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The Relationships Between Adolescents' Future Aspirations and Postsecondary Enrollment: Finite Mixture Models

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A dissertation submitted in partial fulfillment of the requirements for the degree of Doctor of Philosophy at Virginia Commonwealth University

by

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Dedication

This dissertation is dedicated to my son, Emery Lin. Thank you for teaching me and giving me a greater purpose in life.

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Abstract

The Relationships Between Adolescents' Future Aspirations and Postsecondary Enrollment:
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This study took person-centered statistical approaches to explore the multidimensional construct of adolescents' future aspirations and its associations with three covariates (i.e., gender, race, and SES) and a binary, distal outcome measure, postsecondary enrollment. Fourteen survey items representing the multidimensionality of adolescents' future aspirations were extracted from two-waves of Educational Longitudinal Study:2002 student data. The multidimensionality or the latent construct of the adolescents' future aspirations were explored using two finite mixture models called latent class analysis (LCA) and latent transition analysis (LTA). Based on the students' response patterns on the fourteen indicators, three latent classes representing three levels of aspiration emerged and were identified as High Aspiration (HA), Moderate Aspiration (MA), and Low Aspiration (LA) classes. Based on the LCA results, the likelihood to attend colleges was significantly higher for students classified into either the HA or MA classes than students in the LA class. Students' SES was found to be statistically significantly associated with the class assignment postsecondary enrollment. In other words, parents' higher income and

higher educational attainment statistically improved the odds of postsecondary enrollment for students in all three aspirations classes. Furthermore, the LTA results found many students either became more ambitious or less ambitious as they started their senior year in high school. The students who changed their aspiration class were referred to as movers, and students who remained in the same aspiration class were the stayers. The likelihood of enrolling in a postsecondary institution was significantly decreased for students who changed their aspiration classes from time 1 to time 2. The changes in how some adolescents aspired about their future might be due to the impact of their family socioeconomic statuses or personal burnout. For future studies, school personnel, policymakers, and educators should investigate the associations between higher education and adolescents' academic and non-academic aspirations and investigate the causes of changes in adolescents' aspirations. Given the importance of college completion for future income and well-being, this study provided an ecological overview of how different social factors (e.g., school, family, community, personal, and peers) shaped adolescents' attitudes about their future, including their impact on their higher educational attainment.

Chapter 1 – Introduction

Unlike a few decades ago, when a high school diploma would be sufficient for a young American to find a job and provide for his family after completing high school (Schneider & Stevenson, 1999), in society today, a college degree has replaced a high school diploma and become an essential key to success (Venezia & Kirst, 2005). However, not everyone found attending a four-year college feasible due to its high costs, study length, poor economic conditions for being a student, and late graduation, so two-year and vocational schools have become popular options for students who are hoping to obtain some sort of higher education training. In fact, there is an increasing demand for high precision skills in the U.S. trading industry that encourage high-school graduates to consider trade school or two-year community college as an alternative (Hamm, 2019). Following this trend of high demand for college graduates, more jobs in the U.S. require some sort of postsecondary education and training (Smith, 2016).

Moreover, there are a lot of benefits that come with pursuing a higher education. People who earn a postsecondary education degree make more money and have more stable jobs than young adults with only a high school diploma or GED (Kelly, 2015; Trostel, 2015). There is also a strong correlation between educational attainment and physical and mental health (Clark & Royer, 2013; Cutler & Lleras-Muney, 2008, 2010; Eide & Shwoalter, 2011; Grossman, 2006). For instance, people with more years of education tend to have a longer life expectancy (Clark & Royer, 2013; Everett et al., 2013), partly because people with a college degree were found to live a healthier lifestyle by reducing the consumption of cigarettes and alcohol (Cutler & Lleras-Muney, 2010; Lawrence, 2017; Trostel, 2015), and exercising more and developing healthier eating habits (Cutler & Lleras-Muney, 2010). Research has also shown that people who receive

more years of education have more stable marriages and are more likely to have children than those who are less educated (Trostel, 2015; Zajacova & Lawrence, 2018).

Given the significant return on completing a postsecondary credential, it is puzzling to see the increasing trend of either delaying or forgoing higher education after high school among adolescents in the 21st century (Chenoweth & Galliher, 2004; Kelly, 2015). According to the National Center for Education Statistics (NCES, 2016), eighty-four percent of students in the U.S. graduated from high school in the 2015-16 school year. Nevertheless, only 69.7% of those high school graduates enrolled in postsecondary education that year (Bureau of Labor Statistics, 2016), meaning more than 30% of high-school graduates, instead of continuing onto higher learning immediately following high school graduation, chose a non-academic route[1]. More strikingly, nearly 231,000 high school graduates of the 2019 Class did not enroll in postsecondary education immediately following their high school graduation (NSCRC, 2019). In order to gain a deeper understanding of the meaning of higher education to American high school graduates of the 21st century, this study decides to take an ecological approach to explore the impact of adolescents' beliefs, attitudes, and motivations about their future in relation to their postsecondary enrollment outcomes (Kelly, 2015).

Studies have found that American adolescents of the 21st century are more ambitious than their parents' and grandparents' generations, and this is true across all adolescents, either they are rich, poor, Asian, Black, Hispanic, or White (Schneider & Stevenson, 1999). As they transition to adulthood, adolescents not only become more aware of their actual self but also realizing the distance between their actual self and ideal self they desire to become (Markus & Nurius, 1986). The kind of person they hope to become creates a sense of aspiration or ambition

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[1] This was without accounting for the 16% of the students who either dropped out early in high school or have yet obtained a high school diploma or equivalent.

that they have about their future. Despite how realistic those goals are, as adolescents develop a sense of plan for their future is a good sign because their plans serve as motivators or a "compass" to influence the choices they make that would have a lifelong impact on their careers and future schooling (Schneider & Stevenson, 1999, p.6). Most importantly, they acknowledge that their future aspirations require some sort of postsecondary education. Nevertheless, according to Kelly (2015), 70% of their respondents did not comply with their postsecondary plans, meaning that there is a considerable gap between adolescents' high educational aspiration and their actual college attendance. Additionally, researchers in educational attainment literature have well-established that adolescents' K-12 school experience, family and peer influence, community and neighborhood environments, and personal goals could either significantly hinder or facilitate their college-going decisions (see Chapter 2). However, few studies have examined the overall effect these various social factors have on their college-going behaviors. Thus, to examine the overall effects these factors have on postsecondary enrollment, this study uses the ecological framework to investigate these social factors as influencers on adolescents' aspirations about their future and their associations with their postsecondary enrollment.

Ecological Systems Model

An ecological theoretical model of human development is adapted in understanding the developmental influences and future aspirations of American adolescents (Bronfenbrenner, 1977, 1986). According to Bronfenbrenner and Morris (1998), human development is a phenomenon that entails behavioral and psychological changes within a person due to all the possible influences of the environment upon them over time. The ecological model places individuals in the center of the model and surrounded by different social contextual factors (Weisner, 2002). What this implies is that no occurrence can be divorced from the individuals and their social

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contexts. In order to make sense of a child's development, research must take account for not only the environments that produce the phenomenon but also how that child reacts and responds to the environments (Darling, 2007). However, a context is somewhat complex and "made up of everyday routines of life" (Weisner, 2002, p. 276), which Bronfenbrenner organizes into different systems to differentiate the directional effects and relationships that these contexts have on a child development as well as with each other. For example, some influences have direct effects on a child, such as the daily routines or face-to-face activities that take place in a child's family, friends, and school, and others, such as events that take place in neighborhoods and communities or related to a culture or society, may have indirect effects on a child development (Bronfenbrenner, 1977; Bronfenbrenner & Morris, 1998; Weisner, 2002).

In Bronfenbrenner's ecological model, everything is perceived as interconnected, and what we know and how we develop are bound by the environments, the culture, the past, and the present (Bronfenbrenner, 1979; Darling, 2007). How adolescents view their future are developed and influenced by their immediate environments and daily experiences connected to their past and present. Most importantly, their visions or aspirations about their future are living beings that experience ups and downs as they develop psychologically and physically. The ecological model's strength is the theoretical framework that allows these immediate environments to be analyzed simultaneously in terms of their combining and competing effects on child development, particularly on their college-going. To represent the relationships between the immediate environments on the development of adolescents' future aspirations and their effects on postsecondary enrollment, fourteen survey items concerning students' attitudes and beliefs about their future education, career, family, friendship, civic engagement, and personal goals are selected from the ELS:2002 student questionnaire. Then adolescents will be clustered into

different classes depending on their response patterns on the 14 items and predict the associations between adolescents' future aspirations and postsecondary enrollment outcomes using latent class analysis (LCA) (Darling, 2007). Finally, this study will investigate whether students' aspirations about their future change over time and affect postsecondary enrollment using latent transition analysis (LTA) to investigate the response patterns of the 14 items at time 1 when the ELS2002 survey was first administered to them in their sophomore year (2002) and at time 2 when the survey was re-administered during their senior year (2004). If so, the LTA can identify the movers who experienced a change of aspiration class from stayers who remained in the same class at both times and examine their connections to postsecondary enrollment.

Future Aspirations

Future aspirations are not only an expansive but complex concept. They represent the prospects that adolescents have for their future, such as goals, ambitions, expectations, and attitudes about all the facets of their life. Schneider and Stevenson asserted that it is important for adolescents to have ambitions and goals because they give meanings to their actions (1999). For example, it has long been established that adolescents who aspire for higher learning tend to have higher academic achievement and more active participation in school than their peers who have lower aspirations for learning (Duncan & Featherman, 1972; Goodman & Gregg, 2010; Reynolds & Burg, 2008). Moreover, students with high educational aspirations are more motivated to complete higher education levels than their peers (Desforges & Abouchaar, 2003; Flouri, 2006; Jacob & Wilder, 2010). Adopting a higher level of education expectations enables adolescents to understand the connections among their goals, schoolwork, and opportunities post-high school (Hill et al., 2004; Hill & Chao, 2009; Jodl et al., 2001).

Nevertheless, adolescents' future aspirations are a complex concept. It not only entails an individual's academic and career expectations but also consists of personal goals, plans, and ambitions that are non-academic-or-educational related. Thus, the concept of future aspirations is a multidimensional construct (Sipsma et al., 2012), and 14 items capturing adolescents' aspirations about different facets of their future are selected in the Educational Longitudinal Study of 2002 (ELS:2002) (see Table 2.1). These 14 survey items collected students' answers about the importance of education and career, starting a family, having children, civic engagement, helping others and relatives, and having their own autonomy. The non-academic aspects of future aspirations may appear to have less relevance to their expectation about their future schooling and career. Nevertheless, both academic and non-academic goals are developed by individuals' surrounding environments and personal characteristics and abilities. For example, a person who wants to be a video gamer or an actor, then their aspirations might compete or hinder their future schooling as they devote more time to activities that are well-aligned with their goals. Thus, students' nonacademic goals could also affect individuals' expectations of how far they want to pursue their schooling (Gorard & See, 2012). For this reason, this study believes it is necessary to examine the associations between adolescents' aspirations and postsecondary enrollment (Cunningham et al., 2009; McCabe & Barnett, 2000).

Table 2.1

Four Microsystems and Fourteen survey Items

Code	ELS:2002 Survey Items
V1	Being successful in my line of work (*BYS54A*).
V2	Finding the right person to marry and having a happy family life (*BYS54B*).

V3	Having lots of money (*BYS54C*).
V4	Having strong friendships (*BYS54D*).
V5	Being able to find steady work (*BYS54E*).
V6	Helping other people in my community (*BYS54F*).
V7	Being able to give my children better opportunities than I've had (*BYS54G*).
V8	Living close to parents and relatives (*BYS54H*).
V9	Getting away from this area of the country (*BYS54I*).
V10	Working to correct social and economic inequalities (*BYS54J*).
V11	Having children (*BYS54K*).
V12	Having leisure time to enjoy my own interests (*BYS54L*).
V13	Becoming an expert in my field of work (*BYS54N*).
V14	Getting a good education (*BYS54O*).

School Context

The first immediate environment that is common to most adolescents is school. It is an important place where students gain knowledge, make friends, learn about themselves, and develop their interests (Schneider & Stevenson, 1999). They choose what activities to participate in and what courses to take can offer students different types of school experiences and different futures (Schneider & Stevenson, 1999). For instance, the college outcome can be different for students who attend schools with many resources for college preparation than schools with limited resources and college culture. According to the data released by the United States Department Office of Civil Rights (2014a, 2014b), researchers have identified the level of

coursework available, the experience level of the teachers, and the access to guidance counselors of a high school as three key areas in determining students' achievement in high school and their preparedness for college entry (Tsoi-A & Bryant, 2015).

Students who have access to rigorous coursework in high school are more likely to seek and succeed in higher education (McGee, 2013; Roderick et al., 2011). Both Howell's (2011) and Musoba's (2011) studies found that taking more courses, particularly mathematics, is positively associated with college readiness. For this reason, the efforts for the expansion of Advanced Placement (AP) classes, Dual Enrollment (DE), and Honor classes are growing (Bailey et al., 2002; Speroni, 2011; Tugend, 2017), especially at schools that mostly serve low-income, and racially and ethnically diverse learners. The purpose of these advanced programs is to offer high school students an opportunity to save money and time on college while earning college credits in high school (The College Board of Education; Flynn, 2019; Warne, 2017). In general, students who took AP classes score higher on standardized tests than non-AP students (Ewing et al., 2006; Mattern et al., 2009; McKillip & Rawls, 2013). Some studies have found that AP exam scores are strong predictors of college success (e.g., Willingham & Morris, 1986; Morgan & Manackshana, 2000; Hargrove et al., 2007; Keng & Dodd, 2007). For instance, students who scored a three or higher on an AP exam is more likely to enroll in college and earn a bachelor's degree (Dougherty et al., 2016; Geiser & Santellices, 2004; Klopfenstein & Thomas, 2010), and those who scored 1 or 2 on an AP exam would be more likely to develop more substantial content mastery of advanced math and physics skills than students who had not taken AP classes (Gonzalez et al., 2001). However, the impact of advanced programs on students' academic achievement, college readiness, and college success has been inconsistent (Kolluri, 2018; Speroni, 2011). Particularly, some researchers have questioned the actual effectiveness of the AP

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classes on students' educational benefits, especially for students who are not White nor from high-income families (Cinseros et al., 2014; Dougherty & Mellor, 2010; Jeong, 2009; Moore & Slate, 2008). They argue that students who are doing well in the AP classes because they are already well-prepared academically and without controlling for the confounding variables in the studies, AP programs' actual effectiveness is unreliable and unverifiable (Jaschik, 2006; Klopfenstein & Thomas, 2010; Speroni, 2011; Warne, 2017). Therefore, more research is needed to confirm whether AP courses contribute to student academic and college success.

Teachers, especially experienced teachers, are valuable resources to students' learning (Flores, 2007). Nevertheless, the high teacher turnover rate in high-need schools and a shortage of competent and qualified teachers hurt the achievement and college readiness of racially diverse students and low-income students (Choy, 2002; Garcia & Weiss, 2019; Tierney et al., 2009). When students do not have the support or the resources at home, dedicated and experienced teachers can make a significant impact on their learning (Thompson et al., 2008; Berry et al., 2010), such as increasing students' college readiness by introducing high-level instruction in challenging courses (Flores, 2007). Moreover, studies have found that these effective and experienced teachers do not have a deficit thinking or perception about students of minority (Thompson et al., 2008), and they are equipped with cultural proficiency to work with racially and culturally diverse students (Welton & Martinez, 2014), which ensure the effectiveness of student learning.

Similar findings on the effectiveness of student learning and educational attainment are also found on the counselors. As an important school resource, experienced counselors could influence students' college and career planning by identifying their best options based on their potential and goals (Ward, 2006). It is particularly important for the disadvantaged students in

high-need or high poverty schools because they are likely to enroll in lower-level courses that do not help in college preparation (Musoba, 2011). As a consequence, they need guidance counselors who understand how marginality, culture, and power relationships limit college preparedness for low-income and racially diverse students and their families (Holcomb-McCoy, 2010) and encourage them to take the necessary actions to get ready for higher education (Tsoi-A & Bryant, 2015).

Family Context

In addition to the school context, a large body of research investigated the relationships between family-and-social structure and student's academic achievement and college enrollment (SES; Battin-Pearson et al., 2000; Heckman & Krueger, 2005; Orfield, 2004). Even though disparities in school structures, resources, and curricula restrict college entry across schools in the United States, parents' educational attainment has a more significant effect on college enrollment. For example, well-educated parents can help their children obtain college access information and determine what courses they should take and what type of activities promote entry into four-year colleges (Crosnoe & Muller, 2014; Engberg & Wolniak, 2010).

In the literature on social capital and educational attainment among adolescents, the findings are consistent on how families' social capital influences their children's educational outcomes (Dufur et al., 2013; Sandefur et al., 2006). The concept of social capital and its influence on individuals' educational achievement is referred to as the resources in social relations (Rogošić & Baranović, 2016). The logic behind their relationship is that "educational capital enables individuals to transform it into other forms of capital such as economic, cultural, and social" (Ani-Asamoah Marbuah, 2016, p.6). For example, parents with higher incomes have more resources to support their children's schooling. The affluent families enroll their children in

ballet, soccer, and after-school programs (Pew, 2015). In contrast, children from low-income

families would spend their time at home or with their extended family (Miller, 2015). The

differences in child-rearing are widening and set children on different educational paths that

deepen inequality in wealth and social status (Miller, 2015; Tavernise, 2012). In fact, the college

completion rate between the rich and poor has grown by 50% since the late 1980s (Bailey &

Dynarski, 2011).

Similarly, for parents with higher educational level, they are more likely to have the

networks and social ties as resources to help their children in schooling and transition to

postsecondary education (Kim & Schneider, 2005; McNeal, 1999; Morgan & Sorensen, 1999;

Smith et al., 1995; Stanton-Salazar & Dornbusch, 1995; Sun, 1999; Teachman et al., 1997; Zhou

& Bankston, 1994). A strong correlation between parents' educational attainment and students'

achievement shows that highly educated parents are more likely to educate their children at an

early age, such as reading to their children to broaden their vocabulary and enhance their

communication skills, use their social capital to promote their children's learning and pay

attention to the quality of their children's teachers (Egalite, 2016). Some studies even found that

parental involvement that only involves communicating with their children is not enough to

impact their college education. Instead, parents need to take initiatives, such as working with

children on college selections and accompanying their children on college visits (Schneider &

Stevenson, 1999). Multiple studies have confirmed that parental education level has always been

a significant predictor of educational attainment and college enrollment for their children

(Egalite, 2016; Engberg & Wolniak, 2010; Kimmes & Heckman, 2017; Ward, 2006), which

imply that an individual upbringing, family stability, and community attachment and engagement

are indirect measures of social capital that have a critical impact on a child and youth development (Stewart, 2007).

Peer Context

Peer influence is perceived as another dimension of social capital that has complex influences not only on behavioral, social, and cognitive development but also on adolescents' educational aspirations (Cunningham et al., 2009; Duncan et al., 2001; Holland, 2010; Rosenqvist, 2018; Santrock, 2009). During the transition from adolescence to adulthood, adolescents feel the pressure to accede to the social or group norms and often express a desire to be socially accepted and recognized by their peers (Brown, 1999; Cunningham et al., 2009; Holland, 2011; Skinner, 1976). Because of this, peers can influence each other in both negative and positive ways.

There is considerable research documented that peer influence plays several critical roles in "adolescents' academic motivation, aspirations, and achievement" (Holland, 2010, p. 1030). For example, since students spend a substantial amount of time at school, they tend to socialize with the people they have strong/close relationships with, and thus, their decisions and choices are more likely to be influenced by the individuals with whom they like to engage in conversations and spend time (Holland, 2010). Especially when a student's peer has high educational aspirations, the likelihood of attending postsecondary education for that student increases (Alexander & Campbell, 1964; Chen, 1997). However, the level of significance of peer influence on adolescents' educational aspirations varies (Hossler et al., 1999; Schneider & Stevenson, 1999) and is contingent upon students' socioeconomic status, familial background, and academic abilities (Gibson et al., 2005; Sokatch, 2006). For instance, for students whose family or school has limited knowledge and resources about college, their peers may play a key

role in guiding and inspiring them to plan for postsecondary education (Bedsworth et al., 2006; Griffin et al., 2007; Sokatch, 2006), but their shared socioeconomic backgrounds usually determine the number of resources that peers have.

