher’s opinion of your school performance” and “present feelings about school.” These loadings suggest that this scale may represent a more general perception of school rather than academic competence alone. Thus, the scale would benefit from additional items gauging, for instance, the student’s perceived ability to handle the workload, comprehend material, and perform at the level of teacher expectations in the context of the school. Studies that measure outcomes related to perceived academic competence include Simons-Morton and Chen (2009), who measured school adjustment with an 11-item scale. The school adjustment measure was adopted from Harter’s (1982) academic competence scale and gauges students’ perception that they can effectively do their schoolwork and comprehend course material. The number of items in this measure lends further credibility to the notion that the perceived academic competence scale would benefit from additional items.

Substantive coverage. While the structural validity of the scales is largely informed by the confirmatory factor analysis results, it is also important to consider the

degree to which the items comprising the scales substantively cover what the scales purportedly cover. The substantive coverage of the perceived relatedness to parents scale was assessed by assessing the alignment of the items with a perception of a secure and supportive relationship with the parent and the perceived support of autonomy from the parent. These assessments must be considered jointly with information on item factor loadings, discussed previously.

The nine items measuring perceived relatedness to parents provided satisfactory substantive coverage. This scale would benefit from the addition of an item (or items) that gauges adolescents' perception of their parents as demanding or having high expectations of them. This perception was covered in this study by one item: "My parent/guardian likes me to make my own decisions." In general however, the substantive coverage of the perceived relatedness to parents items is considered to be sufficient for the purposes of this study.

Perceived relatedness to peers scale items were assessed for their alignment to perceptions of developed friendships and a sense of integration into a network of peers at school. The perceived relatedness to peers scale sufficiently covered the latter aspect with the following items: "Students in my class enjoy being together," "Students in my class are kind and helpful," and "Students in my class accept me as I am." However, the development of friendship aspect was not sufficiently covered by the perceived relatedness to peers scale. Items related to friendships had thin substantive coverage, focusing primarily on the number of friends and frequency of contact with these friends. This scale would benefit from additional items asking about the nature of relationships

that the student has with friends and peers at school. For instance, gauging whether students would characterize their friendships as trusting and respectful could provide useful information. These characteristics have been shown to be related to positive motivation and engagement in school (Nelson & DeBacker, 2008; Urdan, 1997), higher academic achievement (Berndt & Keefe, 1995; Cook et al., 2007), and educational aspirations after high school (Connell & Wellborn, 1991; Epstein, 1983). In addition, asking questions about whether students feel pressure from their friends to do things that they do not want to do could provide useful information, as peer pressure has been shown to negatively influence academic performance and, ultimately, graduation rate (Hymel et al., 1996; Parker & Asher, 1987; Santor et al., 2000).

The coverage of perceived academic competence was similarly thin, being limited to the following items: "teacher's opinion of your school performance," "present feelings about school," and "amount of pressure from school work." Additional items could help to build a scale that more comprehensively captures students' perceived academic competence as defined for this study: students' perceived ability to handle their workload, comprehend material, and perform at the level of teacher expectations in the context of the school. These items could gauge the students' perception of their understanding of different academic subjects, how they perceive themselves performing in reference to their classmates, and their expectations for getting good grades. The additional items would expand the breadth of the scale to cover the students' perceived ability to execute their schoolwork and comprehend material, which are critical indicators of academic competence (Harter, 1982).

Despite the thin coverage of two of the perceived relatedness to peers and perceived academic competence scales, as revealed by the assessment of substantive coverage and factor loadings, the confirmatory factor analysis results confirmed the structural validity of the hypothesized model as measured by the observed variables. That is, analysis of data on the HBSC survey items indicated a good fit with the proposed model measuring perceived relatedness to parents, perceived relatedness to peers, and perceived academic competence.

Reliability. The assessment of reliability, the final component of Research Question 1, informs the degree to which the scales measure are accurate, consistent, and replicable. Reliability was assessed by producing two internal consistency estimates for each scale: Cronbach's α and an LVM estimate (ρ_{xx}). The Cronbach's α estimates indicate acceptable reliability for all three scales: perceived relatedness to parents, perceived relatedness to peers, and perceived academic competence. However, Cronbach's α failed to account for correlated error variances among scale items. Error terms among the scale items were correlated. Therefore, Cronbach's α estimates are inflated and the LVM estimate gives a more accurate representation of reliability. The LVM estimates of internal consistency indicated acceptable reliability for the perceived relatedness to parents scale ($\rho_{xx} = .80$). This reliability estimate is comparable to reliability estimates reported for scales used in similar studies. For instance, Hill et al.'s (2004) study of student perceptions of parental academic involvement used an 8-item student questionnaire with a reliability estimate of $\alpha = .67$. Simons-Morton and Chen (2009) used a more comprehensive student survey instrument with subscales measuring

students' perceptions of parent involvement, parental monitoring, and parental expectations. These subscales had reliability estimates of $\alpha = .81$, $.68$, and $.82$, respectively. Finally, multiple studies have used the Emotional Autonomy scale, developed by Steinberg and Silverberg, (1986), to consider the impact of different aspects of autonomy on outcomes in adolescence (e.g., Chen & Dornbusch, 1998; Lamborn & Steinberg, 1993). This measure is a 20-item scale with a reported internal consistency estimate of $.75$ (Steinberg & Silverberg, 1986).

The LVM estimates suggest lower than desirable reliability for the perceived relatedness to peers ($\rho_{xx} = .50$) and perceived academic competence ($\rho_{xx} = .49$) scales. Other studies have used survey instruments gauging similar variables that have higher reliability estimates. For instance, the Peer Pressure Inventory, developed by Brown et al. (1986) and used in a study assessing adolescents' perceptions of peer pressure (Santor et al., 2000), has subscales measuring conformity, popularity, peer pressure, and peer conformity, which have reliability estimates ranging from $\alpha = .69$ to $.91$. Simons-Morton and Chen (2009) used a student survey focused on peer influences, which had a reliability estimate of $\alpha = .84$. Administered in the same study was a scale gauging school adjustment, substantively related to perceived academic competence, which had a reliability estimate of $\alpha = .87$.

The low reliability estimates generated by the LVM approach for perceived relatedness to peers and perceived academic competence scales echo the implications from the substantive review and assessment of structural validity. More items are needed to adequately measure these constructs. Both LVM and Cronbach's α estimates increase

as the number of items in a scale increases. While the perceived relatedness to peers and perceived academic competence scales would benefit from the addition of items, new items should be crafted to ensure that they are not correlated with other items in the scale. That is, items within the scale that collect overlapping information (e.g., “My parent/guardian tried to control things I do” with “My parent/guardian treats me like a baby” from the perceived relatedness to parents scale) introduce correlated error variances of items, which diminish the accuracy of reliability estimate.

Structural equation modeling. The effects of perceived relatedness to parents, perceived relatedness to peers, and student characteristics on perceived academic competence inform the second research question. Direct and indirect effects latent variables measuring perceived relatedness to parents and perceived relatedness to peers on perceived academic competence are estimated by conducting a path analysis within a structural equation modeling framework. Differential effects based on students characteristics—socioeconomic status, gender, age, and minority status—were also accounted for to increase the precision of the estimated effects of the relatedness variables on the outcome. Standardized estimates and standard errors were calculated for all effects. The standardized estimates allow us to compare the magnitude of different effects. The calculated standard errors are all small (less than or equal to .02), reflecting a high precision of estimated effects.

Results show that perceived relatedness to parents has a positive and statistically significant direct effect on perceived academic competence. This result is commensurate with findings from previous research indicating that relationships between parents and

their children perceived by the adolescent as secure and supportive (a dimension of relatedness to parents, as defined in this study) are correlated with higher levels of academic achievement (Easton, 2010; Epstein & Sanders, 2002; Lee & Bowen, 2006) and aspirations for college (Hill et al., 2004). The positive effect of perceived relatedness to parents on perceived academic competence is also consistent with findings that supportive parent–child relationships are positively correlated with academic outcomes when the parent fosters the child's sense of autonomy (another dimension of relatedness to parents, as defined in this study) (Deci et al., 1991; Lamborn & Steinberg, 1993; Noom et al., 1999). In addition to the direct effect of perceived relatedness to parents on perceived academic competence, the path analysis produced a positive and significant indirect effect of perceived relatedness to parents on perceived academic competence via perceived relatedness to peers. This result is consistent with the finding that the potentially negative influences that peers have on academic success may be offset by effective parenting practices (Simons-Morton & Chen, 2009). The indirect effect (.09) is substantially smaller than the direct effect of perceived relatedness to parents on perceived academic competence (.39), but still is a significant contributor to the prediction of perceived academic competence.

The estimated direct effect (.23) of perceived relatedness to peers on perceived academic competence is similarly positive and statistically significant. However, the total effect of perceived relatedness to peers on perceived academic competence (.23) is substantially lower than that of perceived relatedness to parents (.47). The implication of the direct effect result is consistent with empirical evidence that having healthy (i.e.,

characterized by trust and respect) friendships with peers that are positively oriented has a variety of positive outcomes related to academics, including both motivation and engagement in school (Nelson & DeBacker, 2008; Urdan, 1997), higher academic achievement (Berndt & Keefe, 1995; Cook et al., 2007), and educational aspirations after high school (Connell & Wellborn, 1991; Epstein, 1983). While the results from this study may more narrowly reflect friendships and relationships adolescents have with peers in their classroom, they nevertheless illustrate the positive outcomes associated with healthy relationships with peers.

The direct and indirect effects of student characteristics—socioeconomic status, gender, age, and minority status—on perceived academic competence were also estimated. Socioeconomic status had a significant direct effect on perceived academic competence and a stronger total indirect effect via both perceived relatedness to parents and perceived relatedness to peers. The direct effect supports evidence indicating that students with a lower socioeconomic status tend to have lower levels of academic achievement (Sirin, 2005). The significant indirect effects are larger in magnitude than the direct effect, suggesting that the differences based on socioeconomic status seen in academic outcomes are heavily influenced by the context of the family and peer relationships. This hypothesis is also in line with Sirin's (2005) finding that the influence of socioeconomic status is stronger at the school level.

The direct and indirect effects of gender on perceived academic competence were both significant with males scoring lower than females. This finding is consistent with previous evidence that girls receive higher grades and are more academically disciplined

than their fellow male students (Duckworth & Seligman, 2006). However, the specific indirect effect of gender on perceived academic competence via perceived relatedness to peers is the only nonsignificant effect estimated in the model. The non-significant effect, suggests that the influence of perceived relatedness to peers on perceived academic competence is consistent across genders.

The direct effect and the total indirect effect of age on perceived academic competence were both significant, showing that perceived academic performance tends to decrease as age increases. This finding is in line with evidence that academic performance tends to decline with age, especially as adolescent students transition to middle and high school (Anderman, 2012). The total effect of minority status on perceived academic competence was negative and statistically significant. This finding is consistent with historical evidence of the achievement gap between White students and their counterparts of other races (Ferguson, 2007; Haycock, 2001). However, the indirect effect of minority status on perceived academic competence was negative and statistically significant, while the direct effect was positive and statistically significant. These findings suggest that differences in other factors, such as relationships with parents and peers, may contribute to the differences in academic outcomes based on race or ethnicity.