However, peer influence can also promote underachievement among (mainly racial/ethnic minority and/or low-income) adolescents who might experience social exclusion and may be particularly vulnerable to pressure and ridicule from their peers about their high academic achievement (Fordham & Ogbu, 1986; Tyson & Darity, 2005). Although the extent to which negative peer influence might contribute to the academic achievement gap between racial/ethnic minority students and White students is unknown, research finds that high-achieving Black and Hispanic students are often referred to as "acting White" by their peers of the same racial backgrounds (Carter, 2006; Gordon, 2005; Tyson & Darity, 2005). However, in Tyson and Darity's qualitative study (2005), they found that the theory of "acting White" does not only apply to racial minority and low-income students, but such peer pressure is also felt among high-achieving White students. Thus, Tyson and Darity concluded that this type of peer tension is "between high-and low-achieving students within or between racial and socioeconomic groups" (2005, p.583). As a result, peer influence could add an extra layer of complexity in adolescents' social identity formation during their transition to adulthood (Gordon, 2005) and their attitudes about pursuing postsecondary education.

Community and Neighborhood Context

The relationship between a broader community context and educational attainment is an area in research that has not been adequately investigated compared to the understanding of the impact of school and family characteristics on children's development and school achievement (Baker et al., 2000; Furstenberg & Hughes, 1997; Holloway, 2004). From an environmental

psychology perspective, Bronfenbrenner argued that communities or neighborhoods could function very much like the family settings that we know impact children (1979). This is a logical argument since "limited geographic mobility forces the [children] to spend so much of time and social energy in neighborhood context" (Bickel et al., 2002, p.5). Through their participation and interaction with the local community organizations, neighborhood values play a critical part in shaping students' worldviews (Pride, 2000). The extent to which neighborhoods can promote and support adolescents preparing for postsecondary education is often regulated by neighborhood members' social class (Vartanian & Gleason, 1999). As Wilson asserted (1980), "persistent poverty is created and sustained by a unique amalgamation of economic, social, and cultural elements that are fused together creating specialized local environments" (cited in Furstenberg & Hughes, 1997, p. 83), meaning that there is a chain reaction in these impoverished areas between what is going on at the macro-level (community organizations) and the micro-level (family unit). For example, when the "demand for unskilled labor" is scarce in "areas of concentrated poverty," the local governments do not provide enough support to sustain the areas while the middle-class residents relocate to "more desirable locations" (Furstenberg & Hughes, 1997, p. 83). These areas have become further removed from the social and cultural mainstream (Siegel, 2012). Studies often found that children in these impoverished areas often grow up without a father figure (Smith, 2015) and have a higher risk of dropping out of school at an early age and participating in gang activities (Darling, 2008; Polite & Davis, 1999). Such a self-destructive and unproductive lifestyle continues to persist in these neighborhoods (Smith, 2015), negatively impacting students' academic achievement.

Personal Goals

Adolescents' ambitions and goals are not always centered around the question of how much schooling they would like to obtain, but most of their aspirations cannot be divorced from the discussion of educational attainment. In other words, their personal goals or pursuits might motivate them to either continue with their schooling or forego their education (Carver & Scheier, 1990). Adolescents' academic and non-academic goals and plans about their future reflect their school experiences, personal characteristics, opportunities, and other environmental constraints (Nurmi 2004, Massey et al., 2008). Unfortunately, their goals and ambitions are precarious and unstable because their commitment and effort are not entirely context-free from their immediate environments and opportunities (Massey et al., 2008).

Although Schneider and Stevenson's study found that contemporary teens are more ambitious than the earlier generations, most of them are directionless and unable to actualize their ambitions (1999), which hampers their higher education success. In their study, the authors distinguished the difference between aligned and misaligned ambitions and asserted that school and family play a critical role in supporting and hampering students' educational achievement, attainment, and professional opportunity (Schneider & Stevenson, 1999). Some teens who have high ambitions but unable to continue their higher education attainment because the dissatisfaction due to the discrepancy between their ideal and the current condition forces or pushes them to let go of their ambitions and fill in with other immediate goals (Higgins, 1987; Massey et al., 2008). While previous studies have investigated the preceding issues and their impact on educational achievement and attainment in various degrees as separate factors, no studies have examined how these adolescents' ambitions and goals are associated with college enrollment outcomes altogether, nor have any studies analyzed whether these competing influences have interactional effects on each other. Not all the immediate environments would

have an equal effect on children's social and psychological development, but what children encounter in their everyday life should have either a competitive or complementary influence on the development of adolescents' ambitions or plans, which deserve to be studied side-by-side as well as more in-depth.

Therefore, in order to understand the "holistic-interactionistic" effect of adolescents' future aspirations (both academic and non-academic goals) on adolescents' decisions in college-going (Magnusson, 2003, p.3), I decide to use person-centered statistical approaches (LCA and LTA) in this study. The person-centered statistical approaches allow researchers to study the simultaneous impact of different contexts (such as school, community, family, peers, and personal goals) on adolescents' educational attainment, which aligns with the theoretical framework of the ecological model to investigate the different immediate environments on individual development at the same time. Schneider and Stevenson asserted that all adolescents are homogenous in terms of their goals and future ambitions (1999), but this research hypothesizes that individuals' educational attainment is affected by both their academic and non-education-related aspirations (Howard & Hoffman, 2018; Laursen & Hoff, 2006). Therefore, the goal of this study is to analyze the overall effect of adolescents' future aspirations as a multidimensional construct on postsecondary enrollment.

Problem Statement

The purpose of this study is to examine the multidimensionality of adolescents' future aspirations (both academic and non-academic goals) concerning postsecondary enrollment to increase our understanding of the school, family, community, peer, and personal factors on adolescents' future planning and postsecondary enrollment. Previous studies have taken different approaches to understand how different social factors affect postsecondary educational

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attainment separately, and these social factors are often treated as single dimensions. Such approaches create a limited understanding of adolescents' future aspirations by overly emphasizing the effect of a particular social factor on adolescent development. As a matter of fact, these results are often inconsistent and are likely to miss important information about the social factors and their relationships with educational attainment (Sipsma et al., 2012). Therefore, to illustrate the multidimensional characteristics and the interconnectedness of adolescents' academic and non-academic goals in defining the heterogeneity of aspirations among adolescents, the study takes latent person-centered statistical approaches, "in which adolescents are grouped into unobservable latent classes defined by clustering or directly observable indicators of interest" to improve our understanding about how adolescents' feel about their future as well as in relation to their future schooling (Sipsma et al., 2012, p. 170). Furthermore, since adolescents' future aspirations are fragile and prone to change and adjustment due to their daily experiences and immediate environments (Massey et al., 2008), this study also investigates whether adolescents change from one future aspiration profile to another from time 1 to time 2 and how the change of future aspiration profiles affect postsecondary enrollment. More details about the specific design of the study are provided in chapters 2 and 3.

Research Questions

RQ1: What are the subclasses of future aspirations for the two-time points cross-sectional data (base year and first follow-up)?

RQ2: What are the associations between the subclasses of future aspirations and postsecondary enrollment for the base year LCA model?

RQ3: What are the associations between the subclasses of future aspirations and postsecondary enrollment for the first follow-up LCA model?

RQ4: To what extent do students' ambition memberships (plans) remain consistent from 10th grade (base year) to 12th grade (first follow-up)?

RQ5: What are the associations between the sub-statuses of future aspirations and postsecondary enrollment?

Definition of Terms

The following terms are defined to help the reader understand the context of each term in this study:

Exploratory factor analysis (EFA): is a statistical approach to identify the factor structure among a series of observed variables when no prior knowledge to support the factor construct underlies a dataset or the number of observable variables should load onto the construct (Fabrigar et al., 1999).

Confirmatory factor analysis (CFA): is primarily used to test hypotheses using the established models with the precise number of factors and to the variables that load on each factor (Hair et al., 1998).

Latent class analysis (LCA): It is a statistical technique to identify the underlying classes hidden under a set of multiple indicators (Nylund-Gibson & Choi, 2018). LCA typically uses indicators that are categorical and most often binary variables (Collins & Lanza, 2010), so the latent classes can be either ordinal or unordered categories.

Latent transition analysis (LTA): is an "extension of LCA to repeated-measures data" (Lanza et al., 2012, p.706). It investigates the changes of discrete (categorical) variables over time or in a longitudinal framework (Lanza et al., 2012).

Logistic Regression: logistic regression analysis is like linear Regression. However, it is used when the dependent variable is a binary variable. Linear regression analysis is used when the

dependent variable is a continuous variable. The interpretation for logistic regression results is different from how we interpret linear regression analysis. Instead of determining whether the linear relationship between the dependent and independent variables is either positive or negative, the logistic Regression presents results in the form of an odds ratio or probability (Field, 2013).

Transition Probability: The transition probability is a matrix table developed in latent transition analysis on longitudinal data with at least two-time points (Collins & Lanza, 2012). The main diagonal values illustrate the percentage of cases or people that remained in the same status from time one to time two. The off-diagonal values represent the percentage of cases or people that moved to another status from time one to time two.

Latent Class: Latent class is the terminology used to refer to the class memberships identified in the latent class analysis. It means the class-solution is fixed.

Latent Status: Latent status refers to the statuses identified in the latent transition analysis. It is called status because it reflects the temporality of the membership at a specific time point.

Stayers and Movers: Stayers refer to the cases or people that remained in the same status in the Latent class analysis. Movers refer to the cases or people that changed their status in the latent class analysis.

School and work: is one of the adolescents' future aspirations latent constructs identified using variable-centered approaches. It embodies adolescents' education and career aspirations. For instance, adolescents who desire to have a successful career or desire to get a good education are more likely to enroll in college.

Family and Friend Relations is another latent construct identified using variable-centered approaches which captures adolescents' plans for their future family, such as the importance of having children and their perception of friendships.

Social Engagement is the third latent construct of the adolescents' future aspiration model identified using variable-centered approaches that describe adolescents' future participation and engagement in the communities. For example, some adolescents plan to correct social and economic inequalities in the future or support other people in their communities.

Personal goals (individual agency): The final latent construct of the adolescents' future aspirations is identified using variable-centered approaches that represent adolescents' non-education-related goals or plans. These goals and plans are usually affected by their school experience, family relations, family obligations, peer influence, and community/neighborhood impact. For example, it is likely for adolescents from low-income families to choose work over postsecondary education because of their financial responsibilities in taking care of their families. It is also likely for adolescents to forgo postsecondary education to devote their time to developing their interests and pursuing their non-academic dreams.

Chapter 2 – Literature Review

This study examines the multidimensional construct of adolescents' future aspirations and their effect on individuals' postsecondary enrollment using Bronfenbrenner's (1979) ecological model. To start, I will review the ecological model and its application in educational attainment research. Next, I will review adolescents' college enrollment outcomes associated with five distinct but overlapping immediate environments or contexts, including school, family, peer, neighborhood/community contexts, and personal goals. Before discussing the finite mixture models, I will introduce the multidimensional construct of adolescents' future aspirations established in the previous study, which implemented exploratory and confirmatory factor analyses. Finally, I will conclude the chapter by discussing how theoretical and methodological considerations inform the current study's conceptual framework and hypotheses.

Theoretical Framework

Adolescents' future aspirations and their academic outcomes are part of human development, which are primarily influenced by the numerous environments they have been interacting with for over a period of time (Battistich et al., 1995; Brooks-Gunn et al., 1996, Steinberg et al., 1992). One theoretical lens for understanding these contextual effects is Bronfenbrenner's ecological model (Benner et al., 2008; Ehrenreich et al., 2012; Stewart, 2007), which posits that interactions between a person and the environment shape an individual's development (Bronfenbrenner, 1977, 1989, 1994). However, not all environments have an equal influence on human development. According to Bronfenbrenner (1979), some environments are more immediate, and others are more remote. Depending on the distance and the relationship between the environments and the individuals, they are organized under four ecological systems that are nested within each other like Russian dolls (Bronfenbrenner, 1979; Huerta, 2015) (see

Figure 2.1). The immediate and remote environments that make up the entire ecological model are called the microsystem, mesosystem, exosystem, and macrosystem.

The *microsystem* is the closest level to the individuals in the ecological model. Individuals engage in face-to-face interactions with more than one microsystem, such as school, family, neighborhood, and community (Bronfenbrenner, 1979; Stewart, 2007). Due to their closeness and daily interactions, the microsystems have a direct influence in shaping adolescents' behaviors, identities, and their world views (Ehrenreich et al., 2012; Huerta, 2015).

The *mesosystem* is the second level in the ecological model and represents an environment that consists of all the microsystems situated around the individuals (Ehrenreich et al., 2012). The microsystems are not entirely independent of each other. Instead, they overlap or interact with each other (Epstein & Sanders, 2002; Leonard, 2011), but the extent of the overlap varies from individual to individual. For instance, studies have found that the more disconnected the parents, students, and schools are from each other, the less likely Hispanic male students enroll in college (Goldrick-Rab & Han, 2011; Huerta, 2015). Moreover, the types of interactions and influences on adolescents' developments are much related to individuals' socioeconomic status, gender, race/ethnicity, and cultural backgrounds. Unlike children from families with more financial resources who live in more affluent neighborhoods, low-income children tend to enroll in schools with a high percentage of free/reduced-price lunch and with insufficient human resources or financial support at school. Thus, children of different socioeconomic statuses can have entirely different daily and school experiences, which can contribute to the development of disparate perceptions about their future and education.

Unlike the microsystem, the *exosystem* is more remote. It often refers to an environment or setting that does not directly involve or engage the individuals. However, exosystematic

environments still have an impact on adolescents' development (Bronfenbrenner, 1979). For

example, parents' workplaces or social networks may impact a child's home life and the types of

economic resources available to them (Eamon, 2001; Huerta, 2015). This has been well-

documented in the sociological literature on social and cultural capitals – the nature of social

connections can affect the flow of information and resources available to the individuals in a

given network or family.

The *macrosystem* is the farthest level from the individuals in the ecological model.

Bronfenbrenner often referred to the macrosystem as a cultural and social blueprint that has a

vital role in determining the social structures, norms, values, and orders to the systems nested

within it (Becker & Luthar, 2002; Bronfenbrenner, 1979; Eamon 2001). For instance, studies

have found gang involvement and street culture are barriers that prevent Latino males from being

college- or career- ready at the macrosystemic level (Conchas & Vigil, 2012; Huerta, 2015;

Vigil, 1999). Gang or street culture is a macrosystem in the ecological model that represents a

subculture that influences an individual's everyday life and development by providing orders and

values that are specific to a group of people (Bronfenbrenner, 1979).

Figure 2.1

The Ecological Model
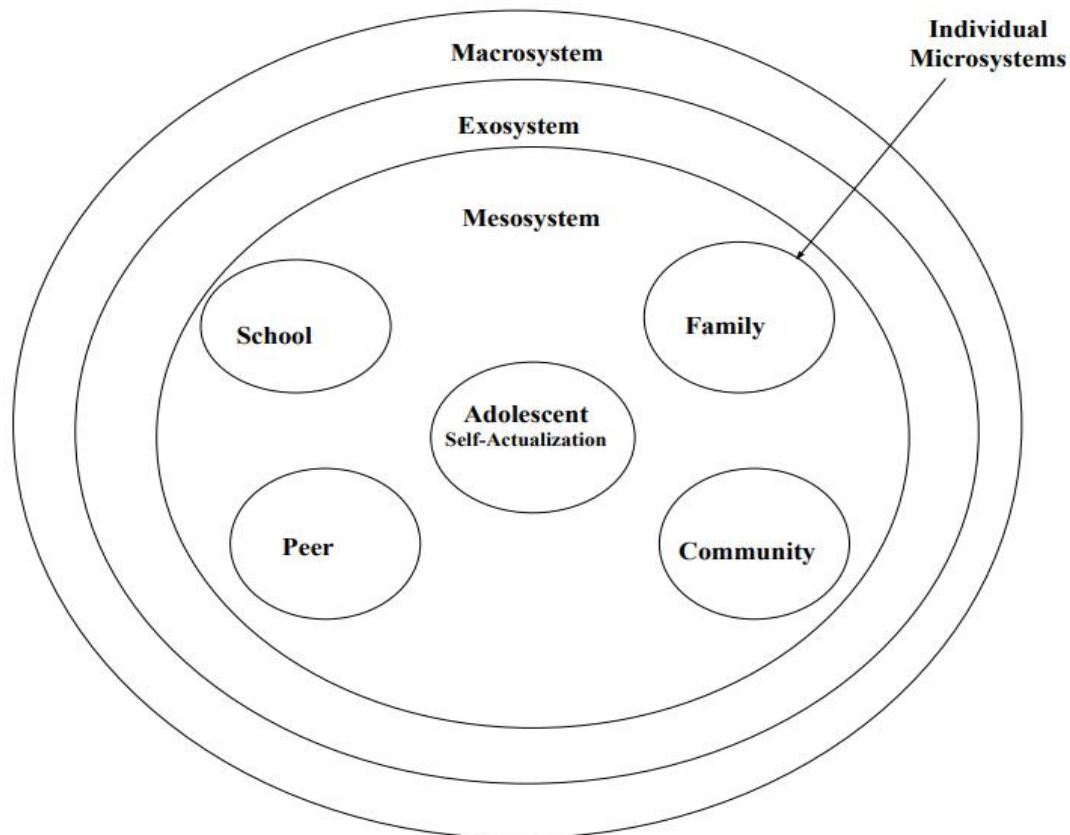
Figure 1. The adaptation of Bronfenbrenner's model (1979) as it applies to the Adolescents' Life Aspiration

The Application of Ecological Model in Educational Research

The ecological model has been applied to quantitative and qualitative educational research on a wide range of topics. Some studies used the ecological model to make the case that in order for programs, policies, and interventions to be effective, they need to take into account and align with youths' family and school environments as well as the social and political structures within their communities (e.g., Giancola, 2000; Spencer & Tinsley, 2008; Taylor & Servage, 2012). Other studies applied the ecological model to emphasize the connections of students' academic experiences and outcomes with their academic environments (e.g., Archer-Banks & Behar-Horenstein, 2012; Becker & Luthar, 2002; Ehrenreich et al., 2012; Huerta, 2015;

Martinez et al., 2016; Peregrina-Kretz et al., 2018; Spanierman, 2002). For example, Archer-Banks and Behar-Horenstein's study (2012) noticed that students become disengaged in school due to unfair teacher treatment and unequal college information and saw unfair treatment systematic problems inherent in the overall education system. Policymakers and educators should make a concerted effort at the system level to ensure high expectations for all learners and equal access to college preparation and information. Therefore, the ecological model framework puts more emphasis on the interrelationships or the interactions between the students and their environments to improve academic achievement and promote academic success (Becker & Luthar, 2002; Benner et al., 2008; Leonard, 2011).

Most of the qualitative studies that employed the ecological model were smaller in scale (e.g., Becker & Luthar, 2002; Eamon, 2001; Taylor & Servage, 2012). Some studies focused on exploring the relationships between two specific levels of systems in the ecological model. For instance, Peregrina-Kretz et al. (2018) studied the relationship between the microsystem and mesosystem to examine the role of peers on students' college and university experiences. In another case study, Spanierman studied the relationship between the microsystem and macrosystem by investigating how racism has affected an African American female student's experience in her graduate program (2002).

Because the qualitative research methodology design creates openness and provides the flexibility to look deeper at multiple components of inquiry, some qualitative studies were able to study both immediate and remote environments at all four levels. For instance, Becker and Luthar (2002) conducted systematic reviews on existing studies that used the ecological model to identify social-emotional factors at all four levels of the ecological model that influence disadvantaged students' achievement in middle school. In their study, Becker and Luthar

recommended that teachers and school leaders should hold positive attitudes and high expectations toward disadvantaged students and establish a positive learning environment among student peers. At the same time, local and federal governments should pay attention to how mental health affects students' academic achievement with a recommendation of making mental health services available to all students (Becker & Luthar, 2002).

By contrast, only a handful of quantitative studies have employed the ecological model (e.g., Benner et al., 2008; Ehrenreich et al., 2012; Lätsch, 2018; Martinez et al., 2016). Unlike the qualitative approach that allows researchers to explore the environments at all four levels, quantitative approaches are restricted to the microsystems at the mesosystemic level due to the general constraints of how surveys or variables were administered and collected. For instance, there is usually a limited space to include all the questions or limited time to survey many questions about the variables representing the exosystem and macrosystem. A common theme across these quantitative studies is that students' characteristics are operationalized as microsystematic-level variables and family- and school-related factors as mesosystematic-level variables. For example, Benner, Graham, and Mistry (2008) conducted a multi-level structural equation model study to examine the associations between family and school structures and academic outcomes. One of the important findings of this study was the cross-system effects between family and school structures on adolescents' school engagement.

The Importance of the Ecological Model

Bronfenbrenner's ecological model provides the flexibility to explore and study multiple interacting contexts simultaneously in a study with a more holistic perspective by considering "a multifaceted and expanding realm of contextual influence" (Ehrenreich et al., 2012, p. 199), which is a critical component to the research design of this study. By applying the ecological

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model framework, the current study can investigate the combining effects of different social factors in shaping adolescents' future aspirations as well as its effect on postsecondary enrollment.

The ecological theoretical framework's design asserts adolescents' immediate environments matter to their emotional, physical, and social development. Moreover, all the interconnected interactions among the environments in the ecological model also affect adolescent development (Bronfenbrenner, 1979). It is well-documented that the social and psychological contexts around adolescents shape their experiences, worldviews, and behaviors, as well as their ability to adjust and respond to their current situations (Wentzel, 1999). Different environments embedded in the microsystems provide youth the unique paths in life that contribute to the differences in their future aspirations, including academic gains, educational attainment, and occupational status (Duncan & Raudenbush, 1999). Although it seems evident that these environments alone affect adolescents' educational attainment outcomes (Stewart, 2007), the process leading to such development is somewhat complicated, and the outcomes cannot be removed from individuals' microsystems (Feuerstein, 2000; Renn, 2003).

Previous research has neglected the importance of the interrelationships between different social factors and their effect on postsecondary enrollment and also overlooked the impact of adolescents' unique needs, varying expectations, and goals on their educational attainment outcomes in relation to their non-academic goals (Benner et al., 2008; Ehrenreich et al., 2012). Nevertheless, their research findings have clearly illustrated the importance of different environments and cultural differences in adolescent development, particularly academic achievement and performance. Therefore, I feel compelled to investigate adolescents' future

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aspirations in a broad ecological context that consists of academic and non-academic experiences (Harrison et al., 1990; McLoyd, 1990).

Although it is common to see many educational attainment research was conducted at the mesosystematic level, "few studies have simultaneously explored the effects of these environments on adolescents' [academic] achievement" (Benner et al., 2008, p. 841). In other words, no study has examined multiple immediate environments (i.e., family, school, peer, community, and in relation to personal goals) holistically and simultaneously. Consequently, we know little about the overall effect of adolescents' immediate environments affecting their adolescent development and know little about how both adolescents' educational and non-academic aspirations are associated with their college enrollment. Therefore, the purpose of this study is to explore the multidimensionality of adolescents' future aspirations and their associations with postsecondary enrollment by placing individual adolescents at the center of their environments using person-centered statistical approaches.

Literature Review on Adolescents' Future Aspirations

The transition from childhood to adulthood can be a shifting and challenging period for youth (Arnett, 2000). Adolescents' future aspirations entail the plans and expectations that adolescents hold for their future and embody the kinds of life experiences that have taken them to where they are and where they will be (Blakemore & Cloudhury, 2006; Markus & Nurius, 1986). According to Markus and Nurius (1986), Adolescents' future could consist of many possible selves that they "could become" as well as the selves they "are afraid of becoming" (p. 954). Markus and Nurius (1986) also gave specific examples:

The possible selves that are hoped for might include the successful self, the creative self, the rich self, the thin self, or the loved and admired self, whereas the dreaded possible

selves could be the alone self, the depressed self, the incompetent self, the alcoholic self,

the unemployed self, or the bag lady self. (p. 954)

This passage effectively illustrates the challenges and complexity accompanying adolescents'

transition to adulthood. As adolescents become more goal-oriented about their future, the

possible selves have been manifested and reflected by their "enduring goals, aspirations, motives,

fears, and threats" (Markus & Nurius, 1986, p. 954). These multiple selves are all possible as

they emerge to adulthood because they are no longer just students. There are multiple identities

(e.g., someone's boyfriend or girlfriend, an employee, or young parents) waiting for them as they

transition to adulthood. Therefore, their future aspirations are not a unidimensional construct that

only consists of academic and career aspirations. Rather, adolescents' future aspirations also

entail marriage, relationships, personal goals, and social engagement (Sipsma et al., 2012; Sirin

et al., 2007).

In the European sociological and psychological literature, adolescents' future aspirations

are also known as future orientation (FO). The goal of FO is to study and observe adolescents'

development and its impact on their future academic and financial success and personal

relationships (see Greene, 1986; Lewin, 1946; Nurmi, 1989; Poole & Cooney, 1987; Sundberg et

al., 1983; Trommsdorff et al., 1982; Trommsdorff et al., 1979). FO is a multidimensional

construct that consists of both academic and non-academic goals. I have noticed in my searches

that European studies focused on both adolescents' academic and non-academic goals, and

American studies focused mostly on youths' educational expectations and their impact on

educational achievement and career expectations. The majority of the European work published

before the late 1990s was predominantly qualitative, longitudinal studies with an emphasis on

identifying the goals and interests adolescents have for their future and how far into the future

their thinking and planning could extend (Greene, 1986; Nurmi, 1989, 1991; Thrommsdorff et al., 1979). For example, Nurmi (1989) conducted two interviews to one hundred and five Finnish adolescents about their adolescents' FO in late 1982 and again in early 1987. Results suggested that these adolescents began to think about their future occupations as young as 11 years old, and Nurmi saw their leisure activities were significantly reduced by age 15. They became more goal-oriented and more concerned about their future occupation. Cantor also found that adolescents' behaviors became more selective and more focused on their future goals as they transitioned to adulthood (1990). This is because as they transition to adulthood, they begin to gain a better understanding of who they are (Eccles et al., 2003). When they attempt to learn about themselves and make connections about their past, present, and future (Eccles et al., 2003; Trommsdorff et al., 1979).

Unlike the European studies, which focused on adolescents' overall development, American studies tended to have a narrower research scope. They were interested in adolescents' educational aspirations and their impact on educational attainment. These studies mostly employed a quantitative research design. The concept of adolescents' educational aspirations was operationalized as quantifiable measures and often treated adolescents' racial/ethnic background and contextual-and-socioeconomic-related variables as either covariate, secondary or tertiary levels in the statistical analyses. However, such approaches lack holistic explanations of why some adolescents choose to discontinue their higher education despite studies that have found that all adolescents have high educational and occupational aspirations (Schneider & Stevenson, 1999). This is because, according to Markus & Narius (1986), the individual paths cannot be divorced from adolescents' "particular and historical context and the models, images, and symbols provided by the media and by the individual's immediate social experiences" (p. 954).

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Research has consistently shown that adolescents' future aspirations do not develop in a vacuum. Instead, they are determined by their social and physical environments and personal characteristics, such as their gender, racial and ethnic backgrounds, their socioeconomic (SES) status, home cultures, peers, school environment, and community (Ali & Menke, 2014; Beal & Crockett, 2010; Elder, 1980; Markus & Nairus, 1986). For instance, some studies have found that social structural inequalities hurt the development of young people's educational and career aspirations (Allen & Hollingworth, 2013; Archer & Yamashita, 2003). Often, socially disadvantaged children are more likely to have poor health and social outcomes as well as low educational and occupational expectations (Ceballo, 2004; Maurizi et al., 2013; Stewart et al., 2007; Walpole, 2003; Wilson, 2010; Yoshikawa et al., 2012). In order to improve our understanding of the relationships between the immediate environments and adolescents' future aspirations concerning their higher education educational attainment, it is worth exploring these immediate environments altogether. Nevertheless, the immediate environments' influence on youths' development often overlap, interact, and compete with each other in real life. For clarity, I will discuss each of these contexts on adolescents' educational aspirations and college enrollment separately.

School Context

There has been tremendous growth in adolescents' educational aspirations and secondary education completion rates in the last five decades (Bozick & Lauff, 2007; Hearn, 2001; Goldin & Katz, 2009; Schneider & Stevenson, 1999). For instance, there is a growing number of young adults between the ages of 16 and 24 who are graduating from high school in the United States (Wong, 2016). Despite these gains, studies found the gap between high school graduation and college enrollment rates have widened in American society, especially among low-income,

Black, and Hispanic students (Bozick & Lauff, 2007; Engberg & Wolniak, 2010). According to the Bureau of Labor Statistics (2016), only 69.7% of those who graduated from high school enrolled immediately after high school graduation.

The reason that such a gap exists is that the American education system is "rooted in democratic localism, [where] schools are embedded within districts, and the quality of schools varies with socioeconomic conditions of their surrounding communities" (Engberg & Wolniak, 2014, p. 240). Consequently, students who enroll in those schools with various socioeconomic conditions gain different learning experiences and develop different educational aspirations and achievements. Some environments are more conducive to college-going culture than others. For instance, students from low-income families were less likely to enter colleges immediately following high school graduation than wealthy families (see Bozick & Lauff, 2007). School-wide disparities in postsecondary access exist among low-income students and exist among students of color, particularly Black and Hispanic students (Bozick & Lauff, 2007). As Schneider and Stevenson (1999) and Goldberg et al. (2001) observed in their studies, many high school students have high ambitions and desire to become doctors, lawyers, and teachers. Nevertheless, many students could not actualize their dreams because they lack the resources or the appropriate environments to nurture their ambitions and goals (Cooper & Liou, 2007).

One way to understand which school factors influence students' educational aspirations and achievements is through looking at a school's "college-going cultures". According to Bryan and her colleagues (2017), college-going cultures assess schools' capacity to support their students' postsecondary education, such as whether the school fosters a college-going culture is assessed by the college expectation and the availability of college talks given by the school counselors, teachers, and other teaching staff to their students about attending colleges (Holland

& Farmer-Hinton, 2009; McClafferty et al., 2002). The inconsistency of college cultures found across all American public schools mirrors the unequal access to postsecondary education and preparation in supporting student learning. According to the existing literature (e.g., Cooper & Liou, 2007; Corwin & Tierney, 2007; Farmer-Hinton, 2008; Holland, 2007; Holland & Farmer-Hinton, 2009; and McClafferty et al., 2002), an influential college culture consists of both tangible resources accessible for college preparation and effective environments in preparing all students toward postsecondary education. Unsurprisingly, school resources and environments often go hand-in-hand. When a school does not have enough college preparation resources, the likelihood of promoting college-going culture is considerably weak. However, building on existing literature and for clarity purposes, college culture in terms of school resources and school environments is discussed separately.

School Characteristics and Resources

High school characteristics are important measures in the academic literature on educational aspirations and achievements. Particularly, a correlation was found between school size and the amount of college culture that exists in a high school. Students, particularly Black and Hispanic students, tend to struggle academically and have low testing scores (ACT, 2013; Greene & Forster, 2003; Lee et al., 1997) and have higher dropout rates at large schools (Baker et al., 2001). Although there is no consistent definition of what constitutes a small school (Holland & Farmer-Hinton, 2009), small schools or small class sizes seem to generate a more cohesive school culture, which facilitates teachers and school staff to build trusting and caring relationships with their students (Cassidy & Bates, 2005; Kahne et al., 2006; Stipek, 2006; Walsey et al., 2000). Reciprocally, when the students feel respected and see their teachers who genuinely care about them, they would work hard, become more engaged in school

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extracurricular activities, and are more likely to graduate from high schools (Davidson, 1999; Jimerson, 2006; Kahne et al., 2006; Wasley et al., 2000).

Additionally, where the school is located affects students' educational aspirations and achievements. For instance, schools in large cities are often overcrowded with a high concentration of Black, Hispanic, and low-income students (Cooper & Liou, 2007; Fry, 2005; McDonough, 2004; Roscigno et al., 2006; Yun & Moreno, 2006) and schools in the rural areas often consist of students who are low-income and White students (Roscigno et al., 2006; Wilson, 1980). The schools in these locations often lack insufficient human and material resources about college enrollment and preparation. For instance, impoverished urban and rural schools often experience lower per-student expenditures, higher percentages of free/reduced lunch programs, higher concentrations of minority students, fewer school resources, and more inexperienced and out of qualified instructors than schools in the affluent communities (Caldas, 1993; Lee, 2000; Lee & Croninger, 1994; McNeal, 1997; Roscigno, 2000; U.S. Department of Education, 2004). These difficulties often place students in urban and rural schools at a disadvantage in their college planning and college preparation (Cabrera & La Nasa, 2000; Venezia et al., 2003; Yun & Moreno, 2006), especially when most of them are first in their families to attend colleges (Corwin & Tierney, 2007).

Unlike their Asian and White peers from more affluent schools, Black and Hispanic students have limited cultural and social capital from their families related to college choices (Farmer-Hinton, 2008). They usually rely on their schools for such support even though their schools also face inadequate resources. According to many scholars in the field of higher education research (e.g., Engberg & Wolniak, 2010; Hill, 2008; Perna & Titus, 2005; Wolniak & Engberg, 2007), the amount of social and cultural capitals available at a particular high school

can make up for the lack of family resources on students' postsecondary education choice. Furthermore, the student population's racial makeup at a school can also contribute to postsecondary enrollment. For example, Perna's (2000) study found the probability for Black students to enroll in four-year colleges was higher if they went to a segregated high school, but the likelihood for White students to enroll in four-year colleges was less if they attended a predominantly White high school (schools comprise between 10% and 29% of the African Americans and Hispanic students) (Perna, 2000).

Finally, the types of academic experience a school can offer often play a critical role in formulating youth's educational aspirations. Thus, some researchers and policymakers have suggested making AP courses, dual program, and Honor classes available to all high schools in America to provide opportunities for all students to engage in college-level work (Bailey et al., 2002; Kolluri, 2018; Rothschild, 1999; Tugend, 2017). Unfortunately, many poor-performing schools do not offer academically rigorous courses (Fry 2005; Holland, 2008; NCES, 2004, 2005, 2008; Roscigno et al., 2006), even though some studies found that rigorous courses have positively influenced youths' aspirations to attend college (Dougherty et al., 2016; Taggart & Paschal, 2019). For example, in Taggart and Paschal's (2019) study, the Hispanic students who enrolled in AP courses were five times more likely to enroll in college than the Hispanic students who did not enroll in AP courses. Data released by the United States Department Office of Civil Rights (2014a, 2014b) extends the support that the level of coursework available at a high school was identified as one of the key areas in determining students' achievement in high school preparedness for college entry. Taking more courses, particularly mathematics, is positively associated with college readiness (Howell, 2011; McGee, 2013; Musoba, 2011; Roderick et al., 2011).

However, the effectiveness of the college-prep programs has been mixed: studies have shown no substantial relationships between taking AP courses and student success in college (Jaschik, 2006; Kolluri, 2018), particularly at schools serving low-income students (e.g., Eckert, 2013; Harper, 2015; Klopfenstein, 2003; Levin, 2009; Ronfeldt et al., 2013; Zhou, 2003). For this reason, some scholars reject that poor-performing schools should model what has been working or deemed successful at affluent schools (Klopfenstein & Thomas, 2009; Hossler et al., 1999; Schneider & Stevenson, 1999). Other than rigorous courses do more harm to students' academic performance and college preparation at poor-performing schools. For example, disadvantaged students may not benefit from these advanced courses because they do not have the study skills that they can carry over into the AP programs (Levin, 2009; Zhou, 2003), and some poor-performing schools may lack certified or experienced teachers to teach these courses (Eckert, 2013; Greene & Forster, 2003; McDonough, 2004; Ronfeldt et al., 2013; Wimberly, 2002). To this end, school resources alone are not adequate in preparing students for college.

Meaningful Relationships at Schools

While academics are important, a school that only emphasizes learning and academic achievement is insufficient in developing students' educational aspirations. For this reason, they propose schools, particularly the ones that serve high proportions of low-income, Black, and Hispanic students, should create an environment that encourages intimate and supportive interpersonal relationships between school personnel and students (Corwin & Tierney, 2007; Holland & Farmer-Hinton, 2009). According to Eccles et al. (1993) and Hopson and Lee (2011), a conducive learning school environment is especially critical to students living in poverty. When a high school establishes a college culture that encourages and expects all their students to

attend college (Corwin & Tierney, 2007), the students will feel respected and valued (National Research Council, 2004; Ryan & Deci, 2000).

The relationship between teachers and students is critical in building an effective school environment that promotes college-going culture (Corwin & Tierney, 2007). According to Thompson et al. (2008), experienced teachers are the most important in-school factor affecting students' academic achievement in high schools and college readiness. They are great resources in preparing students for college admission as they bring high-level instruction in challenging courses (Flores, 2007). Nevertheless, experienced teachers are often missing in high-poverty, high-minority schools, and greatly hurts the achievement and college readiness of Black, Hispanic, and low-income students (Flores, 2007). Also, experienced teachers tend to have less issues with deficit thinking or perception about racial/ethnic minority students (Thompson et al., 2008), and they are often more culturally proficient in working with racially and culturally diverse students (Welton & Martinez, 2014). Often, these skills facilitate the establishment of meaningful and caring relationships between students and teachers. However, Holland and Farmer-Hinton (2009) asserted that teachers solely express their high expectations to enhance students' educational aspirations is not enough. Rather, teachers are responsible to share their college experience (Corwin & Tierney, 2007), disseminate information about the college, encourage their students to take more rigorous courses, and execute college plans to make sure that their students are preparing and attending colleges (Holland & Farmer-Hinton, 2009). When students see that their teachers and school staff hold high expectations about their learning, meaningful teacher-student relationships have been established. In return, students would feel motivated to work harder, committed to school (Cassidy & Bates, 2006; Pianta, 2002; Schussler

& Collins, 2006; Wasley et al., 2000), and become more confident and persistent in their learning as well as more risk-taking in challenging coursework (Stipek, 2006).

Teachers' active involvement and guidance in a student's school life can help students to "acquire the foundation necessary to succeed in future academic endeavors" (Holland & Farmer-Hinton, 2009, p. 89). However, not all students have such close relationships with their teachers. The role of guidance counselors is vital for underrepresented students since they hold key information about the college application and postsecondary enrollment (Corwin & Tierney, 2007; Farmer-Hinton & Adams, 2006; Wimberly & Noeth, 2004; Holland & Farmer-Hinton, 2009). Due to limited access to academically rigorous courses, low-income or disadvantaged students do not have as many opportunities as their high-achieving peers to interact with teachers who have the resources to prepare students for postsecondary education (Stipek, 2006; McDonough, 2004; Venezia & Kirst, 2005). Thus, guidance counselors "are significant distributors of information that shape future academic and career possibilities for students" (Cooper & Liou, 2007, p.47). They can influence students' college and career planning by helping the students to identify their best options based on their potential and goals (Ward, 2006). Schneider and Stevenson warned that when school services such as guidance counselor programs do not offer information that aligns with students' ambitions, it prevents students from actualizing their goals and eventually diminishes students' curiosity and motivation in learning (1999). So, effective counselors know what courses students should take in order to be a competitive candidate for college admission (Musoba, 2011) and understand how marginality, culture, and power relationships limit college preparedness for low-income students and students of color and their families (Holcomb-McCoy, 2010). They would know where to locate the

resources such as financial aid, scholarships, and testing assistantships for their students in need (Tsoi-A & Bryant, 2015; Corwin & Tierney, 2007).