While these student characteristics were included in the analysis model and findings are reported, the purpose of their inclusion is to refine the estimates presented here of the direct and indirect effects of perceived relatedness to parents and perceived relatedness to peers on perceived academic competence. Future research should further explore the complexities underlying differences in academic outcomes based on these

characteristics. Examples of further research include exploration of the mediators that play key roles in the influence that socioeconomic status has on academic outcomes and ethnographic studies that explore how students of different racial and ethnic backgrounds differ in their relationships with family and friends.

The total effects of both perceived relatedness to parents and perceived relatedness to peers on perceived academic competence are positive. However, the magnitude of the parent variable effect is much greater than the magnitude of the peer variable effect. This suggests that the adolescent's sense of relatedness to parents is more influential on academic outcomes than the sense of relatedness to peers and echoes the importance of social capital in preparing the child for academic success. This finding is corroborated by other evidence showing that the social capital provided at home is more influential than the social capital provided at school in affecting outcomes such as academic achievement and behavioral issues (Coleman, 1988; Dufur et al., 2013).

Social capital within the family consists of the value extracted from the norms, social networks, and relationships between the parent and child; it is critical for the child's success in school and adulthood (Coleman, 1987). Coleman's theory is supported by research that focuses more narrowly on the influence healthy parent-child relationships have on academic competence and success (e.g., Baumrind, 1991b; Deci et al., 1991; Epstein et al., 1997) as well as evidence that the potentially negative influence that peers have on academic success may be offset by effective parenting practices (Simons-Morton & Chen, 2009). Findings from this study provide further evidence that children extract value from the relationships that they have with parents that has a

profound influence on academic competence directly and indirectly through relationships they build with peers. In addition, the relationships that children have with their peers have a direct influence on academic competence.

These results illustrate the overlapping influence that different individuals have on an adolescent's academic competence by demonstrating the significant direct effects of perceived relatedness to parents and perceived relatedness to peers on perceived academic competence, as well as the significant indirect effect of perceived relatedness to parents on perceived academic competence via perceived relatedness to peers. As conceptualized by Epstein, et al. (1997), the relationships that children have within the family, the school, and the community constitute the spheres of influence that profoundly shape their learning and growth. The influence of these spheres is overlapping. Thus, studies focusing on the effects of relationships and relatedness must take overlapping influences into account and consider different sources of relationships and relatedness jointly to get a comprehensive understanding of how academic outcomes are affected.

Implications

The purpose of this study was to assess the dependability with which we can measure variables gauging adolescent students' perceived relatedness to parents, adolescent students' perceived relatedness to peers, and adolescent students' perceived academic competence. Interrelationships among these variables were estimated by statistical analyses. Findings on validity and reliability can inform methodological decisions in similar research on testing dimensions of validity and reliability of variables gauging relatedness and relationships as well as assessing the effects these variables have

on perceptions of academic competence, achievement, and success in general. The ability to rigorously measure these constructs and to assess their effects is critical in studying the effectiveness of policies and practices that aim to foster relationships.

Results on the structural validity and reliability of the scales—perceived relatedness to parents, perceived relatedness to peers, and perceived academic competence—have implications for the construction of similar scales using survey items. The limited substantive coverage and low reliability estimates for the perceived relatedness to peers and perceived academic competence scales both suggest that these scales would be improved by the addition of survey items. The perceived relatedness to peers and perceived academic competence scales are comprised of five and three items, respectively. If a researcher intends to capture these constructs, or constructs that are substantively similar, using survey items, it is suggested that items that offer more comprehensive coverage of the scale be added. While the optimal number of items will vary, the perceived relatedness to parents scale, comprised of nine items, offers adequate substantive coverage, has a fairly even distribution of measurement contribution across items, and has acceptable reliability.

A broader implication of this research is the way in which mediating variables that may be latent in nature, such as relatedness to parents and peers, can be included in evaluations of program effectiveness. Programs such as Smaller Learning Communities, school-within-school initiatives, and Success for All (see Bomotti & Dugan, 2005; Dynarski et al., 1998; Slavin et al., 2005) have components that target the sociological structure of the schools and aim to facilitate positive relationships. These components are

founded on the theory that relationships and social structures in the schools play an integral part in the success of the students (e.g., Epstein et al., 1997; Epstein & Karweit, 1983; Lerner et al., 2009). Findings from this study corroborate the theory behind these programs by providing evidence that adolescents' positive perceptions of relatedness to their parents and peers are associated with higher perceptions of their own academic competence.

In addition to corroborating the effects of relatedness constructs, results from this study on the psychometric properties of the perceived relatedness to parents and perceived relatedness to peers variables have implications for the way in which researchers study programs like Success for All. If the effectiveness of such programs are to be meaningfully evaluated then researchers must be confident that variables measuring relationships and relatedness can be accurately observed. If these constructs can be measured, they can be included in analyses that test the effectiveness of these programs to provide more informative results than are currently available of program impacts.

Limitations and Further Research

While findings related to the structural validity and reliability of the scales inform the degree to which perceived relatedness to parents, perceived relatedness to peers, and perceived academic competence can be effectively measured from the HBSC survey data, being unable to refine these items and administer the survey to students again is a limitation. Building effective scales often takes multiple administrations of a survey.

These iterations allow the researcher building the scale to add new items, remove items that are not functioning as desired, and refine existing items.

The perceived relatedness to peers scale would benefit from additional items asking about the nature of relationships that the student has with friends and peers at school. Additional items could be added to the existing scales and administered to students. These additional items could include asking whether students would characterize their friendships as trusting and respectful and whether students felt pressure from friends to do things that they normally would not do (i.e., peer pressure). Also, there are items in other sections of the HBSC survey not identified for this study (e.g. physical activity section) that may have items that are relevant to the perceived relatedness to peers construct. The perceived academic competence scale would benefit from a similar addition of items. These items could gauge how students perceived (a) their ability to handle their workload, comprehend material, perform at the level of teacher expectations in the context of the school, understand different academic subjects, perform with respect to their classmates and (b) their potential for getting good grades.

It can be expected that the addition of new items to the perceived relatedness to peers and perceived academic competence scales would improve reliability estimates. Further research should explore what guidance can be provided on the optimal number of items for scales measuring different constructs. The optimal number of items in a scale will depend on what construct that scale measures and the context of measurement (e.g., Do the students have time to respond to 15 items rather than to three?). Findings

produced by this kind of research could be used to inform the construction of scales for studies where multiple test administrations are not feasible.

This study explored the direct and indirect effects that perceived relatedness to parents and perceived relatedness to peers have on perceived academic competence. Further research should include perceived relatedness to teachers as well. Adolescents' sense of relatedness is constructed primarily from the perceptions of the relationships that they have with parents, peers and teachers (Connell, 1990). It therefore seems reasonable to include the teacher dimension in studies of the influence that sense of relatedness has on academic outcomes. This study has demonstrated the significant direct effects that perceptions of relatedness to parents have on perceived academic competence. In addition, this study has demonstrated, via significant indirect effects, the mediating relationships that perceptions of relatedness to peers have on perceptions of academic competence. This evidence would be improved upon by adding the teacher dimension. Adding the teacher dimension would give a more comprehensive picture of the social structures at home, at school, and in the community that the adolescent experiences on a daily basis. More complex analyses could produce quantitative evidence of the overlapping influences of parent, peer, and teacher relationships and capture their effects on academic outcomes.

Appendix A

IRB Approval



Office of Research Integrity and Assurance

Research Hall, 4400 University Drive, MS 605, Fairfax, Virginia 22030
Phone: 703-993-5445; Fax: 703-993-9590

DATE: August 6, 2015
TO: Anastasia Kitsantas, Ph.D.
FROM: George Mason University IRB
Project Title: [788165-1] The Effect of Adolescent Sense of Relatedness to Parents and Peers on Perceived Academic Competence (Doctoral Dissertation)
SUBMISSION TYPE: New Project
ACTION: DETERMINATION OF NOT HUMAN SUBJECT RESEARCH
DECISION DATE: August 6, 2015

Thank you for your submission of New Project materials for this project. The Office of Research Integrity & Assurance (ORIA) has determined this project does not meet the definition of human subject research under the purview of the IRB according to federal regulations.

Please remember that if you modify this project to include human subjects research activities, you are required to submit revisions to the ORIA prior to initiation.

If you have any questions, please contact Karen Motsinger at 703-993-4208 or kmotsing@gmu.edu. Please include your project title and reference number in all correspondence with this committee.

This letter has been electronically signed in accordance with all applicable regulations, and a copy is retained within George Mason University IRB's records.

Appendix B

HBSC Survey



ICPSR 28241

**Health Behavior in School-Aged
Children (HBSC), 2008-2008**

Ronald J. Iannotti
*United States Department of Health and Human
Services, National Institutes of Health, Eunice
Kennedy Shriver National Institute of Child
Health and Human Development*

Student Questionnaire



**Interagency Consortium for
Physical and Social Research**
P.O. Box 1358
Ann Arbor, Michigan 48106
www.hhs.samhda.edu

Terms of Use

These data are distributed under the following terms of use. By continuing past this page, you signify your agreement to comply with the requirements as stated below:

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Any intentional identification of a research subject (whether an individual or an organization) or intentional disclosure of his or her nonclinical information violates the privacy of confidentiality given in the provision of the information. Disclosure of nonclinical information may also be prohibited under Federal law. Therefore, users of data agree:

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- To maintain use of the identity of any research subject confidential and not to report any such discovery to CDRR and KANMEDA (kanmeda@kanmeda.org)

Citing Data

You agree to reference the recommended NLM graphic citation in any of your publications that use KANMEDA data. Authors of publications that use KANMEDA data are required to send citations of their published works to KDRR for inclusion in a database of related publications. kanmeda@kanmeda.org

Disclaimer

You acknowledge that KANMEDA and KDRR will have no responsibility for your use of the data or for your interpretation or inferences based upon such use.

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- Report of the violation to the Research Integrity Officer, Institutional Review Board, or Human Subjects Review Committee of the host institution. A range of sanctions are available in sanctions including revocation of license and debarment.
- If the confidentiality of human subjects has been violated, then report of the violation may be made to the Federal Office for Human Research Protection. This may result in an investigation of the user's institution, which may result in institution-wide sanctions including the suspension of all research grants.
- Report of the violation of Federal law to the United States Attorney General for possible prosecution.
- Civil monetary payments of damages to any individual(s)/organization(s) injured by the breach of confidential data.

Dissemination

CHSQC

Center for Behavioral Health Statistics and Quality

KPMR

Interagency Committee for Protected and Sensitive Research

Provision of Confidentiality

A provider is a respondent or research participant that the information the respondent provides will not be disseminated in identifiable form without the permission of the respondent, that the host for the respondent participated in the study will not be identified, and that disseminated information will include no linkage to the identity of the respondent. Such a provider understands treatment of data with confidentiality and anonymity. In most cases, release here precludes the confidentiality of the respondent. Release is achieved in the Provision of Confidentiality. Under this condition, names and other identifying information regarding respondents would be confidential.

Research subject

A person or organization that participates in a research study. A research subject may also be called a respondent. A respondent is generally a survey respondent or interview, experimental or observational subject, focus group participant, or any other person providing information to a study.

SAHHSQA

Behavior Abuse and Mental Health Data Archive

SAHHSQA

Behavior Abuse and Mental Health Services Administration

Information about Copyrighted Content

Some instruments administered as part of this study may contain in whole or substantially in part contents from copyrighted materials. Reproductions of the instruments are provided as documentation for the analysis of the data associated with the collection. Therefore, no "fair use" exists in all copyrighted content. More information about the reproduction of copyrighted works by education and finance is available from the United States Copyright Office.