Therefore, students' beliefs and expectations can be translated into their competence and educational and occupational abilities (Zimmerman & Rappaport, 1988). Children with higher academic self-efficacy achieve higher grades, test scores, and high school completion (Chin & Kameoda, 2002). In order to improve students' academic performance and prepare them for postsecondary education, schools should realize that they are responsible for developing students' educational aspirations and make sure all their students have the opportunity to get a college degree regardless of their socioeconomic situations and racial/ethnic backgrounds (McDonough, 1997). Promoting college-going culture within schools would require schools to have sufficient resources and positive environments, such as a rigorous academic curriculum, intimate and caring relationships, experienced and certified teachers, and effective guidance counselors that work in harmony preparing their students for college (Achinstein et al., 2015). Moreover, schools should ensure that all students are treated equitably. The students might not be outspoken about their feelings, but they are sensitive and know what is fair and not. Inequitable treatments can trigger negative feelings and distrust, which can lead to poorer perceptions of school climate (Benner & Graham, 2011), school belonging (Cammarota, 2014), a loss of academic motivation (Perreira et al., 2010), depreciation of education (Mroczkowski & Sanchez, 2015), and dropout (Luna & Revilla, 2013). Thus, a poor school climate that generates hostile and hurtful feelings can negatively impact students' academic performance.

Family Context

Schools have some control in helping youth develop their educational aspirations, but schools do not control the events taking place at individual adolescents' homes. According to the

National Postsecondary Education Cooperative (NPEC, 2007), "for traditional-aged students, across ethnic and racial categories and regardless of SES, parents play the strongest role in the college choice and decision-making processes" (p.39). Studies that compared the effects of resources between family and high school found the former has a more substantial impact on students' academic achievements (see Entvvisle et al., 1997; Jencks & Phillips, 2000). There are many factors under the family context, such as family wealth (e.g., Elder, 1998; Elder et al., 2003; Perez-Brena et al., 2017), family cultural and social capitals (e.g., Corwin & Tierney, 2007; Dufur et al., 2013; Farmer-Hinton, 2008; Sandefur et al., 2006), and parental involvement/expectation (e.g., Domina, 2005; Fan, 2001; Fan & Williams, 2010; Jeynes, 2005; Ross, 2016). However, not all these factors have an equal or same effect on adolescent's educational attainment. Thus, they are discussed separately below.

Family Wealth

In Schneider and Stevenson's (1991) study, all adolescents expressed their high educational and career expectations of becoming lawyers, doctors, or teachers. The adolescents also knew that they needed to obtain at least a bachelor's or higher degree to realize their career expectations. Unfortunately, not all adolescents in Schneider and Stevenson's study were able to enroll or even complete a college degree, and one of the major factors that kept them from getting a postsecondary education was their family financial constraints. Often, adolescents must either delay or forego their higher education by the burden of the increasing cost of college tuition (Elder, 1998; Elder et al., 2003; Freund & Baltes, 2002).

Studies have found a positive connection between family income and children's high school completion and college enrollment (e.g., Nam & Yang, 2011; Ziol-Guest & Lee, 2016). Children from families with high incomes have higher academic achievement than economically

disadvantaged children (Conley, 2001; Ellwood & Kane, 2000). However, some researchers argue that the discrepancies of parents' income on educational attainment exist among current empirical studies. For example, In Morgan and Kim's (2006) and Ellwood and Kane's (2000) studies, the likelihood of college enrollment did not differ between children from high-income and low-income families after controlling for their academic achievement in schools. However, in Belley and Lochner's (2007) study, parents' income exhibited a substantial increase in college attendance but played an insignificant role in high school graduation.

The inconsistent findings suggest that parents' economic status (income) may not fully explain the variation in children's educational attainment (Kim & Sherraden, 2011; Huang et al., 2009; Nam & Huang, 2009). For this reason, recent empirical studies have shifted their focus from family income to parental assets in relation to child development and educational attainment (e.g., Conley, 2001; Destin & Oyserman, 2009; Nam & Huang, 2009; Shanks, 2007; Yeung & Conley, 2008; Zhan & Sherraden, 2003). In these studies, some results illustrated that parental assets were similar to parental income; they significantly increased children's educational attainment (Conley, 2001; Haveman & Wolfe, 1995; Nam & Huang, 2009, 2011; Zhan & Sherraden, 2003). Other findings extended the assertion that different types of family wealth have different lasting impacts on adolescents' education outcomes (Huang et al., 2010). For example, Nam and Huang found that parents' assets were pivotal for high school completion, and parents' income did not significantly associate with the children's likelihood of finishing high school (2011). Another study worth noting is conducted by Huang et al. (2009), who used structural equation models to test and compared the impact of family income and family assets (liquid assets and net worth) on children's academic ability and college enrollment after controlling for family characteristics. Their findings suggested that parental income and assets

were substantial in the early years of their children's lives and played an important role in their children's educational attainment (Huang et al., 2010). Furthermore, Parents that owned homes were identified as the strongest predictor in the likelihood of children graduating from high school and attending college (Kim & Sherraden, 2011). It is recommended that family economic resources on educational attainment should include family assets in their analysis (Huang et al., 2010).

Parent's Cultural and Social Capitals

In addition to family wealth, a large body of research indicates parental education is another significant predictor of children's educational attainment and college enrollment (see Égalité, 2016; Engberg & Wolniak, 2010; Kimmes & Heckman, 2017; Ward, 2006). The level of parent's education determines the types of college information available to their children (Crosnoe & Muller, 2014; Engberg & Wolniak, 2010). It is well documented the correlation between parents' educational attainment and the amount of family financial resources. However, what is less clear is how parents' educational attainment foreshadows the socio-cultural experiences children have lived through in their upbringing (Stewart, 2007).

In the literature on social capital and educational attainment, families' cultural and social capital significantly influence adolescents' educational outcomes (Dufur et al., 2013; Sandefur et al., 2006). The interrelatedness between parents' educational attainment and parental socioeconomic status demonstrates that "educational capital enables individuals to transform it into other forms of capital such as economic, cultural, and social" (Ani-Asamoah Marbuah, 2016, p.6). According to Coleman (1988), parents' social ties and personal contacts are critical in determining their children's educational attainment. Notably, parents' cultural and social capitals represent the types of information that higher- and lower-SES parents can provide to their

children's schoolwork, which influences their children's academic success and college enrollment (SES; Battin-Pearson et al., 2000; Heckman & Krueger, 2005; Orfield, 2004). For example, affluent families have the resources to enroll their children in ballet, soccer, and after-school programs (Pew, 2015), as well as access to the best private tutors to keep track of their children's school work (Park et al., 2011). By contrast, children in low-income families tend to spend their after-school time at home, watching TV, or with extended families (Miller, 2015). Studies have found the differences in child-rearing have widened and set children on different educational paths that deepen inequality in wealth and social status (Miller, 2015; Tavernise, 2012). Different upbringing experiences affect the college completion rate between the rich and poor. In fact, that difference has grown by 50% since the late 1980s (Bailey & Dynarski, 2011).

Additionally, for parents with higher educational attainment, they are more likely to have the networks and social ties as resources to help their children in schooling and transition to postsecondary education (Kim & Schneider, 2005; McNeal, 1999; Morgan & Sorensen, 1999; Smith et al., 1995; Stanton-Salazar & Dornbusch). Studies have found that highly educated parents are more likely to educate their children at an early age. For example, they would read more to their children to broaden their vocabulary, enhance their communication skills, use social capital to promote their children's learning and pay attention to their children's teachers (Egalite, 2016). As a result, these children tend to do well on the achievement tests, receive higher grades in school, and graduate from high school (Felner et al., 1995; Roscigno, 2000). In fact, parents with a college degree have been considered the first resources for their children about college opportunities (Kiyama, 2010).

Parent's Involvement and Expectations

Research has consistently found that parents' involvement in school-related activities benefits children's academic achievement, behavior, motivation, engagement, and self-efficacy (Domina, 2005; Fan, 2001; Fan & Williams, 2010; Jeynes, 2005). According to Fan (2001), the positive effect of parental involvement on younger children has been more consistent than on older ones. Research has found parental involvement improves elementary and middle school students' reading and mathematics skills (Jeynes, 2005; Sheldon & Epstein, 2005; Sirvani, 2007; Sui-Chu & Willms, 1996; Yan & Lin, 2005), their positive student behavior (Domina, 2005), school attendance, class preparation, and course completion (Simon, 2001), as well as student motivation and academic self-efficacy (Fan & Williams, 2010; Gonzalez-DeHass et al., 2005).

However, studies that analyzed parental involvement in secondary students' schooling show mixed effects (Fan, 2001; Ross, 2016). Three main reasons and one limitation that may contribute to the discrepant effects of parental involvement on older children. First, research has shown a steady decline in parental involvement as students transition from middle school to high school (Eccles et al., 1993; Spera, 2005). The transition from middle school to high school is crucial for adolescents to make sense of their social belongings and redefine their identities (Sandler, 2000). Sometimes negatively affect adolescents' academic achievement and college preparation as they want more independence and autonomy from their parents.

Second, because there is little useful information for guiding parents to be effectively involved in secondary students' schooling (Ross, 2016), parents find shifting their role from supervisory and managing to a supporting role during adolescents' transition to adulthood difficult (Chao & Hill, 2009). Not all types of parental involvement have an equal impact on students' academic outcomes (Fan & Chen, 2001). Ross (2016) examined how different aspects of parental involvement influenced students' high school completion and postsecondary

attendance using ELS:2002 base year and first follow-up datasets and found parent participation in school functions and parents' aspirations for their children' postsecondary education positively correlated with their children's high school completion and postsecondary attendance. However, parent-school communication concerning children's school problems and family rules for doing household chores were negatively correlated with their children's high school completion and postsecondary attendance. Ross asserted that it would be insufficient and incomplete for studies to examine the impact of parental involvement and expectation as a general concept without breaking it down into various activities related to parents' engagement in their children's learning (2016).

Third, parental involvement/expectation is a multidimensional construct, so there is no consistent definition of what it entails (Epstein, 1995; Fan & Williams, 2010; Ross, 2016). Parental involvement and expectations, the two terms, have been used in educational research interchangeably. They both encompass parents' attitudes and behaviors that propel their children's academic and social success (Fishel & Ramirez, 2005). According to Epstein (1995) and Debacker and Routon (2017), parents' expectation/involvement can translate into effective academic behaviors and activities that directly affect the beliefs of their children: including parents' education aspirations for their children (Bloom, 1980); parents-children conversations about college and school matters (Christenson et al., 1992); parents can get involved in their children's school activities (Stevenson & Baker, 1987) such as communicating with teachers about their children (Epstein, 1991); and monitor and supervise their children at home about their homework, home chores, and hours spent on leisure activities (Keith et al., 1993, 1986; Marjoribanks, 1983).

Last, a limitation is due to the quantitative research design. Unlike an interview design that provides the flexibility for researchers to collect a range of information on parental involvement, a survey question such as "how far do you expect your child to go in education?" cannot capture what educationally beneficial activities and behaviors are found in a child's family. This explains why there is a lack of compelling quantitative research evidence to assist parents in their children's learning as they transition from middle school to high school. Nevertheless, the answer to this question entails the long-term effects these activities and behaviors have on a child's development (Fan, 2001). As Fan (2001) asserted, parents' education aspirations for children are much more than just a wish or desire. Parents' expectations can be reflected in their decisions and investment in their children's learning concerning where their children should attend schools, what extracurricular activities their children should participate in, and whether their children need tutors to improve their academic performance (Debacker & Routon, 2017). When parents are more involved at home and school, their children have higher reading and math achievement (Eamon, 2005; Lee & Croninger, 1994; Parcel & Dufur, 2001).

While previous research confirms that parental expectations play a major role in children's educational outcomes, high expectations alone may not be adequate to push students to reach their ability (Domina, 2005; Fan, 2001; Izzo et al., 1999). In order to improve students' academic success, researchers believed that parents should supplement their expectations with meaningful activities, such as working with children on college selections and accompanying their children to college visits (Chao & Hill, 2009; Schneider & Stevenson, 1999). Additionally, research has found that differences in parental involvement and expectations exist across SES groups. SES is a measure of social status among individuals or groups and entails information

about an individuals' education, income, occupation, and the types of social, cultural, and human capital they have (Enberg & Wolniak, 2010).

Sometimes, parents' SES could add a layer of complexity in our understanding of parental expectations of children's educational attainment because the findings are often inconsistent and inconclusive. For example, the study of Yan and Lin found parents of color (mainly Black and Hispanic parents) were less actively involved in their children's learning than White parents (2005). On the contrary, Sui-Chu and Willms (1996) showed that Black and Hispanic parents in their sample are more involved than White parents in their children's education. Another study done by Hill et al. found no differences in parental involvement across race/ethnic groups (2004). Further, due to different cultural practices, limited access to information, and a lack of understanding of college choice, parents' behaviors and beliefs are easy to be mistaken for apathy when directing their children's education (Fan, 2001; Ross, 2016). This is quite common for foreign-born parents. Because of their cultural background and language and community barriers, they may be misconstrued for being indifferent to their children's school life. According to deCastro and Catsambis (2009), many Hispanic parents in the U.S. would not question or challenge school officials to make decisions for their children's learning because school personnel are typically perceived as competent authorities. For that matter, school leaders should promote family-school relations by encouraging parent-staff interactions (deCastro & Catsambis, 2009; Fraser et al., 2004; Hill & Chao, 2009; Hill, Hoover-Dempsey et al., 2009; Hill et al., 2009). When parents of color or low-income parents become acquainted with the complex system of American schools and acquire the skills to support their children, they can advocate for their children and promote academic success just like the well-educated and affluent parents do (Olivos, 2006; Smith et al., 2013).

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Peer Context

Peer influence in the ecological model represents another immediate environment with direct and indirect effects on adolescents' development (Brofenbrenner, 1979). It consists of the social norms that allow adolescents to smoothly interact and communicate with their peers (Kremer et al., 2018) and serve as a marker of social acceptance and expectation (Brown, 1999). Peer influence has been long researched in the educational attainment literature since the 1970s (Alexander et al., 1975; Alwin & Otto, 1977; Jackson, 1990; Nolfi et al., 1978). It plays a critical role in shaping students' ways of living and thinking. Skinner (1976) states that adolescents tend to associate themselves with peers who share similar values and conform to their groups' social norms. Unsurprisingly, adolescents sometimes can be socially pressured into bad and unhealthy behaviors, such as smoking (Ennett & Bauman, 1994; Urberg et al., 1996), taking drugs (Cairns & Cairns, 1994), and alcohol use (Urberg et al., 1996). Studies also show that peer influence influences youths' academic achievement (Mounts & Steinberg, 1995). Adolescents and their peers tend to share a similar academic achievement (Chen et al., 2003; Ryan, 2001), learning motivation (Kindermann et al., 1996; Ryan, 2001), and educational expectations (Cohen, 1977; Kiuru et al., 2007). Thus, peers could have both positive and negative impacts on adolescents' development.

During the transition to adulthood, adolescents spend considerable time with their peers. While they make sense of their social circles by developing meaningful relationships with a select few (Holland, 2011), they also try to solidify their identity by associating themselves with others that are similar in age, academic achievement, and social experiences (Arnett, 1999; Brown, 1999). Adolescents' relations with their peers can take on many forms, such as a dyad (a mutual relationship between two individuals), a self-nominated friendship group, or a clique (Kiuru et al., 2007). Each type of peer relation appears to have various degrees of impact on

adolescents' educational aspirations and academic achievements. For instance, in their study sample, Nichols and White (2001) found high school students who claimed to be part of a clique performed higher on math than students who were not part of the clique. Another study investigated peer influence in larger group contexts and found girls were more cohesive than boys, and female peer group members were more likely to develop similar educational expectations than male group members (Kiuru et al., 2007). Additionally, some scholars believed that dyad relationships between best friends appeared to influence adolescents' verbal achievement and delinquent behavior more than general classmates or neighbors (Duncan et al., 2001; Holland, 2011). Similarly, Wu's (2015) finding suggested that how inspired their best friends were about college-going were closely associated with adolescents' college decisions.

Researchers have long been interested in understanding whether parents or peers influence adolescents' educational aspirations and achievement. The findings are often mixed and/or inconclusive. Some scholars found that peer influence may be minimal and incomparable to parents' influence (e.g., Hossler et al., 1999; and Scheneider & Steven, 1999), and may complement parents' influence further support adolescents college-going behaviors (Kremer et al., 2018). Studies also indicated that peers could create an important context for thinking about, preparing for, and choosing postsecondary education options (e.g., Bedsworth et al., 2006; Cunningham et al., 2009; Pérez & McDonough, 2008; Sokatch, 2006). Moreover, Picou and Carter (1976) asserted that peers are a better predictor of adolescents' educational aspirations than parents. Instead of acting as a supplementary role to parents' influence on their educational aspirations and achievement, peer influence gradually replaces parental influence when children reach adolescence (Brown, 2004; Magnusson & Stattin, 1998; Kiuru et al., 2007). As Harris concluded, despite the family environment continuing to play an active role in a child's life, peer

influence becomes much more influential in adolescents' decisions than parents' influence during their high school years (1995).

One of the reasons that peers often play a critical role in adolescents' development is that adolescents often mirror their peers' behaviors. Youths often compare themselves to their peers as well as evaluate and assess their present and future plans against their peers' (Holland, 2011; Cunningham & Meunier, 2004; Cunningham et al., 2003). Since adolescents spend most of their time at school, the people they have the most interactions with are their teachers and peers, and they often feel closer to their peers because of their shared school experiences. Thus, it is common for adolescents to seek advice and feedback from their peers as well as discuss their plans with each other (Malmberg, 1996). According to Kiuru et al. (2007), when adolescents are not sure about their future education, such as whether they should attend college, they would aim to align their plans with their peers or follow a similar path as their peers.

Seeking support and guidance from peers is particularly important for low-income students, students of color, and first-generation college students in cases when the adults in their life cannot provide sufficient help for postsecondary education planning (McDonough, 2004; Azmitia & Cooper, 2001; Gandara, 2005; Grubb et al., 2002). As Pérez and McDonough (2008) asserted, first-generation college students sometimes rely heavily on their peers for college-going. The peers could act as college advisors and mentors for Black students (Holland, 2011). They encourage their friends to work on their college-going plans, share their college experiences, and express their support by engaging in academic activities. Sokatch noticed that how peers plan and prepare for college is likely to increase adolescents' college-going chances, especially attending four-year institutions (2006).

To combat the disparities in college access and college enrollment, peers, according to Holland (2011), can make up for the support and inspiration for educational aspirations that some Black students may not receive from the adults in their lives in several ways. First, peers can offer emotional and instrumental support to create resilience and persistence for their classmates (Rivera, 2014). In order for Hispanic students to successfully apply to college, Rivera asserted that they need more than simply taking the right courses with high GPAs; but they also need their peers' guidance and support to initiate the college application process (2014). Therefore, some adolescents would need to experience or go through tasks with their peers to feel motivated to enroll in colleges. For example, Sokatch's (2006) study noticed that students are more likely to attend four-year institutions if their friends have done the same. Similarly, it is typical for adolescents to select a particular institution where they know someone has studied or is currently studying (Pérez & McDonough, 2008). Such a pattern can also be seen in college completion among students and their peers (Bedsworth et al., 2006). When students receive little or no college counseling, they become overly reliant on their peers' suggestions and thoughts (Bedsworth et al., 2006; Griffin et al., 2007; Sokatch, 2006). Consequently, peers can have a great influence on their college choices. In Kim's (2004) study, about thirty percent of Hispanic students decided not to enroll in their first-choice colleges due to their friends' opinions. Additionally, peers can establish a learning environment that normalizes and values academic engagement and achievement (Bedsworth et al., 2006; Johnson et al., 2005) because students are easily influenced by peer pressure to not reach their academic potentials (Steinberg, 1996). This is crucial for schools that serve in neighborhoods where students are more likely to be involved in dangerous and harmful activities, such as drinking, alcohol, smoking illegal substances, and violent or criminal conduct (Dubow et al., 2001). When schools create a positive and

encouraging learning environment, adolescents are surrounded by peers who think highly of learning, set college-going as one of their goals, and expect the same academic outcomes for their classmates. This can increase the likelihood of all students pursuing some form of postsecondary education (Bedsworth et al., 2006; Sokatch, 2006). Cunningham et al. (2009) confirm this belief and show that when high school students have low future expectations, their negative friends negatively impact their academic achievement. Conversely, their associations with negative friends do not hurt their academic achievement for students with high future expectations. Therefore, to increase students' high school completion and academic performance, adolescents' beliefs of their peers will complete high school (Williams et al., 2002) or witness how their peers plan and work toward postsecondary education (Bedsworth et al., 2006; Griffin et al., 2007) are crucial to their academic success.

Although we do not have definite answers to why some urban adolescents succeed in school and others don't, some scholars believe that some high-achieving urban students know how to camouflage and negotiate relationships with negative friends (Fordham & Ogbu, 1986; Horvat & Lewis, 2003; Stevenson, 1997). The concept of "camouflage" originated from the idea of "acting White" developed by Fordham and Ogbu (1986). According to Fordham and Ogbu (1986), some Black students perform poorly on their academics because they consider certain activities and behaviors to entail characteristics of being White. One of the activities related to acting White is being academically successful. Because interacting with negative friends is part of urban life for adolescents who grow up in urban communities (Cunningham et al., 2009), some high-achieving urban students mastered the skills of knowing when and how to camouflage (hide) "their academic prowess" from their negative friends to avoid confrontation and when to celebrate their academic success (Horvat & Lewis, 2003, p.269). According to Cunningham et al.

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(2009), camouflaging is a way for high-achieving students of color to shield off the negative peer influence on their academic outcomes. It is commonly found in studies that high-achieving students of color (e.g., Black students) would minimize the significance of their academic success and echo along with their negative friends about the affliction and stress caused by acting White (Fordham & Ogbu, 1986; Horvat & Lewis, 2003; Ogbu, 1992). However, the high-achieving students do not always hide their academic success; when they associate with peers who are also academically successful, they would share their achievements and discuss their aspirations (Horvat & Lewis, 2003). Their actions differ with different groups of peers demonstrate their academic resilience by exercising their efficacy to resist negative friends' influence and the label of "acting White" (Cunningham et al., 2009; Horvat & Lewis, 2003; Slaughter-Defoe & Rubin, 2001).

Community and Neighborhood Context

The relationship between community context and education outcomes, such as the likelihood of young people enrolling in college following high school graduation, has been understudied. Based on the articles reviewed for this study, research between the 1950s and early 2000s placed more emphasis on the effects of neighborhood and community on adolescents' development, their academic attitudes, and performance at the secondary level (e.g., Ensminger et al., 1996; Roscigno et al., 2006; Williams et al., 2002). For example, multiple neighborhood indicators were tested to assess the direct and indirect effects on the likelihood of school dropout. According to Ensminger et al. (1996), there is a significant relationship between high school dropout and students' neighborhood; the middle-class neighborhood had a more substantial impact on high school completion for male students than female students.

Nevertheless, the research focus has shifted in the last two decades. Most of the recent studies have a narrower focus and paid more attention to student's participation in school- or community-based services or programs and their impact on adolescents' development in self-efficacy and self-empowerment (e.g., Chin & Kameoka, 2002; Lakin & Mahoney, 2006; Kapp, 2009; Wilson, 1991), learning experience (e.g., Nandan, 2010), cultural competence development of minority students (e.g., Vargas & Erba, 2017), as well as on students' intrinsic versus extrinsic motivation in engaging community services (e.g., Marks & Jones, 2004). Unfortunately, these studies made little connection between community-oriented activities or programs and students' decisions in college-going. The closest to students' academic achievement was Ellerton et al.'s (2016) study on how a community service-learning program improves high-risk junior and senior high school students' STEM knowledge to prepare them for postsecondary education. The community service-learning program was comparable to an afterschool program and claimed to promote students' interest in STEM to younger students, where the students demonstrated greater academic and developmental gains than children who did not participate in this program (Ellerton et al., 2016).

What specific community factors contribute to adolescents' educational aspiration and success, particularly college enrollment, has received less attention than factors related to school, family, and peers. For studies that do include community-related factors in their analysis, they are often perceived as secondary-level or covariate variables in examining the relationships between educational attainment and family- and school- factors within a particular community context (e.g., Roscigno et al., 2006; Williams et al., 2002). Consequently, we know little about the direct and specific impact of community/neighborhood indicators on students' educational aspirations and academic achievements, such as community organizations and institutions like

churches and community service programs. Importantly, the resources and opportunities embedded in local communities are not always the same as the institutional resources at both the family and school levels. Therefore, it is worth investigating this topic because community-related factors could provide an alternative and a holistic perspective on how social and cultural capitals impact families, schools, and education outcomes in the neighborhoods as an interwoven issue.

Understandably, resources embedded in local communities are sometimes difficult to differentiate from family and school resources because local economic opportunities have a tremendous impact not only on family income but also on school resources. Previous studies found that the local economic opportunities affect the quality of living and family structure through the availability of stable jobs (Garrett et al., 1994; Roscigno et al., 2006; Willams et al., 2002). When economic well-being becomes a concern to parents, parents can spend a limited amount of time and money to invest in their children's learning. For instance, unlike middle- and upper-class parents, low-income parents do not have the money and the social capital to hire tutors to help with their children's academics, spare the time to talk with teachers about their children's learning, or manage their children's afterschool and weekend in educationally enriching ways (Lareau, 2002; Roscigno et al., 2006; Willams et al., 2002). Moreover, the local economic opportunities determine the available funds generated through local property taxes that are available to schools (Roscigno, 1995; Roscigno et al., 2006; Wenglinsky, 1997; Willams et al., 2002). Whether schools have sufficient funding to invest in students is captured with the number of full-time accredited teachers available to teach the students and the school expenditure on each student (Roscigno et al., 2006; Williams et al., 2002).

However, the stark differences in family income, parental education, and disparities in school resources are inseparable from their geographic locations. For instance, urban and rural areas differ substantially from suburban places regarding the availability of local resources. According to Wilson (1987) and Williams et al. (2002), many industries began moving out of large cities in the 1970s, and stable jobs became scarce when middle-class families started to migrate to the suburbs, which caused not only the economy to falter in urban areas but also increased the number of people depending on government aid and low-paying service sector jobs (Ensminger et al., 1996; Roscigno et al., 2006; Williams et al., 2002). People who remained in large cities felt increasingly disconnected and marginalized from "mainstream values regarding work and education" (Ensminger et al., 1996, p. 2401) as they became increasingly isolated. Such drastic restructuring and relocation for the American industries also affected the rural areas, particularly in agriculture. Like urban migration, the depopulated rural areas have brought economic hardship and isolation to the people who remained living there. The increasing unemployment rate and growth of part-time service jobs constrain the family resources in raising children (Duncan, 1996; Meyer & Lobao, 1997).

In contrast to the aforementioned negative scenarios for urban and rural areas, suburban areas have been less affected by American industries' decentralization and relocation. Rather, suburban areas have been thriving and are composed of a higher percentage of higher-educated, two-parent families with lower poverty rates (Roscigno & Ainsworth-Darnell, 1999; Roscigno et al., 2006; Steelman & Powell, 1993). Thus, the school conditions in terms of academic performance and resources not only widened between urban, rural, and suburban areas due to the impact of the local economy, but they also became more racially and socioeconomically segregated (Roscigno et al., 2006; Williams et al., 2002).

Inequality reproduced by local advantages and disadvantages have important implications for educational success (Roscigno et al., 2006), meaning community effects have important consequences on its residents, especially its young people. Unlike the adults, due to their work in other cities, they may have limited contact with their neighborhoods, the youths' daily activities are situated in their neighborhoods. Therefore, youths who live in impoverished areas experience limited family support and ineffective schooling and face limited cultural support and networking opportunities, community resources, and racism (Venezia & Jaeger, 2013). Previous research has consistently found that most schools with low academic achievement often serve the most impoverished students in the U.S. and are located in the most disadvantaged rural and urban areas of the country (Roscigno et al., 2006). The quality of schools cannot be solely blamed for inadequate academic achievement. According to Fraser et al. (2004), when children grow up in a stressful environment where order, safety, positive role models, social networks and resources, and community cohesiveness are missing in their daily life (Chin & Kameoka, 2002; Furstenberg, 1993), they would result in poor academic achievement and high school completion. Due to the decline of urban communities (Wilson, 1996), violence, gangs, and illegal drugs are more likely to have a stronger pull on boys (Case & Katz, 1991; Williams et al., 2002). Since it is hard for children to see opportunities for stable jobs in these underserved neighborhoods, they are often forced to learn how to navigate street culture to survive and engage in illegal activities to make a living (Williams et al., 2002).

Previous research has found that boys are more vulnerable and sensitive to their neighborhoods than girls. According to Ensminger et al. (1996), boys are more likely to complete high school if they live in a middle-class neighborhood. On the contrary, urban neighborhoods that are disorganized and experiencing higher crime rates and violence could

compromise students' and teachers' safety and their well-being, which makes learning challenging (Berliner, 2010). Single-parent homes are the most common family structure for children who grow up in urban areas. Research has found that single-parent children are less likely to graduate from high school and have less favorable academic, economic, and social outcomes on average (Salem et al., 1998; Sandefur et al., 1992; Zimilies & Lee, 1991). In fact, low academic achievement is common among children who grew up without a father figure in their homes (Williams et al., 2002).

One of the social institutions within the community context worth mentioning that has received little attention in educational research is local churches. Churches have proven effective at preventing Black youths from participating in street activities or engaging in delinquent behaviors (Bachman et al., 1993; Donahue & Benson, 1995). In Williams et al.'s (2002) study, youth who associated with friends who are regular church-goers were more likely to have higher GPAs and less likely to be suspended from school. Similarly, Jeynes (1999) also found that religious Black and Hispanic youths have higher academic achievement than their less religious peers after controlling for socioeconomic status and gender. Williams et al. (2002) recommended that more research is needed in examining the role of religiosity in a neighborhood on youth development because it could act as a protective buffer to ward off negative influences that exist around urban youth. For example, one study found that negative neighborhoods are not as distracting to youth who regularly attend church activities (Johnson et al., 2000).

Religious leaders could also serve as positive role models in neighborhoods where families have fewer social supports to inspire youths' educational aspirations (Hopson & Lee, 2011). When communities consist of adults who have higher learning experiences, youths' aspiration to pursue a college degree significantly increased (Brown et al., 2009; Venezia &

Jaeger, 2013). Therefore, churches and local youth organizations can work with the local schools

to provide alternative learning and safe environments for youths who live in neighborhoods

"where there are few choices of places to be that safe, organized, and academically stimulating"

(Williams et al., 2002, p. 427). The social capital at family and school levels can increase

substantially if the communities work together to complement each other in supporting youths'

development and can provide a protective social network to help youth negotiate their way out of

disadvantage (Furstenberg & Hughes, 1995). Researchers have recommended that local

governments implement preventive policies and programs to reduce risk factors and create a

protective atmosphere in communities where youths can focus on learning and thriving (Pollard

et al., 1999).

Finally, more studies are needed to understand the impact of community or neighborhood

on adolescents' academic achievement. Often in the discussions of academic achievement, race

as a control variable in explaining the differences and disparities among racial and ethnic groups

in comparison to Whites is narrowly studied (Chiswick, 1988; Herrnstein & Murray, 1994). The

entire picture of urban life or rural life is lost when a study only focuses on a segment/sample of

students of color, who are usually underrepresented racial/ethnic minorities. Failing to focus on a

more comprehensive group of students, including high-academic achievers and poorly

performing students in a study, many opportunities and struggles embedded in urban, rural, and

suburban areas remain unresolved and unidentified. Understanding what opportunities are

embedded in each type of geographic location does not undermine the existential problems

generated through poverty and lack of resources. Instead, it helps researchers realistically study

the struggles and challenges embedded in each type of educational setting and devise suitable

and meaningful solutions to the problem at the local levels. Therefore, it is important to

understand how and why some children from the same urban high schools or even live in the same neighborhoods are academically successful, but others do not. Recognizing the successes of some urban students can provide useful and efficient information to school leaders and policymakers. Based on these real and successful stories, the leaders could promote support to students who live in similar situations or environments.

Personal Goals (Individual Agency)

Personal goals in this study represents how individuals respond and react to the indirect and direct influence that immediate environments -- school, family, community, and peers -- have on them. Personal goals are not entirely about individuals' plans, goals, or ambitions for the future; they also represent the process or the agency that youths take to make sense of their surrounding environments and assess the accessible opportunities based on their everyday experiences. In the book, *The Ambitious Generation: America's Teenagers, Motivated But Directionless*, Schneider and Stevenson (1991) shared countless stories about how the ambitious American children across all SES and racial/ethnic groups either failed to attend colleges or dropped out of college later despite having high career expectations and aspiring to get a college degree. The authors concluded that some ambitious teens failed to accomplish what they dreamt was mainly due to the misalignment of school preparation and ineffective family support. I partially agree with their finding that the environmental factors play pivotal roles in adolescents' decision in pursuing higher education. Nevertheless, it is equally important to consider and weigh in how individual agency and personal factors have systematically affected their future choices and paths about attending colleges.

Previous research has asserted that alienating individual agency is to ignore personal effort and personal characteristics when getting things accomplished (Cabrera et al., 2012;

Lopez, 2001). As Rivera (2014) stated, "most research on college access and attainment focus mainly on environmental determinants, less often on individual characteristics, and seldom both in the same investigation" (p. 285). This is not only misleading but also limits our understanding of both environmental and individual factors interacting to influence college access and academic achievement. Thus, we do not adequately understand how adolescents' personal goals are associated with postsecondary education.

From an economic perspective predicated on human capital, whether or not adolescents should attend college, adolescents' decisions process acquires a thoughtful and logical assessment of expected economic and non-monetary benefits affiliated with advanced education (Paulsen, 2001). Adolescents might think like consumers when it comes to postsecondary enrollment. They would weigh the economic and non-economic benefits of an advanced degree with the risks, time, and effort put into their educational investment (Nee & Ingram, 1998). Therefore, adolescents' decision in college-going is far more complicated than what research generally suggests. For example, without factoring individual agency or personal goals in the studies, the effort and energy that school leaders and policymakers put in the work of improving students' academic accomplishments (Adelman, 1999; Perna, 2000, 2004), offering more financial resources (e.g., student financial aid, current loan limits; Ellwood & Kane, 2000; Paulsen, 2001), and ensuring the access to information (Perna, 2006) are more likely to flounder. Particularly, the existing research has found that adolescents who anticipate more personal control of their future prefer working over school to materialize their hopes (Trommsdorff et al., 1979). Instead of going to school, they choose to increase their control over their lives (Trommsdorff et al., 1979).

Similarly, students who bear a responsibility to support their families often factor in their family obligation into their educational and career decisions (Knight et al., 2010; Sy, 2006). According to Perez-Brena et al. (2017), because the family obligation varies for youths, so the responsibility to their family has a different impact on their education and career decisions. For instance, Sy (2006) conducted a qualitative study on family obligations and showed that instead of going to college, Hispanic youths would head to work immediately after completing high school to alleviate their families' financial circumstances. Similarly, both Sanchez et al.'s (2010) and Perez-Brena et al.'s (2017) studies noted that Hispanic youths whose families experience tremendous economic hardship would feel the responsibility to stay close to their families and financially support their families, resulting in the need to postpone or reduce their educational involvement. Nevertheless, when families experience low economic hardship, the opportunities for higher education become more accessible for youths who carry family obligations. Their educational aspirations increase as they feel the pressure to get a college degree to support their families to achieve social mobility (Perez-Brena et al., 2017).

Future Directions and Gaps in the Literature

In sum, after reviewing 297 articles across the past 20 years or so, these are the few common trends, themes, and gaps that have been identified concerning the associations between different social factors and postsecondary enrollment.

First, the current literature has paid more attention to individual environmental contextual factors and their associations with students' academic outcomes than individual student factors. Most of these studies concentrate on the factors related to an environment, such as school or family, or related to two environments (e.g., between school and family, school and peer, school and community, or parents and peers). Such an approach sets limitations on our understanding of

students' educational achievement as studies focused heavily on how one specific

experience/context, such as school, family, peer, or neighborhood, affects adolescents' college-

going behaviors. The narratives about a specific environment and its impact may be overly

emphasized, which overlooked the roles that other factors have on an individual's academic

outcomes. For instance, some studies found parents' income to be a robust predictor of

adolescents' college-going (Conley, 2001; Ellwood & Kane, 2000) and stressed the importance

of parental expectations and the students' self-awareness as significant factors in educational

achievement (Oyserman, 2013). However, other studies assert that tuition is the primary factor

that hinders youths from pursuing postsecondary education (Ellwood & Kane, 2000). Altogether,

these results showed mixed and incoherent signals to policymakers and school leaders,

minimizing the effectiveness and efficiency of some programs and policies targeted toward

educational reform and social change. Therefore, the effects of factors related to these

environments on adolescent's development and academic achievement should be explored

simultaneously.

Second, although research studies sometimes present this idea that if parents are more

involved and invested in their children's learning or if schools have more resources or more

qualified teachers, then the likelihood of going to college for youths would increase. Feuerstein

argues the process by which this effect occurs is often more complicated than what studies have

shown (2000). Thus, the current study is guided by the ecological model as its theoretical

framework, which "allows for the complex examination of multi-factor characteristics associated

with achievement" (Stewart, 2007, p.17). The distinct advantage of the ecological theoretical

framework is to produce the kind of findings that would offer important suggestions about the

interaction effects of these environments on educational attainment (Benner et al., 2008), which

is ultimately what policymakers, educators, and researchers hope for, to create an inclusive education system with diverse paths for students from all walks of life to have the opportunity to attend college.

Creating an education system that does not exclude some students from getting higher education brings my third point: understanding how adolescents' perception of postsecondary education aligns with their goals and plans for the future. Bronfenbrenner asserted that the microsystem environments directly impact their development (1979), affecting adolescents' experiences, behaviors, and perceptions about the present and future. For this reason, I decided to explore the relationships between adolescents' future aspirations and postsecondary enrollment as living and prone to change to examine whether adolescents' future aspirations change over time. Unfortunately, almost all the work in the educational research on the connections between adolescents' aspirations and academic achievement, including college enrollment outcomes, have narrowly focused only on adolescents' educational aspirations, except Cunningham et al.'s (2009) study, which investigated the association between adolescents' goals including both academic and non-academic future expectations and academic self-esteem and grade point average. In their study, Cunningham et al. concluded the importance and need for creating appropriate constructs that measure adolescents' future expectations to draw meaningful results (2009) because adolescents' educational aspirations provide inadequate explanations of why some students attend colleges and others forego higher education after completing high school. Its narrow focus seems to assume that only students with high motivation or high educational expectations will enroll and complete college. Nevertheless, we learned from Schneider and Stevenson's study that all students have high educational and career expectations, but some students did not attend or complete college (1991). Therefore, what factors prevent or support

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these highly ambitious adolescents from enrolling and completing college deserve to be studied further.

Based on my best knowledge, no study has created a multidimensional construct about adolescents' future aspirations that consists of both academic and non-academic goals (Cunningham et al., 2009; McCabe & Barnett, 2000), nor previous studies have explored the 14 items from ELS:2002 dataset pertaining to how youths felt about different aspects of their future and their relations to postsecondary enrollment. According to Duncan et al. (2001), "Comprehensive assessments of the influence of any one of these contexts (family, neighborhood, school, and peers) are difficult and therefore rare; rarer still are attempts to assess the relative importance of these various contexts for developmental outcomes" (p.437). For this reason, I followed McCabe and Barnett's (2000) recommendation to start from the very beginning to explore and establish the multidimensional construct for adolescents' future aspirations that consists of their educational aspirations as well as future expectations regarding their career, relationships with family and peers, community engagement, and personal goals.

Multidimensional Construct of Adolescents' Future Aspirations

Sometimes when a concept or construct is novel with little to no theoretical support, it is less examined or studied in research. For instance, unlike concepts such as height, gender, and race, which can be quantified and statistically analyzed directly (Blackstone, 2012), adolescents' future aspirations are complex and high-level abstract. This is even true to the most common variables we encounter in quantitative research, such as gender and race. Although we are getting better at quantifying them, they are still tricky, and we often construct them way too simply. For complex and high-level abstract concepts that cannot be observed directly, we would need to use a set of multiple indicators or observable variables to create better measurements and more

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accurate estimates for this type of construct (Mammadov et al., 2016). Therefore, in the

following section, I will discuss the earlier study on the establishing of multidimensional

construct of adolescents' future aspirations[2] using exploratory and confirmatory factor analyses

(see Lu et al., under review).