NOTICE

WARNING CONCERNING COPYRIGHT RESTRICTIONS

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Summary

Since 1982, the World Health Organization (WHO) Regional Office for Europe has sponsored a cross-sectional, school-based study of health-related attitudes and behaviors of young people. These studies, generally known as health indicators for school-aged children (HISAC), are based on longitudinal national surveys of school-aged children in as many as 30 participating countries. The HISAC studies were conducted every four years from the 1987-1988 school year. The data available here are those for the results of the United States survey conducted during the 2004-2005 school year. The study results can be used to monitor trends, or to compare with the other countries included in the International HISAC. This HISAC study has two main objectives. The first objective is to monitor health-risk behaviors and attitudes in youth over time to provide background data and to identify targets for health promotion initiatives. The second objective is to provide researchers with relevant information in order to understand and explain the development of health attitudes and behaviors through early adolescence. The study contains questions dealing with many types of health risks: tobacco, alcohol, marijuana, and other substances. Other topics include questions about family composition, the student's physical health, and other health behaviors and attitudes. Some of these topics include eating habits, drinking, physical activity, body image, health problems, and bullying. A school administrator also completed a survey concerning the school's programs and policies that affect students' health and the content of various health lessons.

Universes

The universe consisted of public, Catholic, and other private school students in grades 6, 7, 8, 9, and 10 or their equivalent in the 50 states and the District of Columbia.

Data Type

Survey data

Data Source

On-site questionnaires

Additional Information for Study 28241

<https://nces.ed.gov/ipeds/data/ipedsdatacenter/data/28241.htm>

Study Citation

We appreciate the [generosity](#) of the study documentation obtained from [EDS40000](#). The study description for this study includes a [complete table of contents](#) for the data.

Case No.	Case Name	Case ID	Case Type	Case Status	Case Description
1	Case 1	1001	Case 1	Case 1	Case 1 Description
2	Case 2	1002	Case 2	Case 2	Case 2 Description
3	Case 3	1003	Case 3	Case 3	Case 3 Description
4	Case 4	1004	Case 4	Case 4	Case 4 Description
5	Case 5	1005	Case 5	Case 5	Case 5 Description
6	Case 6	1006	Case 6	Case 6	Case 6 Description
7	Case 7	1007	Case 7	Case 7	Case 7 Description
8	Case 8	1008	Case 8	Case 8	Case 8 Description
9	Case 9	1009	Case 9	Case 9	Case 9 Description
10	Case 10	1010	Case 10	Case 10	Case 10 Description
11	Case 11	1011	Case 11	Case 11	Case 11 Description
12	Case 12	1012	Case 12	Case 12	Case 12 Description
13	Case 13	1013	Case 13	Case 13	Case 13 Description
14	Case 14	1014	Case 14	Case 14	Case 14 Description
15	Case 15	1015	Case 15	Case 15	Case 15 Description
16	Case 16	1016	Case 16	Case 16	Case 16 Description
17	Case 17	1017	Case 17	Case 17	Case 17 Description
18	Case 18	1018	Case 18	Case 18	Case 18 Description
19	Case 19	1019	Case 19	Case 19	Case 19 Description
20	Case 20	1020	Case 20	Case 20	Case 20 Description
21	Case 21	1021	Case 21	Case 21	Case 21 Description
22	Case 22	1022	Case 22	Case 22	Case 22 Description
23	Case 23	1023	Case 23	Case 23	Case 23 Description
24	Case 24	1024	Case 24	Case 24	Case 24 Description
25	Case 25	1025	Case 25	Case 25	Case 25 Description
26	Case 26	1026	Case 26	Case 26	Case 26 Description
27	Case 27	1027	Case 27	Case 27	Case 27 Description
28	Case 28	1028	Case 28	Case 28	Case 28 Description
29	Case 29	1029	Case 29	Case 29	Case 29 Description
30	Case 30	1030	Case 30	Case 30	Case 30 Description
31	Case 31	1031	Case 31	Case 31	Case 31 Description
32	Case 32	1032	Case 32	Case 32	Case 32 Description
33	Case 33	1033	Case 33	Case 33	Case 33 Description
34	Case 34	1034	Case 34	Case 34	Case 34 Description
35	Case 35	1035	Case 35	Case 35	Case 35 Description
36	Case 36	1036	Case 36	Case 36	Case 36 Description
37	Case 37	1037	Case 37	Case 37	Case 37 Description
38	Case 38	1038	Case 38	Case 38	Case 38 Description
39	Case 39	1039	Case 39	Case 39	Case 39 Description
40	Case 40	1040	Case 40	Case 40	Case 40 Description
41	Case 41	1041	Case 41	Case 41	Case 41 Description
42	Case 42	1042	Case 42	Case 42	Case 42 Description
43	Case 43	1043	Case 43	Case 43	Case 43 Description
44	Case 44	1044	Case 44	Case 44	Case 44 Description
45	Case 45	1045	Case 45	Case 45	Case 45 Description
46	Case 46	1046	Case 46	Case 46	Case 46 Description
47	Case 47	1047	Case 47	Case 47	Case 47 Description
48	Case 48	1048	Case 48	Case 48	Case 48 Description
49	Case 49	1049	Case 49	Case 49	Case 49 Description
50	Case 50	1050	Case 50	Case 50	Case 50 Description

2005-06 Health Behaviors in School Age Children Survey

This survey asks about your health. It is being given to thousands of young people throughout the U.S. and in many other countries. The information you give will be used to develop better programs for young people like yourself.

This survey is anonymous. **DO NOT** write your name anywhere on this survey booklet. No one will know what you write. A computer will record the answers. Answer the questions based on what you really do, think, and feel. There are some questions that describe how types of students answering this survey. We do not want anyone's name. Completing the survey is voluntary. Whether or not you answer the question will not affect your grade in any class.

Make sure you read every question. You do not have to answer any question that makes you feel uncomfortable. When you are finished, follow the instructions of the person giving you the survey.

INSTRUCTIONS FOR COMPLETING THE SURVEY

- Read all the printed answers before marking your choice.
- Mark the circle for the best answer that best fits your situation.
- Use a No. 2 pencil.
- Make heavy marks that fill the circle for your answer.
- Erase clearly any answer you wish to change.
- Please do not make stray marks of any kind.
- For all the questions, except questions A, B, and T, you should mark only ONE circle for your answer in the column below the question, as shown here:

EXAMPLE: Are you a boy or a girl?
☐ Boy
☒ Girl

- Sometimes you will be asked to select one choice for each statement. For these questions, make sure to "check" one circle on each line as shown here:

EXAMPLE: How often do you do each of the following? (Check one circle on each line)

	Often	Sometimes	Never
A. Swim	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
B. Read	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
C. Play Tennis	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>

Public reporting burden for this collection of information is estimated to average 40 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, for completing and reviewing the collection of information, for agency use, reviewing instructions, and sending the data to the agency. Send comments regarding this burden estimate or any aspect of this collection of information, including suggestions for reducing the burden, to Washington Headquarters Service, Paperwork Project (0925-0057), Washington, DC 20503-2018. Do not return this collection of information without this notice.

TODAY'S DATE

Month	Day
<input type="radio"/> October	<input type="radio"/> 9 <input type="radio"/> 10
<input type="radio"/> November	<input type="radio"/> 1 <input type="radio"/> 11
<input type="radio"/> December	<input type="radio"/> 2 <input type="radio"/> 12
<input type="radio"/> January	<input type="radio"/> 3 <input type="radio"/> 13
<input type="radio"/> February	<input type="radio"/> 4 <input type="radio"/> 14
<input type="radio"/> March	<input type="radio"/> 5 <input type="radio"/> 15
<input type="radio"/> April	<input type="radio"/> 6 <input type="radio"/> 16
<input type="radio"/> May	<input type="radio"/> 7 <input type="radio"/> 17
	<input type="radio"/> 8 <input type="radio"/> 18
	<input type="radio"/> 9 <input type="radio"/> 19

7. Here is a picture of a ladder. The top of the ladder is 10 feet high. How far is the bottom of the ladder from the top of the ladder? (If you know the answer, write it in the space below.)

10 feet possible life

9

8

7

6

5

4

3

2

1

0 feet possible life

1. Are you a boy or a girl?

☐ Boy ☐ Girl

2. What month were you born?

☐ Jan ☐ May ☐ Sept

☐ Feb ☐ June ☐ Oct

☐ Mar ☐ July ☐ Nov

☐ Apr ☐ Aug ☐ Dec

3. What year were you born?

☐ 1988 ☐ 1992 ☐ 1996

☐ 1990 ☐ 1994 ☐ 1998

☐ 1991 ☐ 1995 ☐ 1999

4. What grade are you in?

☐ Grade 5 ☐ Grade 6 ☐ Grade 10

☐ Grade 7 ☐ Grade 8 ☐ Grade 9

5. What do you consider your ethnicity to be?

☐ Hispanic or Latino ☐ Native Hawaiian or Other Pacific Islander

☐ Asian or Asian American ☐ Black or African American

☐ White ☐ American Indian or Alaska Native

☐ Native Hawaiian or Other Pacific Islander ☐ Other

6. How often do you play sports?

☐ About 1 hour a day ☐ About 2 hours a day

☐ About 3 hours a day ☐ About 4 hours a day

☐ About 5 hours a day ☐ About 6 hours a day

☐ About 7 or more hours a day

8. Do you think your body is...?

☐ Much too thin ☐ About the right size

☐ A bit too thin ☐ A bit too fat

☐ Much too thin ☐ Much too fat

9. About how many hours a day do you usually play sports or exercise?

(Basketball, Soccer, Tennis, etc.)

☐ About 1 hour a day ☐ About 2 hours a day

☐ About 3 hours a day ☐ About 4 hours a day

☐ About 5 hours a day ☐ About 6 hours a day

☐ About 7 or more hours a day

10. About how many hours a day do you usually use a computer for chatting on-line, internet, emailing, homework etc. in your free time?
(Please mark one circle for *weekday* and one circle for *weekend*.)

Weekdays

- ☐ None at all
☐ About half an hour a day
☐ About 1 hour a day
☐ About 2 hours a day
☐ About 3 hours a day
☐ About 4 hours a day
☐ About 5 hours a day
☐ About 6 hours a day
☐ About 7 or more hours a day

Weekend

- ☐ None at all
☐ About half an hour a day
☐ About 1 hour a day
☐ About 2 hours a day
☐ About 3 hours a day
☐ About 4 hours a day
☐ About 5 hours a day
☐ About 6 hours a day
☐ About 7 or more hours a day

11. How well off do you think your family is?

- ☐ Very well off
☐ Quite well off
☐ Average
☐ Not very well off
☐ Not at all well off

12. How many computers does your family own?

- ☐ None
☐ One
☐ Two
☐ More than two

13. Do you have your own bedroom for yourself?

- ☐ No
☐ Yes

14. Does your family own a car, van or truck?

- ☐ No
☐ Yes, one
☐ Yes, two or more

15. During the past 12 months, how many times did you travel away on vacation with your family?

- ☐ Not at all
☐ Once
☐ Twice
☐ More than twice

All families are different! (For example, not everyone lives with both their parents. Sometimes people live with just one parent, or they have two homes or live with two families) and we would like to know about yours.

16. Please answer this question for the home where you live all or most of the time, and think **all** the people who live there.