The Formation of Adolescents' Future Aspirations

Adolescents' future aspiration is a multidimensional construct that consists of adolescents'

education and career aspirations and non-academic goals. According to the ecological model

(Bronfenbrenner, 1979), school, family, peer, community, and personal goals are the immediate

environments that directly influence a child's development. To capture the overall effects of these

immediate environments have on the development of an adolescent's future aspirations, fourteen

survey items from the ELS:2002 (see Table 2.2) about youths' perception of school, work, family

relationship, friendship, civic engagement, community service, and personal goals in the future

were extracted. Table 2.1 listed the 14 aspiration indicators that represent multiple aspects that

adolescents felt about their future. For instance, there are items asking adolescents about the

importance of their future education (i.e., V1 and V14) and occupations (i.e., V5 and V13), and

there are also items about their personal goals (i.e., V3 and v12), their ideal relationships and

family (i.e., V2, V6, V8., and V11) as well as their commitment to civic engagement (i.e., V6

and V10).

In order to explore and identify the multidimensional construct of adolescents' future

aspirations, the previous study conducted exploratory factor analysis (EFA) and confirmatory

factor analysis (CFA) on the ELS:2002 student base-year data. The base-year data ($n=13,727$)

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[2] Adolescents' future aspiration was referred to as adolescents' life aspirations in the previous study. The term has changed in this study because the future aspirations appeared to be more appropriate to the study purposes that captures the changes or the transition of adolescents' plans from T1 (the base year) to T2 (the first follow-up).

was divided into halves. The first half ($n=6,820$) of the sample was used to explore the multidimensional construct of adolescents' future aspirations. The EFA results suggested that V9 (getting away from this area of the country) had the poorest correlation with other indicators (see Table 2.2), so it was dropped from further analysis. Four latent factors emerged in the EFA results after V9 was removed from the analysis, and these factors represented different domains of adolescents' future aspirations: 1) school and work, 2) relationships with family and friends, 3) civic engagement, and 4) personal goals. Then the second half ($n=6,928$) of the ELS:2002 base-year sample was used in CFA to validate further the relative fit of the four-factor adolescents' future aspiration model developed in the EFA. The fit-indices or statistics suggested the CFA model was acceptable, $\chi 2$ (59) =2724.909, $p<.001$; RMSEA = 0.057, 90% CI [0.056, 0.059]; CFI =.963. Figure 2.2, the CFA baseline model structure illustrated the number of indicators loaded on each latent factor and their estimates (factor loadings). Then, measurement invariance tests' results found these factor loadings operated equivalently for male and female students.

Finally, the study used structural equation modeling to predict the likelihood of going to college by assessing its association with each factor in the adolescents' future aspiration model after controlling for race, parents' educational levels, and school types. The results indicated that factor one, education and work, was statistically significant and positively related to college enrollment for both male students (β = .611, p <.001) and female students (β = .593 p < .001). Factor two, relationships with family and friends, was only significantly and positively associated with college enrollment for male students (β = .185, p =.002). Factor three (civic engagement) and factor four (personal goals) were negatively associated with college enrollment for male students (β = -.352, p <.001 and β = -.606, p <.001) and female students (β = -.316, p< .001 and β = -.398, p =.028). The results also showed that the adolescents' future aspiration

model has a good model fit. The four factors accounted for about 87.8% of the college enrollment variance for the male student group and about 88.7% of the variance in college attendance for the female student group.

Table 2.2

Polychoric Correlation Matrix

Variables	V1	V2	V3	V4	V5	V6	V7	V8	V9	V10	V11	V12	V13	V14
V1	1.000	`												
V2	.469	1.000												
V3	.212	.115	1.000											
V4	.397	.532	.148	1.000										
V5	.659	.496	.301	.495	1.000									
V6	.355	.352	.033	.366	.386	1.000								
V7	.464	.539	.206	.367	.512	.412	1.000							
V8	.180	.264	.152	.217	.215	.337	.327	1.000						
V9	-.064	-.092	.177	-.089	-.031	-.017	-.058	-.201	1.000					
V10	.201	.127	.098	.135	.185	.471	.270	.255	.208	1.000				
V11	.287	.727	.110	.390	.351	.305	.485	.297	-.071	.153	1.000			
V12	.343	.314	.256	.381	.358	.152	.226	.141	.059	.131	.329	1.000		
V13	.593	.221	.275	.207	.462	.260	.334	.152	.109	.265	.185	.296	1.000	
V14	.655	.357	.145	.336	.551	.465	.456	.308	-.101	.319	.289	.226	.504	1.000

Note. Refer to Table 2.1 for the corresponding variables.

The previous work (Table 2.3 contains the complete SEM results) suggested that adolescents' future aspirations are a multidimensional construct. It is concerned with students' academic and career aspirations and with other non-academic-related expectations. Each of these four factors has a different impact on adolescents' college enrollment. Inconsistent enrollment outcomes were also found among students of different races/ethnicities driven by materialistic expectations when accounting for school and familial characteristics. To extend the previous work on the associations between adolescents' future aspirations and college enrollment, I think it is important to explore the future aspirations model's multidimensionality using person-centered statistical approaches. The previous results indicated inconsistent enrollment outcomes among students of different racial backgrounds, school, and family characteristics, suggesting that we should not treat students the same. There is a possibility that these students could be clustered into different groups depending on how they felt about school and work, relationships with family and friends, civic engagement, and personal goals.

Finite Mixture Models

Given that students are proactive learners, they decide whether they should work or go to college after graduating from high school. It is essential to consider the pivotal role that students' agency plays in their decision-making about their future in relation to the immediate environments. Therefore, I decided to take a person-centered approach that appropriately aligns with the theoretical framework of the ecological model where individuals are placed at the center of their environments and the developmental process to capture individuals' interaction with their environments as well as their decision-making processes and adjustments to their life circumstances (Bronfenbrenner, 1979; Renn, 2003).

Table 2.3

The Adolescents' Future Aspiration Estimates on College Enrollment with Covariates

Variables	Student Aspiration Model Logistic regression (probit procedures)											
	Model Overall (N = 12,025)				Model Female (n=6,320)				Model Male (n=5,705)			
	Educ & work	Family & Friends	Help others	Personal Pursuit	Educ & work	Family & Friends	Help others	Personal Pursuit	Educ & work	Family & Friends	Help others	Personal Pursuit
Baseline Model	.624***	.108**	-.319***	-.589***	.593***	.052	-.316***	-.398**	.611***	.185**	-.352***	-.606***
Race												
Black	.807***	-.167	-.308***	-.361	.939*	-.104	-.342**	-.570	.939*	-.104	-.342**	-.570
Hispanic	.677***	.011	-.304**	-.607	.628***	.203	-.393**	-.713**	.628***	.203	-.393**	-.713**
White	.574***	.130*	-.289***	-.577***	.511***	.164*	-.285**	-.487**	.511***	.164*	-.285**	-.487*
Mother's education												
High school	.643***	.048	-.238***	-.576**	.643***	-.007	-.333***	-.220	.634***	.072	-.211**	-.631*
Two-year	.563***	.086	-.191*	-.606**	.501***	-.071	-.184	-.459	.476***	.250*	-.177	-.540*
Four year	.645***	.149	-.425***	-.624*	.632**	.117	-.177	.700	.709***	.195	-.674***	-.510
Father's education												
High school	.643***	.073	-.243***	-.581***	.621***	.022	-.261**	-.390	.618***	.129	-.249**	-.565*
Two-year	.749***	.092	-.336***	-.961**	.903**	.036	-.419*	-1.280	.507*	.237*	-.299**	-.635*
Four year	.533***	.099	-.392***	-.300	.448*	.152	-.533***	-.120	.599***	.017	-.311*	-.339

School Type												
Public	.662***	.061	-.285***	-.569***	.579***	-.029	-.287***	-.180	.714***	.157*	-.319***	-.740**
Private	.452***	.037	-.301*	-.471*	1.023	.295	-.778	-1.656	.332***	-.024	-.184	-.100
Free or Reduced Lunch												
Low poverty	.605***	.142**	-.298***	-.658***	.628***	.060	-.258*	-.637*	.561***	.257**	-.350***	-.611***
Mid-low poverty	.570***	-.022	-.123*	-.497*	.593***	.003	-.152	-.436	.448*	-.037	-.130	-.254
High poverty	.863***	-.366*	-.412**	.030	.421	-.513*	-.295	1.159	1.553*	-.171	-.594**	-1.389

Note. *p<.05; **p<.01; ***p<.001

Further, to justify the appropriateness of using a person-centered analytical approach for the present study, the following section will provide the background for variable- and person-centered methodological approaches with a specific focus on latent class and latent transition analyses.

Variable-centered Vs. Person-Centered Approaches

In general, there are two different analytical approaches to study latent constructs: the variable-centered approach and the person-centered approach (Laursen & Hoff, 2006). According to Howard and Hoffman (2018), the variable-centered approach is the traditional and widely used approach in the social sciences, and its goal is to investigate and explain the relationships among variables of interest in a population. The variable-centered analyses are useful in answering research questions and hypotheses pertaining to the effects of one variable on another, assuming that "the population is homogeneous concerning how the predictors operate on the outcomes" (Lauren & Hoff, 2006, p. 379). For example, a typical variable-centered research question would be, what is the impact of parental involvement on students' learning outcomes? Depending on the type of variables used in the study, typically, statistical techniques such as correlations, regressions, and structural equation models are implemented in the variable-centered analytical approach (Lauren & Hoff, 2006).

Conversely, the person-centered approach rejects the assumption that the entire population is homogenous (Howard & Hoffman, 2018; Lauren & Hoff, 2006). Instead, it emphasizes the "holistic-interactional perspective" (Magnusson, 2003, p.3) on human development "with respect to how variables influence each other" (Lauren & Hoff, 2006, p.379). The person-centered approach recognizes "the developmental processes of individuals cannot be understood apart from the environments in which they are born and live through the

life course" (Magnusson, 2003, p.4). Therefore, we cannot neglect the impact of different immediate contexts, such as school, community, family, and peers, on students' decision-making in regard to postsecondary education.

The person-centered approach is growing in popularity in the social sciences because it provides analytical tools to "identify groups or types of individuals who share particular attributes or relations among attributes" (Lauren & Hoff, 2006, p. 379). Some approaches are viable for cross-sectional data, such as profile, class, and cluster analyses, and other techniques, such as latent transition analysis, are appropriate for working with longitudinal data. These statistical approaches are meaningful to educational attainment research, particular to the understanding of college enrollment patterns -- why some students continue onto college and others forego by focusing on the measure units (individual memberships) and not the variables (Lubke & Muthén, 2005; Muthén & Muthén, 2012).

LCA and LPA

Latent class analysis (LCA), latent profile analysis (LPA), latent transition analysis (LTA), and factor analysis (exploratory factor analysis and confirmatory factor analysis) all fall under a larger latent family "called finite mixture models" (Nylund-Gibson & Choi, 2018, p.441). When latent variables are used in the research, the covariation among the observed variables has been established by their relationship to the latent variable (Mammadov et al., 2016; McCutcheon, 1987). Unlike the factor analysis (a statistical technique emphasis on variable-centered approach), LCA, LPA, and LTA take a person-centered approach to cluster individuals such as people, schools, districts, or governments into similar memberships or profiles. (Gillet et al., 2017; Nylund-Gibson & Choi, 2018).

Theoretically, LCA and LPA are similar: both statistical techniques aim to identify the underlying classes hidden under a set of multiple indicators (Nylynd-Gibson & Choi, 2018). Both methods are nonparametric statistics as they try to identify membership from data based on posterior probabilities. They do not assume or require data to be normally distributed, or the need to meet any assumptions related to linearity (Statistics Solutions, n.d.; Grant & Kenton, 2019). Despite LCA and LPA having a lot in common, what fundamentally differentiates them is the type of measures being used in the analysis (Mammadov et al., 2016; Nylund-Gibson & Choi, 2018). In general, there are two types of variables in statistics: discrete (categorical) and continuous. LCA typically uses categorical and most often binary indicators, and LPA works with continuous variables (Collins & Lanza, 2010, p.454). Due to the types of variables used in research, LCA and LPA apply different assumptions for their statistical procedures.

According to Nylund-Gibson and Choi (2018), "latent class analysis (LCA) is a statistical method used to identify unobserved subgroups in a population with a chosen set of indicators" (p.440). The latent classes can be either ordinal or unordered categories. The adolescents' future aspirations model can represent the first latent categorical variable, and the level of importance (e.g., unimportant, somewhat important, and very important) can represent the second latent categorical variable (Mammadov et al., 2016). Respondents will be grouped into these latent classes "based on shared characteristics and distinguish[ed] one group from another by focusing on how the observed variables covary among the individuals" (Mammadov et al., 2016, p.176).

Latent Transition Analysis (LTA)

LTA is an "extension of LCA to repeated-measures data" (Lanza et al., 2012, p.706). It investigates the changes of discrete (categorical) variables over time or in a longitudinal framework (Lanza et al., 2012). LTA has been used in evaluating intervention programs (i.e.,

testing competing models of smoking behavior as individuals move from one stage to another, see Martin et al., 1996; Velicer et al., 1996), and in substance use (Collins et al., 1997; Tracy et al., 1997), and applied in the behavioral sciences (i.e., sexual behaviors among injection drug users; Posner et al., 1996). Recently, educational research has been applying LTA to study students' motivation profiles (Gillet et al., 2017) and parental permissiveness (Hyatt & Collins, 2000).

The main reasons that LTA has become a popular analytical approach are that individuals in the sample are unique individuals and are likely to change their behavior or ways of thinking over time. Take my study on the immediate environments related to students' future aspirations as an example, the assumption that I made for this study was that not all students would enroll in college even though they value education and work, because other factors, such as how they feel about family or friends, individual goals or hobbies, and political and social interactions, would all have a critical impact on their decision about college-going. For this reason, it is necessary not only to investigate whether their perceptions about these factors change from 10th grade to 12th grade but also to examine whether these changes impact college enrollment patterns through one data point to another.

Conceptual Framework

The theoretical framework, research, empirical studies, measurements, and methodological literature discussed throughout this chapter will serve as a guide and foundation to this study's conceptual framework, exploring the association between adolescents' future aspirations as a multidimensional construct and postsecondary education. One underlying assumption, supported by Bronfenbrenner's ecological model, is that adolescents' future aspirations have different effects on their postsecondary education outcomes (1979).

Adolescents' future aspirations consist of not only educational aspirations but also their goals concerning their career, future family, friendship, personal goals, and community relations. Its multidimensionality is recommended and supported by a robust analysis of the literature with the support of the ecological theoretical framework and advanced statistical analyses using variable- and person-centered approaches. Given this, existing literature supports that immediate environments have a direct and indirect impact on adolescents' development, including their future aspirations, and the ecological theoretical framework allows the current study to examine all the immediate environments simultaneously while placing individuals at the center of their environments in seeking understandings about the connections between adolescents' future aspirations and postsecondary enrollment. To predict the relationships between adolescents' future aspirations and postsecondary education enrollment, it is necessary to first establish the multidimensional construct that measures adolescents' different aspirations (see Lu et al.). Then, it is appropriate to categorize adolescents' future aspirations into appropriate profiles or class memberships before examining their associations with postsecondary enrollment. Finally, because adolescents' future aspirations are closely related to and influenced by their lived experiences (immediate environments), their future aspirations are subject to change due to their environments. Therefore, to capture the changes in their goals and ambitions about their future, the study analyzes adolescents' future aspirations at two-time points in the dataset. In line with this framework, the current study intends to answer the following research questions:

RQ1: What are the subclasses of future aspirations for the two-time points cross-sectional data (base year and first follow-up)?

RQ2: What are the associations between the subclasses of future aspirations and postsecondary enrollment for the base year LCA model?

RQ3: What are the associations between the subclasses of future aspirations and postsecondary enrollment for the first follow-up LCA model?

RQ4: To what extent do students' aspiration memberships (plans) remain consistent from 10th grade (base year) to 12th grade (first follow-up)?

RQ5: What are the associations between the sub-statuses of future aspirations and postsecondary enrollment?

In response to each of these research questions, I hypothesize the following:

1. For questions 1, following Cunningham et al. 's (2009) and McCabe and Barnett's (2000) recommendation, I hypothesize that adolescents' future aspirations are a multidimensional construct that measures not only the level of adolescents' educational aspirations but also their non-academic aspirations, such as relationships with family and friends, social engagement, career expectations, and personal goals.

2. For research questions 2 and 3, in line with previous research (e.g., Enberg & Wolniak, 2010; Greene & Winters, 2005; McCabe & Barnett, 2000), I hypothesize that adolescents who have high educational and career expectations are more likely to enroll in colleges than other adolescents' future aspirations. Nevertheless, it is also important to put adolescents' educational and career expectations in perspective with their SES and racial/ethnic background. According to Perna (2000), the impact of educational aspirations on college enrollment has been mixed for Hispanic, White, and Black students. The enrollment outcome for people who want to have a family of their own in the future may have mixed results depending on the varying degrees of their families' education expectations and their families' responsibilities and obligations. Similarly, for people who have a high commitment to social justice and social change, the level of

engagement and participation in the community would have a mixed impact on college enrollment. Additionally, for students who value more personal goals, the likelihood of enrolling in college is potentially low. The students would like to have more control and autonomy to develop personal interests that may prevent them from getting a traditional education. As Cunningham et al. (2009) stated, "these expectations include general expectations, such as where one wants to be at a certain station of life, or academic expectations, which focuses primarily on an individual's plan for academic longevity" (p. 281). Therefore, adolescents' non-academic aspirations also greatly influence their postsecondary education decisions.

3. For questions 4 and 5, I generally hypothesize that the possibility for adolescents' future aspirations are likely to change over time since there are two years of gap between the first administration of student survey (2002) and the second administration of the same student survey (2004). Further, adolescents' perceptions, goals, worldviews, and decisions are mercurial and vulnerable to life circumstances, which there are high chances that life events may change their plans about the future, including their college plan.

Chapter 3 – Methodology

Chapter 3 presents an overview of the methods implemented to 1) conduct descriptive statistics of the associations between the three covariates (i.e., gender, race, and SES) and the predictor outcome, *postsecondary enrollment*, in this study and 2) explore the multidimensional construct of adolescents' future aspirations using person-centered methodological approaches (LCA and LTA) on the 14 aspiration indicators as well as its associations with the covariates and the predictor. This study utilizes the Educational Longitudinal Study of 2002 (ELS:2002) from the National Center for Educational Statistics (NCES) to address the research questions and hypotheses.

This chapter begins by restating the research questions. Then, the chapter provides the research design, dataset, rationale for data selection, and sample. Finally, an overview is provided about the descriptions of the measurements, the instrumentation, as well as the analytical methods utilized to answer the research questions.

Research Questions

RQ1: What are the subclasses of future aspirations for the two-time points cross-sectional data (base year and first follow-up)?

RQ2: What are the associations between the subclasses of future aspirations and postsecondary enrollment for the base year LCA model?

RQ3: What are the associations between the subclasses of future aspirations and postsecondary enrollment for the first follow-up LCA model?

RQ4: To what extent do students' ambition memberships (plans) remain consistent from 10th grade (base year) to 12th grade (first follow-up)?

RQ5: What are the associations between the sub-statuses of future aspirations and postsecondary enrollment?

Research Design

In order to answer the research questions, this study uses non-experimental, person-centered research designs. Specifically, the study analyzes data collected from a longitudinal survey of nationally representative high school sophomores in 2002, with follow-up surveys in 2004. A distal dependent variable is drawn from the 2012 dataset. Using a longitudinal, large-scale dataset provides an efficient and reliable method of obtaining data (Creswell, 2009). By collecting repeated measures over time using a random, national sample of high school students, this study allows for exploring possible factors representing the adolescents' future aspirations and the process related to college enrollment outcomes for high school or traditional students.

ELS:2002 Dataset

The Educational Longitudinal Study of 2002 dataset (ELS:2002) is the fourth nationally representative, longitudinal studies program conducted by NCES. The publicly available data included personal, familial, social, institutional, and cultural factors that may affect the educational, vocational, and personal development of high school students. Data were collected from students at various stages from the base-year (2002), first follow-up (2004), second follow-up (2006), and third follow-up (2012) starting at 10th grade to post-college (Ingels et al., 2007). A respondent pool of more than 16,000 students from approximately 750 schools was assessed on their educational and developmental experiences longitudinally (Engberg & Allen, 2011). NCES employed a multi-stage sampling frame in which high schools were first selected based on 24 strata, followed by a random sampling of approximately 26 students within each high school.

According to Ingels et al. (2014), the weighted response rate was calculated using the appropriate base weight for each time point of a given student questionnaire. To ensure the ELS:2002 data can be used with confidence regarding its generalizability, a nonresponse bias

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analysis was performed to address and correct potential students' and schools' biases resulting from oversampling (Ingels et al., 2014). Table 3.1 shows the summary of weighted response rates for the base-year and follow-up years, and the response rate for each point of the collection remained above an acceptable level (Molina, 2015).

Table 3.1

Summary of ELS:2002 Student Response Rates

	Eligible	Publicly available	Weighted Percent	Unweighted Percent
Base year Sample (2002)	17,591	15,362	87	87
First Follow-Up (2004)	16,515	14,989	89	91
Second Follow-Up (2006)	15,892	14,159	88	89
Third Follow-Up (2012)	15,724	13,250	84	84

Note. Data drawn from Ingels et al. (2014, p.53).

However, there is one limitation concerning the use of public available ELS:2002 data. According to Ingles et al. (2014), for protecting the participants' sensitive information, the public-use data suppressed some of the original data, such as students' transcripts and information about the postsecondary institutions attended post-high school and limited this study's access to students' postsecondary enrollment information. Nevertheless, such limitations did not affect the study analysis and the results' validity and reliability.

Rationale for Using the ELS:2002

Several features of ELS: 2002 make it especially appropriate for answering the questions in this study. First, it is a longitudinal dataset that consists of 4,013 variables with more than 16,000 participants, which suggests the dataset offers a wide range of information about the general student population in the U.S (Ingels et al., 2014). Second, this relatively recent

completed study (the last wave of data was collected in 2012), providing relevant and up-to-date information about the current student generation (Palardy, 2013). Third, the ELS:2002 data consists of appropriate measures that are central to this study—14 aspiration indicators that not only measure how adolescents' aspirations about their future schooling and career prospect but also examine their perceptions on multiple aspects of their future, including their future family, children, friendships, civic engagement, and personal goals. Moreover, the adolescents' future aspirations on different aspects of their lives were surveyed at two-time points, when the students were in 10th grade (the base year, 2002) and their senior year in high school (the first follow-up, 2004). Therefore, the ELS:2002 gives the advantage to allow the study to explore the multidimensional construct of adolescents' future aspirations using the latent class analysis to identify different future-aspiration classes. Instead of statistically analyzing these variables separately in the traditional, regression analytical approach, the person-centered approaches allow the study a more complex data structure to explore how adolescents cluster into different aspiration classes based on the response patterns (Mindrila, 2017). Additionally, the longitudinal nature of ELS:2002 data allows this study to answer research question 4 (To what extent do students' aspiration memberships remain consistent from 10th grade (base year) to 12th grade (first follow-up)?) by assessing the changes in adolescents' future aspirations from time point 1 and time point 2 using LTA's transition probability analysis (Ryoo et al., 2018). Finally, because of the longitudinal nature of the data, ELS:2002 provides a variable for the distal outcome (*postsecondary enrollment*, the only dependent variable in this study drawn from the third follow-up student survey) is appropriate for person-centered statistical analyses.

Sample

Only respondents who skipped all the questions about their future aspirations from both time points (the base year and first follow-up) will be excluded from the analysis. Respondents who omitted part of the 14 survey items on their aspirations are kept for analysis. Conducting listwise deletion of removing all data for a case with one or a few missing values could create response biases. Thus, I performed pairwise deletion to minimize the loss in the listwise deletion and treated those unanswered values as missing while accounting for other answered items in such cases. Additionally, respondents whose postsecondary information are missing will also be excluded from this study. The overall missing values accounted for 6.2% of the final sample and fell in the acceptable range for listwise deletion. Thus, the sample size for this study is $n =$ 15,249. There are 7,105 male students and 7,381 female students. White students accounted for 54.1% of the entire sample, 12.5% of the sample were Black students, 13.4% were Hispanic students, 9.1% were Asians and Hawaiians/Pacific Islanders, and 5.42% were in the "other" category, which consisted of American Indians, Alaska Natives, and multiracial. By 2012 (the third follow-up), 816 (5.4%) respondents did not enroll in any postsecondary education, and 14,433 (94.7%) reported that they had at least some postsecondary education or more.

Measures

This section provides an overview of the dependent, independent, and control variables used in the analyses. Each variable was selected based on Bronfenbrenner's ecological model and college enrollment literature highlighted in Chapter 2 of this study. The section begins with a description of the variables and how they are operationalized in this study.

Dependent Variable. *Postsecondary enrollment:* This is a binary variable, coded as 0 = No postsecondary enrollment, and 1 = Yes (had some postsecondary education or more). This

dependent variable only answers the question of whether students have attended a college. It does not contain information about whether or not students have completed their postsecondary education nor explained the types of postsecondary institutions they have attended, such as a community college, vocational/business schools, or four-year public/private university. Because ELS:2002 is a 12-year-long longitudinal study, data attrition is expected, particularly extracting a distal outcome measure from the last survey of ELS:2002 in 2012. Ten years after the first survey was administered to the same group of students, 30% of students' postsecondary enrollment information was missing. To reduce the missingness, I decided to create the *postsecondary enrollment* variable by drawing students' actual college enrollment information from the second follow-up and third follow-up student data, using three variables (*F2B07 = whether has ever attended postsecondary school*, *F3PSLLVL= level of last/currently attended postsecondary institution,* and *F3EVRAT= ever attended a postsecondary institution*. Creating such a composite variable was triggered by the limitation imposed by the public-available data where information about the types of postsecondary institutions respondents last attended is not available in the third follow-up of publicly available data. As an alternative, I also thought about selecting variables that contain information about the types of postsecondary institutions that respondents have attended. That information was only available in the second follow-up student data, which was collected in 2006. I thought this was another option to address the limitation because the literature often found students who defer or delay their postsecondary enrollment, their odds of not attending or completing postsecondary education were high (Bozick & DeLuca, 2005; Horn et al., 2005; Niu & Tienda, 2013). However, the variables about the types of postsecondary institutions students in the second follow-up student data could reduce the sample size even more than my original plan. I suppose it was common for students to take a gap

between high school and college, so when the second follow-up student survey was administered in 2006 or 2 years after their high school graduation, there was still quite a size of the student population who had yet attended colleges. After weighing the pros-and-cons, I decided to create a binary predictor using the three variables from the last two-waves of data. When I found missing information on *F3EVRAT*, I would rely on the other two variables (*F2B07and F3PSLLVL)* to verify the missingness.

Indicators. As described in Chapter 2 of this study, a total of fourteen indicators are selected as the multidimensional construct of adolescents' future aspirations from the base-year ELS:2002 student questionnaire and the first follow-up ELS:2002 student questionnaire. Before the transformation, these measures were scored on a three-point Likert scale (1= not important; 2= somewhat important; and 3= very important. Table 3.2 provides the frequencies and percentages of the 14 survey items in base-year 2002 and the first follow-up 2004 dataset before transforming the variables from three-Likert scales to binary variables. For analytical and interpretation purposes, responses for "somewhat important" and "very important" are clustered into one category "1 = yes, important", and responses for "No, not important" were assigned as "0". Even though any type of categorical variables (i.e., binary, ordered-category, and Likert-scale) is suitable for finite mixture model analysis, it is not recommended to use rank-order data (Lazarsfeld & Henry, 1968). Also, the interpretation of finite mixture model results is more straightforward with binary or nominal data.

Table 3.2

The Frequencies and Percentages for the 14 Survey Items

`	Base Year 2002 (*BYS54A ~ BYS54O* in ELS:2002*)*	First Follow-up 2004 (*F1S40A ~ F1S40O* in ELS:2002)

	1 n (%)	2 n (%)	3 n (%)	1 n (%)	2 n (%)	3 n (%)
1. Being successful in my line of work	164 (1.08)	1,683 (11.04)	12,043 (79.0)	96 (0.6)	1,237 (8.1)	12,797 (83.9)
2. Finding the right person to marry and having a happy family life	662 (4.34)	2522 (16.5)	10,681 (70.0)	560 (3.7)	2,153 (14.1)	11,411 (74.8)
3. Having lots of money	1189 (7.8)	6959 (45.6)	5713 (37.5)	1,631 (10.7)	7,534 (49.4)	4,936 (32.6)
4. Having strong friendships	227 (1.5)	2,047 (13.4)	11,563 (75.8)	249 (1.6)	1,893 (12.4)	11,961 (78.4)
5. Being able to find steady work	223 (1.5)	1,940 (12.7)	11,593 (76.0)	154 (1.0)	1,681 (11.0)	12,242 (80.3)
6. Helping other people in my community	1,004 (6.6)	7,671 (50.3)	5,152 (33.8)	816 (5.4)	7,280 (47.7)	5,971 (39.2)
7. Being able to give my children better opportunities than I've had	448 (2.9)	2,339 (15.3)	11,010 (72.2)	363 (2.4)	2,020 (13.3)	11,690 (76.7)
8. Living close to parents and relatives	2,258 (14.8)	7,388 (48.5)	4,162 (27.3)	2,605 (17.1)	7,825 (51.3)	3,625 (23.8)
9. Getting away from this area of the country	6,253 (41.0)	4,718 (30.9)	2,817 (18.5)	6,870 (45.1)	4,617 (30.3)	2,544 (16.7)
10. Working to correct social and economic inequalities	3,736 (24.0)	7,383 (48.4)	2,657 (17.4)	3,858 (25.3)	7,305 (47.9)	2,884 (18.9)
11. Having children	1,984 (13.0)	5,199 (34,1)	6,595 (43.3)	2,072 (13.6)	5,112 (33.5)	6,896 (45.2)
12. Having leisure time to enjoy my own interests	320 (2.1)	4,042 (26.5)	9,413 (61.7)	278 (1.8)	4,252 (27.9)	9,560 (62.7)
13. Becoming an expert in my field of work	513 (3.4)	3,567 (23,4)	9,714 (63.7)	431 (2.8)	3,268 (21.4)	10,384 (68.1)
14. Getting a good education	164 (1.1)	2,094 (13.7)	11,546 (75.7)	108 (0.7)	1,447 (9.5)	2,534 (82.2)

Note. 1= not important; 2= somewhat important; 3=very important

Covariates. Three covariates are selected for this study in the following:

Gender (BYSEX in ELS:2002 in base year data): the variable is coded as 1 = male, 2 = female, is used as a grouping variable. There were 7,653 male students (49.79%) and 7,717 female students (50.21%) in the base year student questionnaire.

Race (BYRACE in ELS:2002 in base year data): the variable is coded as 1= White (the reference group), 2 = Black, 3= Hispanic, 4 = Asian (including Asian, and Hawaii/Pacific Islander), 5 = Other (including American Indian/Alaska Native, and more than once race). There were 8,682 White students (56.95%), 2,020 Black students (13.25%), 2,217 Hispanic students (14.54%), 1,460 Asian students (9.58%), and 865 other students (5.67%). Because the students with more than one race and American Indian/Alaska Native are small, so I created a category "other" to combine the two groups.

Family SES (BYSES1QU in ELS:2002 base year data): the variable is coded as 1 = lowest quartile (22.28%); 2 = second quartile (22.25%); 3= third quartile (23.04%); 4 = highest quartile (26.55%). Family SES is a composite variable constructed from parent data using five equally weighted, standardized components including father's education, mother's education, family income, father's occupation, and mother's occupation.

Data Analytic Plan

This study is appropriate for an IRB exemption because it employs ELS:2002 student questionnaires, public-use data files acquired from the National Center for Education Statistics (NCES, https://nces.ed.gov/surveys/els2002/). According to the VCU's IRB requirements, the nature of the data files in this study falls under the Exempt Research Category 4 (secondary data or specimen research) that does not require consent from the IRB. It is also worth mentioning that all analyses were conducted using M*plus* 7.4 unless otherwise specified. Specific packages used for each analysis would be described where appropriate.

The analytic data plan consists of three stages:1) solving missing data; 2) conducting chi-square tests to explore the relationships between the covariates and the dependent variable, and 3) applying person-centered approaches (LCA and LTA) to predict college enrollment outcomes using adolescents' future aspiration memberships after controlling for the characteristics and demographic variables described in the Measure section.

Addressing Missing and Nonnormal Data

To recap, the missing responses across the 14 survey variables for the multidimensional construct of adolescents' future aspirations of the first two waves of ELS:2002 student surveys are inconsistent. The 14 observed variables do not "follow multivariate normal distribution" (Finney & DiStefano, 2006, p. 270). They are three-scaled ordinal variables that cannot be treated as normally distributed categorical or continuous variables. If using normal theory-based maximum likelihood (ML) imputations to treat the ordinal observed variables as continuous or normally distributed categorical variables, the quality and the actual model parameter estimates, standard errors, and chi-square goodness of fit statistics are likely reduced, resulting in too many errors in the statistical inferences (Li, 2014; Muthén & Kaplan, 1985). Therefore, dealing with non-normal categorical variables' discreteness requires different algorithms to impute data robustness (Enders, 2010).

To test the impact of missing data on parameter estimates' precision, I will compare models that use the MLR (robust maximum likelihood) and WLSMV (robust or diagonal weighted least square method) estimators and compare their results. Although both methods are more effective than ML in psychological and social studies, where ordinal variables represent latent constructs (Lei & Shiverdecker, 2019), both methods have their strengths and limitations. For example, MLR has been known to be the "panacea" in dealing with nonnormality and

missing data (Lei & Shiverdecker, 2019, p.1). It functions as the full-information maximum

likelihood (FIML) estimation method in working with continuous variables, which uses all the

available data without imputation or deleting data (e.g., Enders, 2001; Kline, 2016, p. 87).

Nevertheless, it does not account for the nonlinearity of the ordinal variables (Lei &

Shiverdecker, 2019). The robust (or diagonal) weighted least square method (WLSMV) uses

listwise (LD) or pairwise deletion (PD) with missing data (Lei & Shiverdecker, 2019).

According to Muthén and Muthén(2008), if the dependent variables are also categorical, then

logistic regression coefficients are obtained in the MLR method, and probit regression

coefficients are created in WLSMV (the logistic coefficient is approximately equal to 1.81 times

the probit coefficient).

Chi-square Tests

Chi-square analyses were conducted to examine baseline differences between students

who did not matriculate in a postsecondary institution. The Cramer's *V* statistic was presented to

ensure the relationships between measures were accurate. Cramer's *V* is a type of effect size

statistics used to determine the strength of the relationship between the categorical variables

when one of the predictor outcome measures has two or more categories (Field, 2018; Pallant,

2016). Cramer's *V* statistics can be interpreted using Cohen's (1988) criteria: .10 for a small

effect, 30 for medium effect, and .50 for large effect. Most measures in this study have more than

two categories. For both dependent and independent variables with only two categories in the

study, the Cramer's value represents the Phi statistic, a commonly used effect size statistic that

measures the strength of association between two binary variables (Field, 2018). The Phi statistic

ranges from 0 to 1, where values close to 1 suggest a strong association between the two

variables (Pallant, 2016). The "V" option after the "tabulate" command in Stata SE 16 was used to produce Cramer's *V* statistic.

Person-Centered Approaches

Although latent class analysis (LCA), latent transition analysis (LTA), and factor analysis are used to understand the unobserved (or latent) constructs as well as the covariate relationships among a set of observed variables, LCA and LTA have been identified as the person-centered approaches "because LCA and LTA use response patterns of observed variables to assign individuals to unobserved latent groups" (Ryoo et al., 2018, p. 3). Another distinction between person-centered approaches and variable-centered approaches (i.e., factor analysis) is in the latent constructs' characteristics: the characteristics of the latent construct established using the variable-centered approach are often treated as continuous. In other words, they lost their discrete characteristics in variable-centered analyses. Nevertheless, categorical observed variables' discrete characteristics remain unchanged in person-centered analyses, such as latent class and latent transition analysis (Ryoo et al., 2018).

Latent Class Analysis LCA

Latent class analysis (LCA) can be used either as an exploratory or confirmatory procedure (Geiser, 2013; Samuelsen & Dayton, 2019; Wang & Wang, 2019). Similar to exploratory factor analysis, exploratory LCA is used to discover the appropriate number of latent classes without a specific theory to support the classification (Samuelsen & Dayton, 2019) or to "test theories about typological differences between individuals" (Geiser, 2013, p. 247). The steps to determine the appropriate number of LCA classes are called class enumeration, and they are quite similar to the procedures in deciding the appropriate number of factors to retain in EFA (Nylund-Gibson & Choi, 2018, p. 443). This includes an iterative process of fitting several LCA

models with differing latent classes and comparing the model fit indices from each model. Although it is impossible to know the "true" correct number of classes in any given data analysis setting, one could rely on the fit indices to determine to approximate the correct number of classes for our research interests, "assuming that latent classes truly 'exist' in a given population" (Nylund-Gibson & Choi. 2018, p. 443).

LCA produces information criteria (IC), such as the Bayesian information criterion (BIC), sample-size adjusted Bayesian information criterion (SABIC), consistent Akaike information criterion (CAIC), and approximate weight of evidence criterion (AWE). These fit indices have been examined in simulation studies and have proven to be reliable information in determining the correct number of classes in an LCA (Morgan, 2015; Morovati, 2014; Nylund et al., 2007; Nylund-Gibson & Choi, 2018; Yang, 2006). Nevertheless, "these fit indices often do not all point to a single solution" (Nylund-Gibson & Choi, 2018, p. 443), so deciding the appropriate latent classes should rely on other methods and strategies such as Lanza's three rules and Geiser's recommendations to consider whether these classes are interpretable and useful in classifying and differentiating the participants in the sample (Muthén & Muthén, 2003; Nylund-Gibson & Choi, 2018). The Lanza's three rules and Geiser's recommendations are explained in Chapter 4 along with the results to illustrate how I arrived at the appropriate model solution for the adolescents' future aspirations. After the "best" LCA model solution is selected, a couple of ways can be used to examine the LCA model solution: 1) using multi-group; 2) examining the LCA structure using covariates; and/or 3) testing the predictive outcomes using distal measures. The LCA model for the adolescents' future aspirations using cross-sectional data is illustrated visually in Figure 3.1.

Figure 3.1

Latent Class Analysis Model
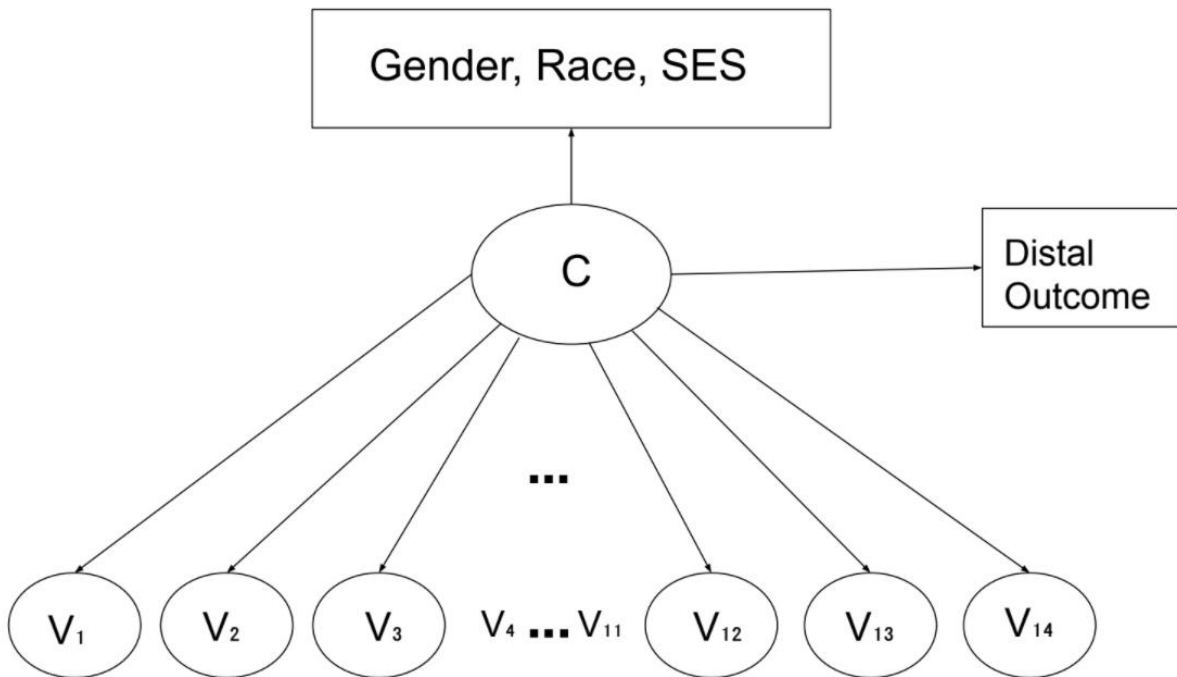
Latent Transition Analysis (LTA)

  Latent transition analysis (LTA; Collin & Wugalter, 1992) is an "extension of LCA to repeated-measures data" (Lanza et al., 2012, p.706). It investigates the changes of discrete (categorical) variables over time or in a longitudinal framework (Lanza et al., 2012). The main reason LTA has become a popular analytical approach is that the person-centered approach using longitudinal data treats individuals in the sample as unique individuals and predicts class memberships' changes over time (Ryoo et al., 2018). For instance, this study assumes that adolescents hold different goals and ambitions for their future and believe their goals and ambitions are likely to change over time as they transition from 10th grade to 12th grade. Therefore, changes in future-aspiration class membership could have differential impacts on these adolescents' college enrollment outcomes.