Adults

- ☐ Mother
☐ Father
☐ Grandfather (or father's girlfriend)
☐ Grandmother (or mother's boyfriend)
☐ Grandfather
☐ Grandmother
☐ Live in a foster home or children's home
☐ Someone or somewhere else please write down their relationship to you



Children

Please say how many brothers and sisters live here (including half, step or foster brothers and sisters).

Please write in the number or write 0 (zero) if there are none.

How many brothers? _____ How many sisters? _____

16a. Did you move to the home you are living in now because of a hurricane in the last year (for example, Hurricane Katrina)?

- ☐ No
☐ Yes

16b. Did you change to the school you are attending now because of a hurricane in the last year (for example, Hurricane Katrina)?

- ☐ No
☐ Yes

17. Do you have another home or another family, such as the ones where your parents are separated or divorced?

☐ No. GO TO QUESTION 18.

☐ Yes.

How often do you stay there?

☐ All the time

☐ Regularly but less than half the time

☐ At weekends

☐ Sometimes

☐ Nearly never

Please mark all the people who live there:

Adults

☐ Mother

☐ Father

☐ Stepfather (or father's girlfriend)

☐ Stepfather (or mother's boyfriend)

☐ Grandmother

☐ Grandfather

☐ Live in a foster home or children's home

☐ Someone or somewhere else: please write down their relationship to you: _____

Children

Please say how many brothers and sisters live here (including half, step or foster brothers and sisters). Please write in the number or write 0 (zero) if there are none.

How many _____ How many _____
brothers? _____ sisters? _____

18. About how many hours a day do you usually watch television (including videos and DVDs) in your free time? (Please mark one circle for weekdays and one circle for weekend.)

Weekdays	Weekend
<input type="radio"/> None at all	<input type="radio"/> None at all
<input type="radio"/> About half an hour a day	<input type="radio"/> About half an hour a day
<input type="radio"/> About 1 hour a day	<input type="radio"/> About 1 hour a day
<input type="radio"/> About 2 hours a day	<input type="radio"/> About 2 hours a day
<input type="radio"/> About 3 hours a day	<input type="radio"/> About 3 hours a day
<input type="radio"/> About 4 hours a day	<input type="radio"/> About 4 hours a day
<input type="radio"/> About 5 hours a day	<input type="radio"/> About 5 hours a day
<input type="radio"/> About 6 hours a day	<input type="radio"/> About 6 hours a day
<input type="radio"/> About 7 or more hours a day	<input type="radio"/> About 7 or more hours a day

Physical activity is any activity that increases your heart rate and makes you get out of breath some of the time. Physical activity can be done in sports, school activities, playing with friends, or walking to school.

Some examples of physical activity are running, bike riding, swimming, hiking, dancing, skateboarding, swimming, soccer, basketball, football, & surfing.

For this next question, add up all the time you spent in physical activity each day.

19. Over the past 2 days, on how many days were you physically active for a total of at least 30 minutes per day?

<input type="radio"/> 0 days	<input type="radio"/> 4 days
<input type="radio"/> 1 day	<input type="radio"/> 5 days
<input type="radio"/> 2 days	<input type="radio"/> 6 days
<input type="radio"/> 3 days	<input type="radio"/> 7 days

20. OUTSIDE SCHOOL HOURS: How OFTEN do you usually exercise in your free time so much that you get out of breath or sweat?

☐ Every day

☐ 4 to 6 times a week

☐ 2 to 3 times a week

☐ Once a week

☐ Once a month

☐ Less than once a month

☐ Never

21. OUTSIDE SCHOOL HOURS: How many HOURS a week do you usually exercise in your free time so much that you get out of breath or sweat?

☐ None

☐ About half an hour

☐ About 1 hour

☐ About 2 to 3 hours

☐ About 4 to 6 hours

☐ 7 hours or more

22. During an average physical education (PE) class, how many minutes do you spend actually exercising or playing sports?

☐ Do not know PE

☐ Less than 10 minutes

☐ 10 to 20 minutes

☐ 20 to 30 minutes

☐ More than 30 minutes

23. Here is a list of reasons that some young people give for taking part in physical activity in their free time. For each reason please check how important it is for you.
(Please mark one circle for each line)

	Very important	Quite important	Not important
a. To have fun	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. To be good at sport	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. To win	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d. To make new friends	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e. To improve my health	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
f. To use my friends	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
g. To get in good shape	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
h. To look good	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
i. I enjoy the feeling of using my body	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
j. To please my parents	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
k. To be cool	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
l. To control my weight	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
m. It is exciting	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

24. How often do you usually have breakfast (mean: have a glass of milk or fruit juice)?
(Please mark one circle for weekdays and one circle for weekend)

Weekdays	Weekend
<input type="radio"/> never have breakfast during weekdays	<input type="radio"/> I never have breakfast during the weekend
<input type="radio"/> One day	<input type="radio"/> I usually have breakfast on only one day of the weekend (Saturday OR Sunday)
<input type="radio"/> Two days	<input type="radio"/> I usually have breakfast on both weekend days (Saturday AND Sunday)
<input type="radio"/> Four days	

25. How many times a week do you usually eat or drink...? (Please mark one circle for each line)

	Never	Once a week	2-3 times a week	4-5 times a week	6-7 times a week	8-9 times a week	10 or more times a week
a. Fruits	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. Vegetables	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. Ice-cream (vanilla or chocolate)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d. Cake or other soft drinks that contain sugar	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e. Diet coke or diet soft drinks	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
f. Low fat/semi-skimmed milk	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
g. Whole fat milk	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
h. Cheese	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
i. Other milk products (like yogurt, chocolate with pudding)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
j. Cereals (like Cornflakes, Rice Crispies, Cocoa Crispies)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
k. White bread	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
l. Some bread (whole-grain-bread)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
m. Chips (like potato chips or sticks, fries, Onions)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
n. French fries	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

26. How often do you eat in a fast food restaurant (for example, McDonald's, KFC, Pizza Hut, Taco Bell)?

☐ Never
☐ Hardly (less than once a month)
☐ Once a month
☐ 2-3 times a month
☐ Once a week
☐ 2-3 times a week
☐ 4 or more times a week

27. Some young people go to school or to bed hungry because there is not enough food at home. How often does this happen to you?

☐ Always
☐ Often
☐ Sometimes
☐ Never

28. How much do you weigh without clothes? (in pounds)

Weighted		
1	2	3
0	0	0
1	1	1
2	2	2
3	3	3
4	4	4
5	5	5
6	6	6
7	7	7
8	8	8
9	9	9

Voted		
0	0	0
1	1	1
2	2	2
3	3	3
4	4	4
5	5	5
6	6	6
7	7	7
8	8	8
9	9	9

20. How tall are you without shoes?

Feet	Inches
5	2
0	0
1	1
2	2
3	3
4	4
5	5
6	6
7	7
	8
	9
	10
	11

Feet	Inches
0	0
1	1
2	2
3	3
4	4
5	5
6	6
7	7
	8
	9
	10
	11

30. At present are you on a diet or doing something else to lose weight?

☐ No, my weight is fine

☐ No, but I should lose some weight

☐ No, because I need to put on weight

☐ Yes

31. Which of the following things did you do to control your weight during the last 12 months?

- | | No | Yes |
|---|--------------------------|--------------------------|
| a. Exercise | <input type="checkbox"/> | <input type="checkbox"/> |
| b. Eat less sweets | <input type="checkbox"/> | <input type="checkbox"/> |
| c. Eat less fat | <input type="checkbox"/> | <input type="checkbox"/> |
| d. Drink less soft drinks | <input type="checkbox"/> | <input type="checkbox"/> |
| e. Eat less (smaller amounts) | <input type="checkbox"/> | <input type="checkbox"/> |
| f. Eat more fruit and/or vegetables | <input type="checkbox"/> | <input type="checkbox"/> |
| g. Vomiting | <input type="checkbox"/> | <input type="checkbox"/> |
| h. Use diet pills or laxatives | <input type="checkbox"/> | <input type="checkbox"/> |
| i. Smoke more | <input type="checkbox"/> | <input type="checkbox"/> |
| j. Diet under supervision of a professional | <input type="checkbox"/> | <input type="checkbox"/> |
| k. Other, namely _____ | <input type="checkbox"/> | <input type="checkbox"/> |

[illegible]

32. The following is a list of statements about one's experience, feelings, and attitudes of his/her body. There are no right or wrong answers. We would like to know what your experience, feelings and attitudes of your body are. Please read each statement carefully and evaluate how it relates to you by checking the degree to which you agree or disagree with it. Try to be as honest as you can. Thank you for your time and cooperation.

I do not agree at all
I do not agree
I agree
I strongly agree

a. I am frustrated with my physical appearance
b. I am satisfied with my appearance
c. I hate my body
d. I feel comfortable with my body
e. I feel anger toward my body

33. Have you begun to menstruate (have periods)?
☐ No, I have not yet begun to menstruate
☐ Yes, I began at the age of _____ years and _____ months.

33. Have you begun to menstruate (have periods)?
☐ No, I have not yet begun to menstruate
☐ Yes, I began at the age of _____ years and _____ months.

NOTE: Circle

34. Where do you have white hair (corners) on your face? (Choose One)

☐ I have no hair on my face.

☐ I only have hair on the corners of my upper lip.

☐ I have hair all over my upper lip & mustache.

☐ I have a mustache and hair on the upper part of my chin, and in the middle under my lower lip.

☐ I have a full adult mustache and beard.

NOTE: Circle

35. Have you noticed a deepening of your voice? (Choose one)

☐ Not yet started changing

☐ Not nearly started changing

☐ Voice change is definitely underway

☐ Voice change seems complete

NOTE: Circle

36. How often do you brush your teeth?

☐ More than once a day

☐ Once a day

☐ At least once a week but not daily

☐ Less than once a week

☐ Never

37. Have you ever had or been diagnosed with acne (pimples, etc., nodules)?

☐ No

☐ Yes, at what age did you begin having acne? _____ years

38. Do you currently have acne? (pimples, etc., nodules)

☐ No - no pimples, etc., or nodules in the last 3 months

☐ Yes - 1 to 4 pimples, etc., or nodules on the face (except nose) during the last 3 months

☐ Yes - 5 or more pimples, etc., or nodules on the face (except nose) during the last 3 months

39. In the last 6 months how often have you had the following...? (Please mark one circle for each item)

	Almost every day	Almost every week	About once every 2 weeks	About every 4 weeks	Never or rarely
a. Headache	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. Stomach-ache	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. Back ache	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d. Feeling low	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e. Irritability or bad temper	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
f. Feeling nervous	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
g. Difficulties in getting to sleep	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
h. Feeling dizzy	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

40. During the last month have you taken any medicine or taken for the following?

	Yes	No	Yes, more than once
a. Headache	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. Stomach-ache	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. Difficulties in getting to sleep	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d. Nervousness	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

41. Has the doctor ever told you that you have asthma?

	Yes	No	Do Not Answer
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

42. Have you had wheezing or shortness of breath in the chest in the last 12 months?

	Yes	No	Do Not Answer
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

43. In the last 12 months, have you been to a doctor, an emergency room, or a hospital for wheezing?

	Yes	No	Do Not Answer
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

44. Would you say your health is.....? (Please mark one circle)

<input type="radio"/> Excellent	<input type="radio"/> Fair
<input type="radio"/> Good	<input type="radio"/> Poor

45. Think about how you have been feeling over the last 30 days. Mark the number that goes with how often you have felt or done each of these. (Please mark one circle for each line)

	Always	
	Often	
	Sometimes	
	Seldom	
	Never	

a. Were you very sad? ☐ ☐ ☐ ☐ ☐

b. Were you grouchy or irritable, or in a bad mood? ☐ ☐ ☐ ☐ ☐

c. Did you feel hopeless about the future? ☐ ☐ ☐ ☐ ☐

d. Did you feel like not eating or eating more than usual? ☐ ☐ ☐ ☐ ☐

e. Did you sleep a lot more or a lot less than usual? ☐ ☐ ☐ ☐ ☐

f. Did you have difficulty concentrating on your school work? ☐ ☐ ☐ ☐ ☐

Many young people get hurt or injured from activities such as playing sports or fighting with others at different places such as the street or home. Injuries can include being poisoned or burned. Injuries do not include illnesses such as measles or the flu. The following questions are about injuries you may have had during the past 12 months.

46. During the past 12 months, how many times were you injured and had to be treated by a doctor or nurse?

<input type="radio"/> Not injured in the past 12 months
<input type="radio"/> 1 time
<input type="radio"/> 2 times
<input type="radio"/> 3 times
<input type="radio"/> 4 times or more

47. How easy is it for you to talk to the following persons about things that really bother you? (Please mark one circle for each line)

	Very easy	
	Easy	
	Not easy	
	Very difficult	
	Don't know or am not sure	

a. Father ☐ ☐ ☐ ☐ ☐

b. Stepfather (or mother's boyfriend) ☐ ☐ ☐ ☐ ☐

c. Mother ☐ ☐ ☐ ☐ ☐

d. Stepmother (or father's girlfriend) ☐ ☐ ☐ ☐ ☐

e. Elder brother or sister ☐ ☐ ☐ ☐ ☐

f. Elder sister or brother ☐ ☐ ☐ ☐ ☐

g. Best friend ☐ ☐ ☐ ☐ ☐

h. Friends of the same sex ☐ ☐ ☐ ☐ ☐

i. Friends of the opposite sex ☐ ☐ ☐ ☐ ☐

48. How much does your mother (or female guardian) really know about...?

	She knows a lot	
	She knows a little	
	She doesn't know anything	
	Don't know, we neither guardian	

a. Who your friends are ☐ ☐ ☐ ☐ ☐

b. How you spend your money ☐ ☐ ☐ ☐ ☐

c. Where you are after school ☐ ☐ ☐ ☐ ☐

d. Where you go at night ☐ ☐ ☐ ☐ ☐

e. What you do with your free time ☐ ☐ ☐ ☐ ☐

49. How much does your father (or male guardian) really know about...?

	He knows a lot	
	He knows a little	
	He doesn't know anything	
	Don't know, we neither guardian	

a. Who your friends are ☐ ☐ ☐ ☐ ☐

b. How you spend your money ☐ ☐ ☐ ☐ ☐

c. Where you are after school ☐ ☐ ☐ ☐ ☐

d. Where you go at night ☐ ☐ ☐ ☐ ☐

e. What you do with your free time ☐ ☐ ☐ ☐ ☐

50. My parents/guardians... (Please mark one circle for each item)

	Almost always	Mostly	Some	Not at all
a. Help me as much as I need	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. Let me do the things I like doing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. Is loving	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d. Understands my problems and worries	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e. Lets me to make my own decisions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
f. Treats me like a baby	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
g. Makes me feel better when I am upset	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

51. In general, how satisfied are you with the relationships in your family? (Mark one circle next to the number that best describes your feelings.)

☐ 1 We have good relationships in our family.

☐ 2

☐ 3

☐ 4

☐ 5

☐ 6

☐ 7 We have poor relationships in our family.

52. At present, how many close male and female friends do you have? (Please mark one circle each column)

Male	Female
<input type="radio"/> None	<input type="radio"/> None
<input type="radio"/> One	<input type="radio"/> One
<input type="radio"/> Two	<input type="radio"/> Two
<input type="radio"/> Three or more	<input type="radio"/> Three or more

53. How many days a week do you usually spend time with friends right after school?

☐ 0 days

☐ 1 day

☐ 2 days

☐ 3 days

☐ 4 days

54. How many evenings per week do you usually spend out with your friends?

☐ 0 evenings

☐ 1 evening

☐ 2 evenings

☐ 3 evenings

☐ 4 evenings

☐ 5 evenings

55. How often do you talk to your friend(s) on the phone or send them text messages or have contact through the internet?

☐ Daily or more

☐ 1 or 2 days a week

☐ 3 or 4 days a week

☐ 5 or 6 days a week

☐ Every day

56. In your opinion, what does your class teacher(s) think about your school performance compared to your classmates?

☐ Very good

☐ Good

☐ Average

☐ Below average

57. How do you feel about school at present?

☐ Like it a lot

☐ Like it a bit

☐ Don't like it very much

☐ Don't like it at all

58. Here are some statements about the students in your class(es). Please show how much you agree or disagree with each one. (Please mark one circle for each line)

	Strongly agree	Agree	Disagree	Strongly disagree
a. The students in my class(es) enjoy being together	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. Most of the students in my class(es) are kind and helpful	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. Other students accept me as I am	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

59. How pressured do you feel by the schoolwork you have to do?

☐ Not at all
☐ A little
☐ Some
☐ A lot

Here are some questions about bullying. We say a student is **BULLIED** when another student, or a group of students, say or do mean and unpleasant things to him or her. It is also bullying when a student is teased repeatedly in a way he or she does not like or when he or she is deliberately left out of things. But it is **NOT BULLYING** when two students of about the same strength or power argue or fight. It is also **NOT** bullying when a student is teased in a friendly and playful way.

60. How often have you been bullied at school in the past couple of months?

☐ I haven't been bullied at school the past couple of months
☐ I has only happened once or twice
☐ 2 or 3 times a month
☐ About once a week
☐ Several times a week

61. How often have you taken part in bullying another student(s) at school in the past couple of months?

☐ I haven't bullied another student(s) at school in the past couple of months
☐ It has only happened once or twice
☐ 2 or 3 times a month
☐ About once a week
☐ Several times a week

62. During the past 12 months, how many times were you in a physical fight?

☐ I have not been in a physical fight
☐ 1 time
☐ 2 times
☐ 3 times
☐ 4 times or more

63. Have you ever smoked tobacco? (At least one cigarette, cigar or pipe)

☐ Yes
☐ No

64. How often do you smoke tobacco at present?

☐ Every day
☐ At least once a week, but not every day
☐ Less than once a week
☐ Do not smoke

65. At present, how often do you drink anything alcoholic, such as beer, wine or hard liquor like, vodka or rum? Try to include even those times when you only drink a small amount (e.g., one or two sips). (Please mark one circle for each line)

	Every day	Every week	Every couple of months	Never
a. Beer	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. Wine	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. Liquor/ Spirits	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d. Pre-mixed drinks (for example, Longfizz like Natural Energy, Miller's Hard Lemonade)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e. Any other drink that contains alcohol	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

66. On how many occasions (if any) have you done the following things in the last 30 days? (Please mark one circle for each line.)

	Never	Once or twice	3-5 times	6-9 times	10-19 times	20-29 times	30 or more
a. Smoked cigarettes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. Drank alcohol	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. Been drunk	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

67. How frequently have you smoked cigarettes during the LAST 30 DAYS?

☐ Not at all

☐ Less than 1 cigarette per week

☐ 1-5 cigarettes per day

☐ 6-10 cigarettes per day

☐ 11-20 cigarettes per day

☐ More than 20 cigarettes per day

68. How many of your friends would you estimate...

	None	A few	Many	Most	All
a. Smoke cigarettes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. Drink alcohol	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. Get drunk at least once a week	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d. Smoke/use marijuana, (pot, weed, hash, joint)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e. Carry a weapon, such as gun, knife, or club	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

69. Have you ever had so much alcohol that you were really drunk?

☐ No, never

☐ No, once

☐ Yes, 2-3 times

☐ Yes, 4-10 times

☐ Yes, more than 10 times

70. Have you ever taken marijuana (pot, weed, hashish, joint)? (Please mark one circle for each line.)

	Never	Once or twice	3-5 times	6-9 times	10-19 times	20-29 times	30 or more
a. in your life	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. in the last 12 months	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. in the last 30 days	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

71. FATHER—Does your father have a job?

☐ Yes ☐ Don't know

☐ No ☐ Don't have or don't see father

IF YES, please say in what place he works (for example hospital, bank, restaurant)

Please write down exactly what job he does there (for example teacher, bus driver)

IF NO, why does your father not have a job? (Please mark the circle that best describes the situation)

☐ He is sick or retired, or a student

☐ He is looking for a job

☐ He takes care of others, or is full-time in the home

☐ don't know

75. **NOTES**—Does your mother have a job?
☐ No ☐ Don't know
☐ Yes ☐ Don't have or don't see mother

If YES, please say in what place she works
 (for example: hospital, bank, restaurant)

Please write down exactly what job she does
 there (for example: teacher, bus driver)

If YES, why does your mother not have a job?
 (Please mark the circle that best describes the situation)
☐ She is sick, or retired, or a student
☐ She is looking for a job
☐ She takes care of others, or is full-time in the home
☐ I don't know

This is the end of the survey.
 If you're done, please go back to the front of the packet to the last page and answer all the questions and follow the directions.
 THANK YOU VERY MUCH FOR YOUR HELP!

Appendix C

Analysis Output

```
Mplus VERSION 7.31
MUTHEN & MUTHEN
06/23/2015 1:54 PM

INPUT INSTRUCTIONS

Title: DISSERTATION CFA JUNE2015 add new number of friends var
DATA: FILE IS "C:\Users\CEHD\Desktop\Analysis\CFA June
2015\MPlus\Data_SEM.dat";

VARIABLE: NAMES ARE Q1 MALE AGE Q4 ETHNIC MINORITY Q11 Q12 Q13 Q14
Q15 Q79_1 Q80_1 Q47A Q47B Q47C Q47D Q48A Q48B Q48C Q48D Q48E Q49A
Q49B Q49C Q49D Q49E Q50A Q50B Q50C Q50D Q50E Q50F Q50G Q50H Q51
Q52_1 Q52_2 Q52_N Q54 Q55 Q56 Q57 Q58 Q59 Q60A Q60B Q60C Q61;

USEVARIABLES = MALE AGE MINORITY Q11 Q12 Q13 Q14 Q15 Q50A Q50B Q50C
Q50D Q50E Q50F
Q50G Q50H Q51 Q52_N Q54 Q58 Q59 Q60A Q60B Q60C Q61;

MISSING ARE ALL (-99);

CATEGORICAL ARE Q13 Q14 Q50A Q50B Q50C Q50D Q50E Q50F
Q50G Q50H;

MODEL: SES BY Q11 Q12 Q13 Q14 Q15;
      RPAR BY Q50A Q50B Q50C Q50D Q50E Q50F Q50G Q50H Q51;
      RPEER BY Q52_N Q54 Q60A Q60B Q60C;
      AC BY Q58 Q59 Q61;
      Q14 WITH Q12;
      Q50E WITH Q50B;
      Q50G WITH Q50F;
      Q60B WITH Q60A;
      Q54 WITH Q52_N;
      Q51 WITH Q11;
      Q50H WITH Q50D;

      RPAR, RPEER, AC ON MALE;
      RPAR, RPEER, AC ON AGE;
      RPAR, RPEER, AC ON MINORITY;
      RPAR, RPEER, AC ON SES;
```

```

RPEER, AC ON RPAR;
AC ON RPEER;

MODEL INDIRECT: AC ind RPAR;
                AC ind SES;
                AC ind MALE;
                AC ind MINORITY;
                AC ind AGE;

OUTPUT: STDYX MODINDICES;

*** WARNING
Data set contains cases with missing on x-variables.
These cases were not included in the analysis.
Number of cases with missing on x-variables: 461
1 WARNING(S) FOUND IN THE INPUT INSTRUCTIONS

DISSERTATION CFA JUNE2015 add new number of friends var

SUMMARY OF ANALYSIS

Number of groups                                1
Number of observations                          8607

Number of dependent variables                   22
Number of independent variables                 3
Number of continuous latent variables           4

Observed dependent variables

Continuous
Q11      Q12      Q15      Q51      Q52_N      Q54
Q58      Q59      Q60A     Q60B     Q60C      Q61

Binary and ordered categorical (ordinal)
Q13      Q14      Q50A     Q50B     Q50C      Q50D
Q50E     Q50F     Q50G     Q50H

Observed independent variables
MALE      AGE      MINORITY

Continuous latent variables
SES      RPAR      RPEER      AC

Estimator                                WLSMV
Maximum number of iterations              1000
Convergence criterion                     0.500D-04
Maximum number of steepest descent iterations 20
Maximum number of iterations for H1        2000
Convergence criterion for H1              0.100D-03
Parameterization                          DELTA

Input data file(s)

```

C:\Users\CEHD\Desktop\Analysis\CFA June 2015\MP1us\Data_SEM.dat

Input data format FREE

SUMMARY OF DATA

Number of missing data patterns 154

COVARIANCE COVERAGE OF DATA

Minimum covariance coverage value 0.100

PROPORTION OF DATA PRESENT

Q15	Covariance Coverage Q11	Covariance Coverage Q12	Q13	Q14
Q11	0.981			
Q12	0.980	0.999		
Q13	0.979	0.997	0.998	
Q14	0.980	0.998	0.997	0.999
Q15	0.978	0.995	0.995	0.996
0.997				
Q50A	0.973	0.991	0.990	0.991
0.989				
Q50B	0.971	0.989	0.988	0.989
0.987				
Q50C	0.970	0.988	0.987	0.988
0.986				
Q50D	0.972	0.990	0.989	0.990
0.987				
Q50E	0.970	0.987	0.986	0.987
0.985				
Q50F	0.971	0.989	0.988	0.988
0.987				
Q50G	0.970	0.988	0.987	0.988
0.986				
Q50H	0.970	0.987	0.986	0.987
0.985				
Q51	0.977	0.994	0.993	0.994
0.992				
Q52_N	0.962	0.980	0.979	0.980
0.978				
Q54	0.975	0.994	0.993	0.993
0.991				
Q58	0.971	0.988	0.988	0.988
0.987				
Q59	0.972	0.990	0.989	0.990
0.988				
Q60A	0.969	0.985	0.984	0.985
0.983				
Q60B	0.968	0.984	0.983	0.984
0.982				
Q60C	0.965	0.982	0.981	0.982
0.980				

Q61 0.979	0.964	0.981	0.980	0.981
	Covariance Q50A	Coverage Q50B	Q50C	Q50D
Q50E				
Q50A	0.992			
Q50B	0.988	0.990		
Q50C	0.988	0.987	0.989	
Q50D	0.989	0.988	0.988	0.991
Q50E	0.987	0.986	0.985	0.987
0.988				
Q50F	0.988	0.987	0.987	0.988
0.986				
Q50G	0.988	0.986	0.986	0.987
0.985				
Q50H	0.987	0.986	0.985	0.987
0.985				
Q51	0.989	0.987	0.986	0.988
0.986				
Q52_N	0.976	0.974	0.973	0.975
0.972				
Q54	0.987	0.985	0.984	0.986
0.983				
Q58	0.982	0.980	0.979	0.981
0.978				
Q59	0.984	0.982	0.981	0.982
0.980				
Q60A	0.980	0.978	0.977	0.979
0.977				
Q60B	0.980	0.978	0.977	0.979
0.976				
Q60C	0.977	0.975	0.974	0.976
0.974				
Q61	0.975	0.974	0.973	0.974
0.972				
	Covariance Q50F	Coverage Q50G	Q50H	Q51
Q52_N				
Q50F	0.990			
Q50G	0.987	0.989		
Q50H	0.986	0.986	0.989	
Q51	0.987	0.986	0.986	0.995
Q52_N	0.973	0.973	0.973	0.979
0.981				
Q54	0.985	0.984	0.984	0.991
0.977				
Q58	0.980	0.979	0.979	0.986
0.972				
Q59	0.981	0.981	0.980	0.987
0.974				
Q60A	0.978	0.977	0.977	0.983
0.969				
Q60B	0.978	0.977	0.977	0.982

0.969				
Q60C	0.975	0.974	0.974	0.979
0.966				
Q61	0.973	0.973	0.972	0.979
0.965				

Q60B	Covariance Q54	Coverage Q58	Q59	Q60A
Q54	0.995			
Q58	0.987	0.990		
Q59	0.988	0.987	0.991	
Q60A	0.984	0.982	0.984	0.986
Q60B	0.983	0.981	0.983	0.984
0.985				
Q60C	0.980	0.979	0.980	0.982
0.982				
Q61	0.980	0.978	0.980	0.977
0.977				

	Covariance Q60C	Coverage Q61
Q60C	0.983	
Q61	0.974	0.983

UNIVARIATE PROPORTIONS AND COUNTS FOR CATEGORICAL VARIABLES

Q13		
Category 1	0.247	2124.000
Category 2	0.753	6464.000
Q14		
Category 1	0.028	243.000
Category 2	0.189	1622.000
Category 3	0.783	6731.000
Q50A		
Category 1	0.052	442.000
Category 2	0.305	2602.000
Category 3	0.644	5497.000
Q50B		
Category 1	0.082	696.000
Category 2	0.484	4126.000
Category 3	0.434	3700.000
Q50C		
Category 1	0.029	251.000
Category 2	0.149	1265.000
Category 3	0.822	6999.000
Q50D		
Category 1	0.137	1168.000
Category 2	0.377	3213.000
Category 3	0.486	4147.000
Q50E		
Category 1	0.139	1181.000
Category 2	0.465	3960.000
Category 3	0.396	3367.000
Q50F		

Category 1	0.200	1704.000
Category 2	0.374	3187.000
Category 3	0.426	3628.000
Q50G		
Category 1	0.119	1016.000
Category 2	0.284	2419.000
Category 3	0.596	5078.000
Q50H		
Category 1	0.170	1447.000
Category 2	0.389	3311.000
Category 3	0.441	3751.000

THE MODEL ESTIMATION TERMINATED NORMALLY

MODEL FIT INFORMATION

Number of Free Parameters 87

Chi-Square Test of Model Fit

Value	5014.626*
Degrees of Freedom	253
P-Value	0.0000

* The chi-square value for MLM, MLMV, MLR, ULSMV, WLSM and WLSMV cannot be used for chi-square difference testing in the regular way. MLM, MLR and WLSM chi-square difference testing is described on the Mplus website. MLMV, WLSMV, and ULSMV difference testing is done using the DIFFTEST option.

RMSEA (Root Mean Square Error Of Approximation)

Estimate	0.047	
90 Percent C.I.	0.046	0.048
Probability RMSEA <= .05	1.000	

CFI/TLI

CFI	0.919
TLI	0.905

Chi-Square Test of Model Fit for the Baseline Model

Value	58955.080
Degrees of Freedom	297
P-Value	0.0000

WRMR (Weighted Root Mean Square Residual)

Value	3.450
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MODEL RESULTS

		Estimate	S.E.	Est./S.E.	Two-Tailed P-Value
SES	BY				
Q11		1.000	0.000	999.000	999.000
Q12		0.305	0.029	10.620	0.000
Q13		0.419	0.041	10.149	0.000
Q14		0.461	0.041	11.326	0.000
Q15		0.784	0.046	17.062	0.000
RPAR	BY				
Q50A		1.000	0.000	999.000	999.000
Q50B		0.741	0.013	58.911	0.000
Q50C		1.009	0.013	77.249	0.000
Q50D		0.984	0.012	84.988	0.000
Q50E		0.701	0.013	53.249	0.000
Q50F		0.530	0.015	35.309	0.000
Q50G		0.429	0.017	25.978	0.000
Q50H		0.911	0.012	76.633	0.000
Q51		1.920	0.032	59.210	0.000
RPEER	BY				
Q52_N		1.000	0.000	999.000	999.000
Q54		0.971	0.105	9.223	0.000
Q60A		1.968	0.144	13.624	0.000
Q60B		2.561	0.187	13.694	0.000
Q60C		2.852	0.197	14.443	0.000
AC	BY				
Q58		1.000	0.000	999.000	999.000
Q59		1.219	0.046	26.284	0.000
Q61		0.687	0.039	17.413	0.000
RPAR	ON				
SES		0.634	0.036	17.688	0.000
RPEER	ON				
SES		0.074	0.012	6.392	0.000
RPAR		0.127	0.011	12.127	0.000
AC	ON				
SES		0.111	0.019	5.785	0.000
RPAR		0.221	0.013	16.838	0.000
RPEER		0.380	0.041	9.268	0.000
RPAR	ON				
MALE		0.111	0.020	5.536	0.000
AGE		-0.069	0.007	-10.294	0.000
MINORITY		-0.271	0.021	-13.008	0.000
RPEER	ON				
MALE		0.005	0.007	0.654	0.513
AGE		0.005	0.002	2.065	0.039
MINORITY		0.027	0.008	3.486	0.000
AC	ON				
MALE		-0.109	0.013	-8.379	0.000
AGE		-0.036	0.004	-8.181	0.000
MINORITY		0.028	0.013	2.087	0.037
Q14	WITH				

Q12	0.227	0.013	17.118	0.000
Q50E WITH Q50B	0.204	0.010	19.968	0.000
Q50G WITH Q50F	0.432	0.012	37.336	0.000
Q60B WITH Q60A	0.141	0.014	10.063	0.000
Q54 WITH Q52_N	0.510	0.030	16.806	0.000
Q51 WITH Q11	0.293	0.016	17.819	0.000
Q50H WITH Q50D	0.111	0.009	12.938	0.000
Intercepts				
Q11	3.937	0.097	40.598	0.000
Q12	2.770	0.095	29.067	0.000
Q15	4.057	0.119	34.052	0.000
Q51	10.841	0.239	45.320	0.000
Q52_N	6.369	0.131	48.593	0.000
Q54	2.257	0.207	10.926	0.000
Q58	3.623	0.092	39.403	0.000
Q59	3.690	0.094	39.123	0.000
Q60A	3.859	0.106	36.386	0.000
Q60B	3.481	0.114	30.645	0.000
Q60C	3.602	0.115	31.196	0.000
Q61	3.316	0.105	31.682	0.000
Thresholds				
Q13\$1	0.030	0.143	0.212	0.832
Q14\$1	-2.780	0.149	-18.711	0.000
Q14\$2	-1.620	0.145	-11.163	0.000
Q50A\$1	-2.547	0.133	-19.181	0.000
Q50A\$2	-1.273	0.130	-9.757	0.000
Q50B\$1	-1.012	0.121	-8.389	0.000
Q50B\$2	0.572	0.120	4.787	0.000
Q50C\$1	-3.219	0.154	-20.905	0.000
Q50C\$2	-2.239	0.154	-14.541	0.000
Q50D\$1	-2.394	0.121	-19.774	0.000
Q50D\$2	-1.245	0.120	-10.365	0.000
Q50E\$1	-0.920	0.119	-7.748	0.000
Q50E\$2	0.444	0.118	3.757	0.000
Q50F\$1	-1.076	0.117	-9.178	0.000
Q50F\$2	-0.040	0.117	-0.341	0.733
Q50G\$1	-1.619	0.125	-12.927	0.000
Q50G\$2	-0.673	0.125	-5.394	0.000
Q50H\$1	-2.969	0.120	-24.829	0.000
Q50H\$2	-1.841	0.118	-15.549	0.000
Variances				
SES	0.364	0.023	15.636	0.000
Residual Variances				
Q11	0.516	0.022	23.044	0.000
Q12	0.810	0.018	45.099	0.000

Q15	1.017	0.027	37.266	0.000
Q51	2.673	0.048	56.158	0.000
Q52_N	1.642	0.030	54.511	0.000
Q54	3.850	0.093	41.538	0.000
Q58	0.540	0.012	44.894	0.000
Q59	0.490	0.013	37.103	0.000
Q60A	0.737	0.017	44.382	0.000
Q60B	0.667	0.021	31.524	0.000
Q60C	0.616	0.020	30.694	0.000
Q61	0.912	0.021	44.088	0.000
RPAR	0.514	0.013	38.827	0.000
RPEER	0.062	0.008	7.654	0.000
AC	0.135	0.009	15.828	0.000

STANDARDIZED MODEL RESULTS

STDYX Standardization

		Estimate	S.E.	Est./S.E.	Two-Tailed P-Value
SES BY					
Q11		0.643	0.019	33.336	0.000
Q12		0.200	0.016	12.257	0.000
Q13		0.252	0.022	11.235	0.000
Q14		0.278	0.022	12.894	0.000
Q15		0.425	0.016	26.737	0.000
RPAR BY					
Q50A		0.819	0.007	118.557	0.000
Q50B		0.610	0.009	65.752	0.000
Q50C		0.826	0.008	97.505	0.000
Q50D		0.806	0.007	120.766	0.000
Q50E		0.578	0.010	58.794	0.000
Q50F		0.439	0.012	37.200	0.000
Q50G		0.356	0.013	26.807	0.000
Q50H		0.748	0.008	97.692	0.000
Q51		0.698	0.007	100.824	0.000
RPEER BY					
Q52_N		0.214	0.014	15.644	0.000
Q54		0.138	0.014	9.954	0.000
Q60A		0.542	0.013	40.513	0.000
Q60B		0.661	0.014	48.555	0.000
Q60C		0.715	0.012	60.482	0.000
AC BY					
Q58		0.542	0.013	43.182	0.000
Q59		0.636	0.013	49.868	0.000
Q61		0.323	0.014	22.567	0.000
RPAR ON					
SES		0.460	0.016	27.950	0.000
RPEER ON					
SES		0.160	0.021	7.711	0.000
RPAR		0.376	0.017	21.833	0.000
AC ON					

SES	0.141	0.023	6.115	0.000
RPAR	0.388	0.020	19.267	0.000
RPEER	0.226	0.018	12.319	0.000
RPAR ON				
MALE	0.067	0.012	5.558	0.000
AGE	-0.125	0.012	-10.434	0.000
MINORITY	-0.161	0.012	-13.308	0.000
RPEER ON				
MALE	0.008	0.013	0.655	0.512
AGE	0.027	0.013	2.088	0.037
MINORITY	0.047	0.013	3.596	0.000
AC ON				
MALE	-0.115	0.013	-8.608	0.000
AGE	-0.115	0.014	-8.398	0.000
MINORITY	0.029	0.014	2.088	0.037
Q14 WITH				
Q12	0.262	0.014	18.708	0.000
Q50E WITH				
Q50B	0.311	0.014	22.159	0.000
Q50G WITH				
Q50F	0.511	0.012	43.410	0.000
Q60B WITH				
Q60A	0.201	0.016	12.377	0.000
Q54 WITH				
Q52_N	0.203	0.011	18.792	0.000
Q51 WITH				
Q11	0.249	0.013	18.638	0.000
Q50H WITH				
Q50D	0.274	0.018	15.374	0.000
Intercepts				
Q11	4.196	0.108	38.947	0.000
Q12	3.014	0.110	27.490	0.000
Q15	3.643	0.106	34.208	0.000
Q51	4.747	0.103	45.982	0.000
Q52_N	4.856	0.106	45.965	0.000
Q54	1.139	0.106	10.768	0.000
Q58	4.143	0.106	39.056	0.000
Q59	4.066	0.103	39.393	0.000
Q60A	3.779	0.107	35.471	0.000
Q60B	3.196	0.107	29.882	0.000
Q60C	3.210	0.104	30.884	0.000
Q61	3.286	0.106	31.100	0.000
Thresholds				
Q13\$1	0.030	0.143	0.212	0.832
Q14\$1	-2.780	0.149	-18.711	0.000
Q14\$2	-1.620	0.145	-11.163	0.000
Q50A\$1	-2.511	0.129	-19.473	0.000
Q50A\$2	-1.254	0.128	-9.833	0.000
Q50B\$1	-1.004	0.119	-8.415	0.000

Q50B\$2	0.568	0.119	4.778	0.000
Q50C\$1	-3.172	0.149	-21.228	0.000
Q50C\$2	-2.206	0.150	-14.701	0.000
Q50D\$1	-2.361	0.118	-20.090	0.000
Q50D\$2	-1.228	0.117	-10.452	0.000
Q50E\$1	-0.914	0.118	-7.767	0.000
Q50E\$2	0.441	0.117	3.752	0.000
Q50F\$1	-1.072	0.117	-9.191	0.000
Q50F\$2	-0.040	0.117	-0.341	0.733
Q50G\$1	-1.615	0.125	-12.942	0.000
Q50G\$2	-0.671	0.124	-5.397	0.000
Q50H\$1	-2.933	0.116	-25.239	0.000
Q50H\$2	-1.819	0.116	-15.712	0.000
Variances				
SES	1.000	0.000	999.000	999.000
Residual Variances				
Q11	0.587	0.025	23.662	0.000
Q12	0.960	0.007	146.715	0.000
Q15	0.820	0.013	60.748	0.000
Q51	0.512	0.010	52.986	0.000
Q52_N	0.954	0.006	162.430	0.000
Q54	0.981	0.004	257.287	0.000
Q58	0.706	0.014	51.906	0.000
Q59	0.595	0.016	36.644	0.000
Q60A	0.706	0.014	48.743	0.000
Q60B	0.563	0.018	31.241	0.000
Q60C	0.489	0.017	28.960	0.000
Q61	0.896	0.009	97.120	0.000
RPAR	0.746	0.015	48.366	0.000
RPEER	0.782	0.012	65.755	0.000
AC	0.602	0.017	36.289	0.000
R-SQUARE				
Observed				Two-Tailed
Residual				
Variable	Estimate	S.E.	Est./S.E.	P-Value
Variance				
Q11	0.413	0.025	16.668	0.000
Q12	0.040	0.007	6.128	0.000
Q13	0.064	0.011	5.618	0.000
0.936				
Q14	0.077	0.012	6.447	0.000
0.923				
Q15	0.180	0.013	13.368	0.000
Q50A	0.670	0.011	59.279	0.000
0.339				
Q50B	0.373	0.011	32.876	0.000
0.638				
Q50C	0.682	0.014	48.752	0.000
0.328				
Q50D	0.649	0.011	60.383	0.000
0.361				
Q50E	0.335	0.011	29.397	0.000
0.675				
Q50F	0.193	0.010	18.600	0.000
0.814				

Q50G	0.126	0.009	13.403	0.000
0.878 Q50H	0.559	0.011	48.846	0.000
0.452 Q51	0.488	0.010	50.412	0.000
Q52_N	0.046	0.006	7.822	0.000
Q54	0.019	0.004	4.977	0.000
Q58	0.294	0.014	21.591	0.000
Q59	0.405	0.016	24.934	0.000
Q60A	0.294	0.014	20.256	0.000
Q60B	0.437	0.018	24.277	0.000
Q60C	0.511	0.017	30.241	0.000
Q61	0.104	0.009	11.284	0.000
Latent Variable	Estimate	S.E.	Est./S.E.	Two-Tailed P-Value
RPAR	0.254	0.015	16.496	0.000
RPEER	0.218	0.012	18.337	0.000
AC	0.398	0.017	24.023	0.000

QUALITY OF NUMERICAL RESULTS

Condition Number for the Information Matrix (ratio of smallest to largest eigenvalue) 0.273E-04

TOTAL, TOTAL INDIRECT, SPECIFIC INDIRECT, AND DIRECT EFFECTS

	Estimate	S.E.	Est./S.E.	Two-Tailed P-Value
Effects from RPAR to AC				
Total	0.270	0.013	20.319	0.000
Total indirect	0.048	0.005	10.257	0.000
Specific indirect				
AC				
RPEER				
RPAR	0.048	0.005	10.257	0.000
Direct				
AC				
RPAR	0.221	0.013	16.838	0.000
Effects from SES to AC				
Total	0.310	0.022	13.902	0.000
Total indirect	0.199	0.013	15.226	0.000
Specific indirect				
AC				
RPAR				
SES	0.140	0.011	13.165	0.000

AC RPEER SES	0.028	0.004	6.385	0.000
AC RPEER RPAR SES	0.031	0.003	9.378	0.000
Direct AC SES	0.111	0.019	5.785	0.000
Effects from MALE to AC				
Total	-0.077	0.014	-5.564	0.000
Total indirect	0.032	0.006	5.130	0.000
Specific indirect				
AC RPAR MALE	0.025	0.005	5.273	0.000
AC RPEER MALE	0.002	0.003	0.654	0.513
AC RPEER RPAR MALE	0.005	0.001	4.856	0.000
Direct AC MALE	-0.109	0.013	-8.379	0.000
Effects from MINORITY to AC				
Total	-0.035	0.014	-2.495	0.013
Total indirect	-0.063	0.007	-8.846	0.000
Specific indirect				
AC RPAR MINORITY	-0.060	0.006	-10.409	0.000
AC RPEER MINORITY	0.010	0.003	3.432	0.001
AC RPEER RPAR MINORITY	-0.013	0.002	-8.066	0.000
Direct AC				

MINORITY	0.028	0.013	2.087	0.037
Effects from AGE to AC				
Total	-0.053	0.005	-11.129	0.000
Total indirect	-0.017	0.002	-7.708	0.000
Specific indirect				
AC RPAR AGE	-0.015	0.002	-8.877	0.000
AC RPEER AGE	0.002	0.001	2.060	0.039
AC RPEER RPAR AGE	-0.003	0.000	-7.395	0.000
Direct AC AGE	-0.036	0.004	-8.181	0.000
STANDARDIZED TOTAL, TOTAL INDIRECT, SPECIFIC INDIRECT, AND DIRECT EFFECTS				

STDYX Standardization				
	Estimate	S.E.	Est./S.E.	Two-Tailed P-Value
Effects from RPAR to AC				
Total	0.473	0.019	24.754	0.000
Total indirect	0.085	0.008	10.593	0.000
Specific indirect				
AC RPEER RPAR	0.085	0.008	10.593	0.000
Direct AC RPAR	0.388	0.020	19.267	0.000
Effects from SES to AC				
Total	0.395	0.020	19.422	0.000
Total indirect	0.254	0.012	21.660	0.000
Specific indirect				
AC				

RPAR SES	0.179	0.011	16.702	0.000
AC RPEER SES	0.036	0.005	6.762	0.000
AC RPEER RPAR SES	0.039	0.004	10.188	0.000
Direct AC SES	0.141	0.023	6.115	0.000
Effects from MALE to AC				
Total	-0.082	0.014	-5.639	0.000
Total indirect	0.033	0.006	5.164	0.000
Specific indirect				
AC RPAR MALE	0.026	0.005	5.312	0.000
AC RPEER MALE	0.002	0.003	0.654	0.513
AC RPEER RPAR MALE	0.006	0.001	4.873	0.000
Direct AC MALE	-0.115	0.013	-8.608	0.000
Effects from MINORITY to AC				
Total	-0.037	0.015	-2.503	0.012
Total indirect	-0.066	0.007	-9.108	0.000
Specific indirect				
AC RPAR MINORITY	-0.063	0.006	-10.859	0.000
AC RPEER MINORITY	0.011	0.003	3.444	0.001
AC RPEER RPAR MINORITY	-0.014	0.002	-8.208	0.000

Direct AC MINORITY	0.029	0.014	2.088	0.037
Effects from AGE to AC				
Total	-0.168	0.014	-11.693	0.000
Total indirect	-0.053	0.007	-7.887	0.000
Specific indirect				
AC RPAR AGE	-0.048	0.005	-9.166	0.000
AC RPEER AGE	0.006	0.003	2.063	0.039
AC RPEER RPAR AGE	-0.011	0.001	-7.512	0.000
Direct AC AGE	-0.115	0.014	-8.398	0.000

MODEL MODIFICATION INDICES

NOTE: Modification indices for direct effects of observed dependent variables regressed on covariates and residual covariances among observed dependent variables may not be included. To include these, request MODINDICES (ALL).

Minimum M.I. value for printing the modification index 10.000

E.P.C.		M.I.	E.P.C.	Std E.P.C.	StdYX
BY Statements					
SES 0.057	BY Q50B	11.021	0.096	0.058	
SES 0.065	BY Q50D	13.052	-0.109	-0.066	-
SES 0.056	BY Q50G	10.310	-0.093	-0.056	-
SES 0.067	BY Q50H	14.393	-0.112	-0.068	-
SES 0.165	BY Q51	53.077	0.626	0.377	
SES 0.038	BY Q54	10.515	0.126	0.076	
SES	BY Q58	76.770	0.256	0.154	

0.177					
SES	BY Q59	27.409	-0.181	-0.109	-
0.120					
SES	BY Q61	19.945	-0.119	-0.072	-
0.071					
RPAR	BY Q11	253.621	0.429	0.356	
0.380					
RPAR	BY Q12	25.812	-0.063	-0.052	-
0.057					
RPAR	BY Q54	12.158	0.071	0.059	
0.030					
RPAR	BY Q58	14.541	0.083	0.069	
0.079					
RPAR	BY Q59	46.739	-0.182	-0.151	-
0.167					
RPAR	BY Q60C	19.279	-0.118	-0.098	-
0.087					
RPAR	BY Q61	12.126	0.061	0.050	
0.050					
RPEER	BY Q11	10.818	0.211	0.059	
0.063					
RPEER	BY Q12	21.910	-0.170	-0.048	-
0.052					
RPEER	BY Q13	36.475	-0.323	-0.091	-
0.091					
RPEER	BY Q15	13.109	0.197	0.055	
0.050					
RPEER	BY Q50A	19.195	-0.215	-0.060	-
0.060					
RPEER	BY Q50C	11.617	-0.185	-0.052	-
0.051					
RPEER	BY Q50D	11.457	-0.159	-0.045	-
0.044					
RPEER	BY Q51	106.766	0.964	0.271	
0.119					
RPEER	BY Q58	83.321	-0.468	-0.132	-
0.151					
RPEER	BY Q59	121.404	0.676	0.190	
0.209					
AC	BY Q11	176.412	0.671	0.318	
0.339					
AC	BY Q12	61.717	-0.211	-0.100	-
0.109					
AC	BY Q13	68.328	-0.328	-0.155	-
0.155					
AC	BY Q14	13.063	-0.141	-0.067	-
0.067					
AC	BY Q15	17.647	0.180	0.086	
0.077					
AC	BY Q50B	15.224	-0.149	-0.071	-
0.070					
AC	BY Q50C	11.850	-0.159	-0.075	-
0.074					
AC	BY Q51	165.057	1.041	0.493	
0.216					
AC	BY Q52_N	14.200	-0.131	-0.062	-
0.047					
AC	BY Q54	24.285	-0.252	-0.119	-
0.060					
AC	BY Q60B	36.411	0.279	0.132	
0.122					

ON/BY Statements

SES	ON RPAR	/			
RPAR	BY SES		455.714	0.851	1.172
1.172					
SES	ON RPEER	/			
RPEER	BY SES		218.718	9.036	4.213
4.213					
SES	ON AC	/			
AC	BY SES		89.420	0.743	0.584
0.584					

ON Statements

SES	ON MALE		27.589	0.074	0.123	
0.061						
SES	ON AGE		83.613	-0.043	-0.072	-
0.107						
SES	ON MINORITY		368.325	-0.277	-0.459	-
0.227						

WITH Statements

Q13	WITH Q11		10.032	-0.049	-0.049	-
0.070						
Q13	WITH Q12		87.111	0.119	0.119	
0.136						
Q14	WITH Q13		28.610	0.098	0.098	
0.106						
Q15	WITH Q11		127.014	-0.204	-0.204	-
0.282						
Q15	WITH Q12		96.767	0.116	0.116	
0.128						
Q15	WITH Q13		36.262	0.099	0.099	
0.102						
Q15	WITH Q14		38.677	0.099	0.099	
0.102						
Q50A	WITH Q11		11.510	0.039	0.039	
0.093						
Q50B	WITH Q13		16.621	0.065	0.065	
0.084						
Q50C	WITH Q50A		39.780	0.075	0.075	
0.223						
Q50D	WITH Q12		31.920	-0.060	-0.060	-
0.111						
Q50D	WITH Q14		18.297	-0.067	-0.067	-
0.117						
Q50E	WITH Q50A		20.751	-0.057	-0.057	-
0.119						
Q50E	WITH Q50D		32.203	0.064	0.064	
0.130						
Q50F	WITH Q50A		22.924	-0.063	-0.063	-
0.119						
Q50F	WITH Q50B		47.337	0.081	0.081	
0.112						
Q50F	WITH Q50D		17.767	-0.053	-0.053	-
0.097						
Q50F	WITH Q50E		85.786	0.105	0.105	
0.142						
Q50G	WITH Q12		10.924	-0.036	-0.036	-

0.042					
Q50G	WITH Q50A	18.275	-0.061	-0.061	-
0.111					
Q50G	WITH Q50E	38.067	0.075	0.075	
0.098					
Q50H	WITH Q12	16.223	-0.042	-0.042	-
0.070					
Q50H	WITH Q50C	13.122	0.044	0.044	
0.115					
Q50H	WITH Q50F	14.062	-0.046	-0.046	-
0.077					
Q50H	WITH Q50G	25.774	-0.068	-0.068	-
0.107					
Q51	WITH Q15	23.003	0.131	0.131	
0.079					
Q51	WITH Q50A	17.490	-0.114	-0.114	-
0.120					
Q51	WITH Q50B	29.141	-0.139	-0.139	-
0.106					
Q51	WITH Q50C	40.382	-0.185	-0.185	-
0.198					
Q51	WITH Q50E	33.721	-0.147	-0.147	-
0.109					
Q51	WITH Q50H	13.375	0.094	0.094	
0.086					
Q52_N	WITH Q12	17.642	0.050	0.050	
0.043					
Q52_N	WITH Q14	12.421	0.060	0.060	
0.048					
Q52_N	WITH Q15	45.825	0.099	0.099	
0.077					
Q54	WITH Q13	16.903	0.109	0.109	
0.057					
Q54	WITH Q15	43.821	0.144	0.144	
0.073					
Q54	WITH Q50B	87.364	0.209	0.209	
0.133					
Q54	WITH Q50E	32.586	0.124	0.124	
0.077					
Q58	WITH Q11	65.331	0.075	0.075	
0.142					
Q58	WITH Q51	41.785	0.134	0.134	
0.111					
Q58	WITH Q52_N	57.498	-0.083	-0.083	-
0.088					
Q58	WITH Q54	99.924	-0.167	-0.167	-
0.116					
Q59	WITH Q12	10.413	-0.027	-0.027	-
0.042					
Q59	WITH Q13	21.474	-0.059	-0.059	-
0.087					
Q59	WITH Q14	23.849	-0.060	-0.060	-
0.089					
Q59	WITH Q50B	33.851	-0.060	-0.060	-
0.107					
Q59	WITH Q50E	12.805	-0.036	-0.036	-
0.062					
Q59	WITH Q51	30.839	0.122	0.122	
0.106					
Q59	WITH Q54	14.375	-0.064	-0.064	-
0.047					

Q60A 0.050	WITH Q50F	12.414	-0.039	-0.039	-
Q60A 0.080	WITH Q59	25.487	0.048	0.048	
Q60B 0.078	WITH Q13	17.034	-0.062	-0.062	-
Q60B 0.093	WITH Q51	23.286	0.124	0.124	
Q60B 0.057	WITH Q54	15.496	-0.091	-0.091	-
Q60B 0.180	WITH Q59	82.766	0.103	0.103	
Q60C 0.052	WITH Q12	12.784	-0.037	-0.037	-
Q60C 0.113	WITH Q50A	14.042	-0.052	-0.052	-
Q60C 0.102	WITH Q51	25.194	0.131	0.131	
Q60C 0.069	WITH Q52_N	17.860	0.070	0.070	
Q61 0.061	WITH Q12	34.226	-0.053	-0.053	-
Q61 0.073	WITH Q14	23.811	-0.067	-0.067	-
Q61 0.133	WITH Q50C	26.273	-0.073	-0.073	-
Q61 0.057	WITH Q50E	15.678	0.045	0.045	
Q61 0.072	WITH Q50F	31.180	0.062	0.062	
Q61 0.067	WITH Q50G	26.840	0.060	0.060	
Q61 0.069	WITH Q51	22.090	0.108	0.108	
Q61 0.040	WITH Q52_N	14.542	-0.049	-0.049	-
Q61 0.050	WITH Q60A	17.348	-0.041	-0.041	-

DIAGRAM INFORMATION

Use View Diagram under the Diagram menu in the Mplus Editor to view the diagram.

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Diagram output
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Biography

Michael Frye grew up in Aldie, Virginia. He received his Bachelor of Science in mathematical statistics from Virginia Tech in 2006. Upon graduation, he began a career in evaluation research at RMC Research, and he moved to Abt Associates in 2012, where he currently works. He received his Master of Science in Educational Psychology, under the guidance of Dimitar Dimitrov, from George Mason University in 2009.