Building and Validating LCA and LTA Models

Ryoo et al. asserted that building and validating LTA models are often subjective and confusing (2018). There is not an agreed approach in the methodological literature (Ryoo et al., 2018). Nevertheless, there are two aspects researchers need to be aware of while building a LTA model. First, the choice of the appropriate number of latent groups should not only rely on the fit indices but should also include whether theories support the latent groups. Second, to avoid model identification issues related to the number of parameter estimates and increase the accuracy of maximum likelihood (ML) estimates, it is recommended to reduce the categories of the distal outcome variable (Collins & Lanza, 2010; Ryoo et al., 2018).

To build and validate the LTA models for this study, I adapted to Ryoo et al.'s (2018) six-step procedures and framework (Figure 3.2). In Step 0, the authors assume the number of latent classes (memberships) remain unchanged over time (Ryoo et al., 2018), meaning that the percentage of respondents in each latent class (membership) changes over time, but the characteristics of the latent profiles stay consistent from time point 1 (T1) to time point 2 (T2). Before conducting LTA, it is important to check and diagnose the cross-sectional data at each time point to establish and confirm that the number of latent classes remains consistent over time. Such an iterative LCA process is required because the number of latent groups is not predetermined in LTA, meaning that LTA will serve as confirmatory analysis confirming the latent structure, and LCA will serve as exploratory analysis to explore the multidimensionality of adolescents' future aspiration (Nylund-Gibson et al., 2014). To explore the number of latent groups/classes, I will fit LCA into two ELS:2002 cross-sectional data (the base year and the first follow-up) before running LTA. To confirm the appropriate number of latent groups/classes, I will consider AIC and BIC fit indices for model selection (Collins & Lanza, 2010; Ryoo et al., 2018).

According to Ryoo et al. (2018), the discussion of the emerging latent groups/classes for each measurement points over time is not technically a transition analysis of how respondents move from one class to another over time, "but rather how associations among the observations can change the number of classes and, subsequently, the qualitative description of the population over time" (p. 5). To identify the consistent number of latent groups/classes over time, in Step 1, I will perform longitudinal measurement invariance tests to "compare model between the measurement variance model and the measurement invariance model within the best candidate model" (Ryoo et al., 2018, p. 6). When the latent groups/classes fail to preserve their characteristics over time, the subsequent best candidate model will be applied. It is worth noting that Ryoo et al.'s framework assumes that the number of classes over time remains unchanged. However, when none of the best candidate models hold the same latent groups/classes over time, it is recommended to proceed with the LCAs with inconsistent groups or classes (Collins & Lanza, 2010). Testing longitudinal measurement invariance is a critical step in explaining the characteristics of the latent groups by observed variables over time. Omitting the constraints imposed on the parameters in the LCAs would create ambiguity during the process of defining latent statuses in Step 2.

Figure 3.2

Procedures in Building and Validating LTA Models.
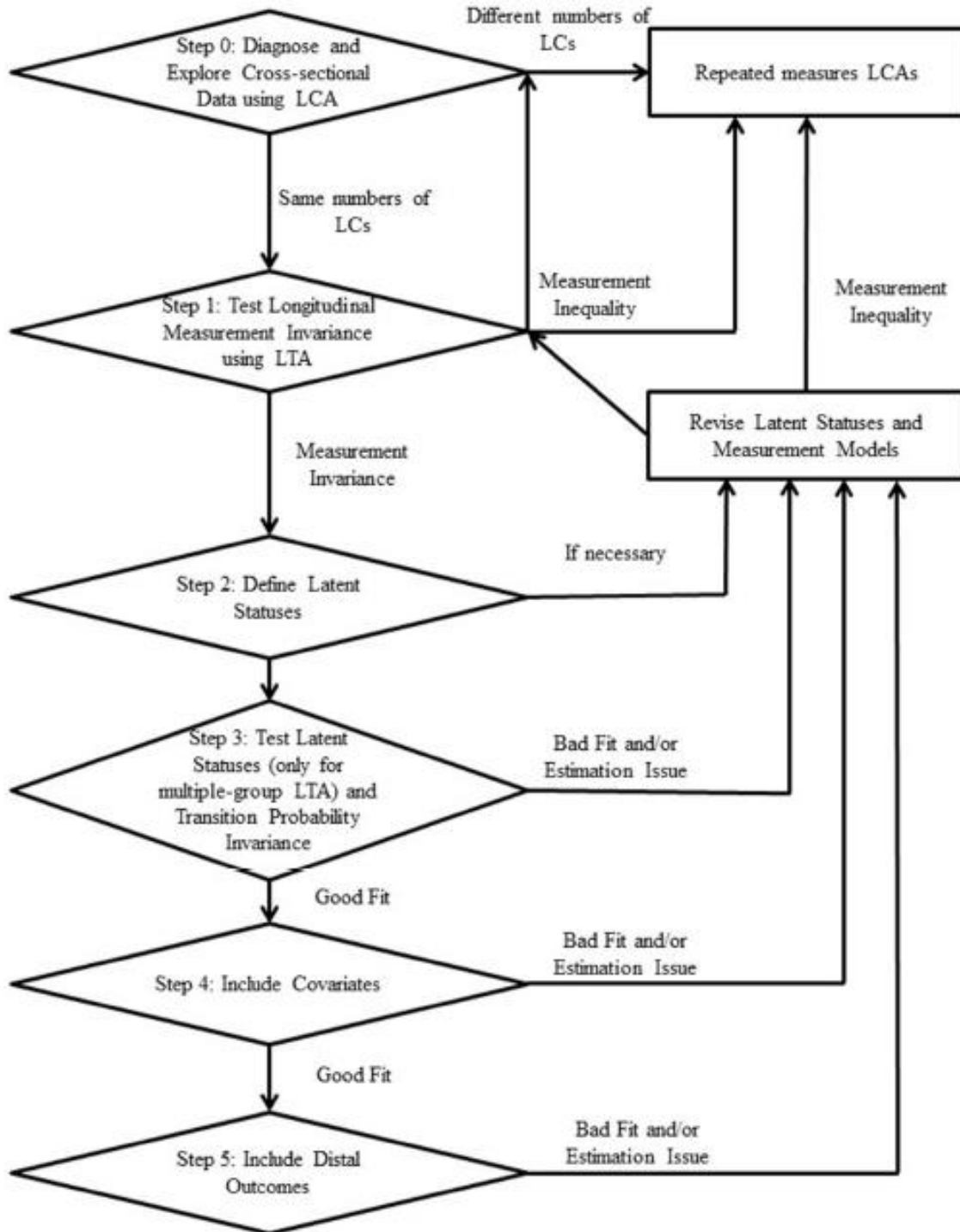
Note. The figure is drawn from Ryoo et al.'s study (2018, p. 2).

After the longitudinal measurement invariance is achieved, a few LCA models with unique numbers of latent groups/classes are ready for the final class selection. In step 2, I will determine the best or optimal fitting model by assessing the quality of factors (unobserved variables) associated with the indicators (observed variables) in conjunction with theoretical considerations. A few criteria will be considered, such as the likelihood ratio statistics, Akaike Information Criterion (AIC), Bayesian Information Criterion (BIC), and degree of freedom (df) (Ryoo et al., 2018). Nevertheless, the fit indices are not the hard rules, they are guidelines to select the appropriate number of latent groups/classes (Ryoo et al., 2018). Since there are no more than two data time points, only one test of the transition probability invariance and the multiple-group LTA will be performed in Step 3 (Ryoo et al., 2018). Because there are a few covariates and a distal outcome needed to be tested, I followed Ryoo et al.'s (2018) recommendations to include the covariates (Step 4) first and then test the distal outcome variable in the final model (Step 5). Due to the nonlinear nature of the ordinal outcome variable (*college enrollment*), logistic regression is a preferred analytical approach (Flora & Flake, 2014). M*plus*7.4 makes it easy to carry out both factor and finite mixture model analyses, which correctly account for the categorical nature of observed variables. Once the appropriate latent classes are confirmed using LCA and LTA, logistic regression will be performed in STATA 16 for better interpretation. The final LTA model is illustrated in Figure 3.3.

Fit and Evaluate LCA and LTA Models

After describing the steps for building LCA and LTA models, the following section discusses how to fit and evaluate LCA and LTA models to provide complementary information for the procedures of building and validating LCA and LTA models discussed earlier.

Figure 3.3

Latent Transition Analysis Model
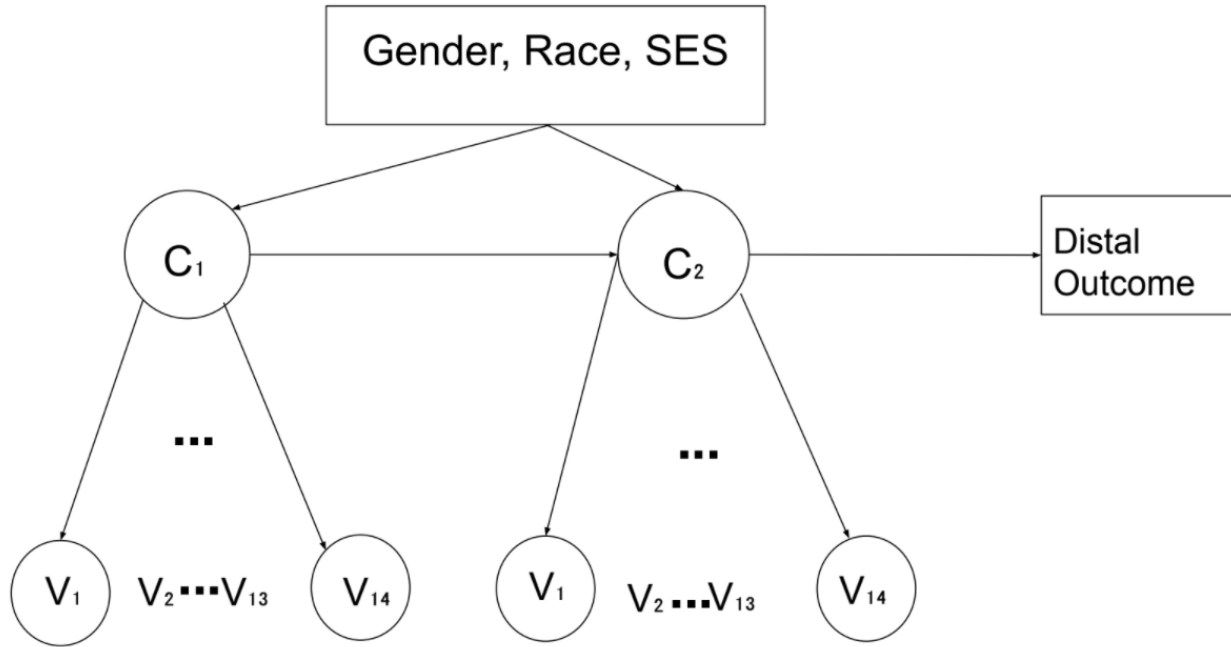
Model Equations

Latent Class Analysis. In order to understand the LTA better, it is necessary to describe

the latent class analysis (LCA) and its function in cross-sectional data. We adapt the same

notations as described in Collins and Lanza (2010), the fundamental expression of LCA is

written as:

$$P(Y = y) = \sum_{k=1}^{K} \delta_k \prod_{j=1}^{J} \prod_{r_j=1}^{R_j} \rho_{(j,r_j|k)}^{I(y_j=r_j)}$$

where $k=1,\cdots,K$ represent the number of the latent groups/classes, $j=1,\cdots,J$ are the indicators

(observed variables) included in the model having $r_j = 1,\cdots,R_j$ response categories (R_j can

vary across items), δ_k represents the probability of profile/membership in the kth latent class, ρ is

the item-response probabilities, and I is the three-scaled indicator function for j^{th} item. Use

δ_k and ρ to calculate the degree of freedom and the parameter estimates in LCA. It must be

pointed out that the most critical step in selecting the best candidate models in LCA is to identify

the appropriate number of latent groups/classes (K). The item-response probabilities (ρ) assigned

the respondents into unique latent groups/classes and the possible number of latent

groups/classes is derived from the probability of membership (δ_k).

Latent Transition Analysis. In a latent transition analysis, we hope that the latent

groups/classes identified in the LCA models remain identical or similar across data time points.

Additionally, we also expect to assess the respondents' behavior patterns over time by estimating

the probability of transitioning from each class at a one-time point to all others at the next time

point (Ryoo et al., 2018). Using the same notations as for LCA, the LTA with two time points in

the current study of adolescents' future aspirations can be written as:

$$P(Y = y) = \sum_{k_1=1}^{K} \sum_{k_2=1}^{K} \delta_k \tau_{(k_2|k_1)} \prod_{t=1}^{2} \prod_{j=1}^{J} \prod_{r_{j,t}=1}^{R_J} \rho_{(j,r_{j,t}|k_t)}^{I(y_{j,t}=r_{j,t})}$$

where $\tau_{(k_2|k_1)}$ stands for the transition probability of the membership in latent status k from time

1 to time 2. The transition probability (τ) can be tested for its consistency over time using similar

procedures as testing the item-response probabilities (ρ) and the probability of membership (δ_k).

According to Collins and Lanza (2010), postulating the measurement invariance and the latent

classes remain the same across times by imposing constraints on the parameters of item-response

probabilities (ρ) across times, i.e., $\rho_{(j,r_{j,t}|k_t)}^{I(y_{j,t}=r_{j,t})} = \rho_{(j,r_j|k_t)}^{I(y_{j,t}=r_j)}$, which can facilitate the

interpretation of the LTA models as well as improve model identifications. Additionally, test

measurement invariance answers the question of whether the characteristics of latent

groups/classes are consistent over time (Ryoo et al., 2018).

LCA and LTA with Covariates

Using multinomial logistic regression to examine the impacts of covariates on latent

groups/classes and transition between latent memberships. The model can be written as:

$$\delta_{k_1}(x) \ = \ P(K = k_1| X \ = \ x) \ = \frac{exp(\beta_{0k1}+\beta_{1k1}x)}{1+\sum_{k'_1=1}^{K-1} \quad exp(\beta_{0k'_1}+\beta_{1k'_1} \quad x)} \ and$$

$$\tau_{k_t|k_{t-1}}(x) = P(K = k_1| K = k_{t-1}, X = \ x) = \frac{exp(\beta_{0k_t|k_{t-1}} \ + \ \beta_{1k_t|k_{t-1}}x)}{1 + \sum_{k'_1=1}^{K-1} \quad exp(\beta_{0k'_t|k'_{t-1}} + \ \beta_{1k'_t|k'_{t-1}}x)}$$

Although there is no limit of how many covariates can be included in the LCA or LTA models,

previous studies have found that the increasing number of covariates can magnify the complexity

in "identifying the maximum likelihood solution" (Collins & Lanza, 2010; Ryoo et al., 2018b, p.

3).

Parameter Estimates and Evaluating LTA

Both LCA and LTA statistical methods use an "iterative approach" to test the

probabilities of latent memberships (δs), item-response probabilities (ρs), and probabilities of

transition (τs) for parameter estimates (Ryoo et al., 2018). M*plus* (Muthén & Muthén, 1998-

2012) uses either the algorithm of expectation-maximization or Newton-Raphson or both

procedures to calculate the maximum likelihood estimates until the model converges (Ryoo et

al., 2018).

There are a few fit indices that help to determine whether the model sufficiently represent

the data (Collins & Lanza, 2010), such as the likelihood-ratio statistic G^2(Agresti, 1990) and the

likelihood-ratio difference test (LRDT) and information criteria including AIC (Akaike, 1974),

BIC (Schwarz, 1978), consistent AIC (CAIC; Bozdogan, 1987), and adjusted BIC (ABIC;

Sclove, 1987). In this study, I will use AIC and BIC for model comparisons of LTAs. The more

parsimonious or smaller AIC and BIC values, the better the model fit. If AIC and BIC disagree

with each other, Ryoo et al. suggest to "select the optimal number by looking at trends of

changes in both" (2018b, p.5). Moreover, to test the transition probabilities between data time

point 1 and point 2 using the likelihood ratio statistic (G^2), which assesses how well the LTA

model fits the observed data. Finally, the commands (syntax) for running the LCA and LTA (see

Appendix A, B, and C) are adapted from Ryoo et al. (2018) 's study using M*plus* 7.4 (Muthén &

Muthén, 1998-2015).

Chapter 4 – Results

Introduction

In this chapter, the results from these analyses are presented in three main sections to answering the research questions in the order presented in Chapter 3. The first part of the chapter provides descriptive statistics on the sample used for this study. The second part of the chapter addresses the first three research questions through latent class analysis. The third section of this chapter addresses the latent classes/memberships developed through LTA. The second and third sections of this chapter also include examinations of model goodness of fit between each time point and in the final aggregated models and the postsecondary enrollment outcomes predicted from using each model.

Descriptive Statistics

First, descriptive statistics were computed for all covariates and dependent variables. The goal was to describe the postsecondary enrollment patterns by exploring the associations among measures of interest. Descriptive statistics included summaries of students' gender and racial backgrounds at the base year that ELS:2002 student questionnaire was first distributed in Spring 2002. As all the covariates used in the analyses were categorical, chi-square tests were the appropriate technique to perform (Franke et al., 2012). Frequencies, percentages, chi-square statistics, *p*-values*,* and Cramer's *V* were reported.

Demographic characteristics. Demographic characteristics were first examined which included gender and race/ethnicity.

Gender. Table 4.1 shows the chi-square results between college enrollment and gender. The results indicate that a slightly higher percentage of female students (95.8%) had enrolled in

college than their male counterparts (93%) by the time that the final ELS:2002 was administered in 2012. The results are statistically significant $\chi^2(1, n= 14,584) = 47.28, p < 0.01$. The Cramer's *V* statistic indicates the effect size or the strength of this relationship is very small (Table 4.1).

Table 4.1

Chi-square Analysis of College Enrollment Outcomes by Gender

	Postsecondary Enrollment		χ^2	p	Cramer's *V*
	No (%)	Yes (%)			
Male	488 (6.8%)	6,685 (93.2%)			
Female	312 (4.2%)	7,099 (95.8%)			
Total	800 (5.5%)	13,784 (94.5%)	47.28	<0.01	0.06

`

Race/Ethnicity. A second chi-square analysis was conducted to examine the association between college enrollment outcomes and race/ethnicity (see Table 4.2). The initial results suggest a statistically significant difference between a students' race/ethnicity and their college enrollment outcomes, $\chi^2(5, n= 14,468) = 39.13, p < 0.01$. A lower percentage of students who reported having Hispanic, Black, or other (including American Indian/Alaska Native, Asian/Hawaiian/Pacific Islander) racial/ethnic backgrounds had enrolled in postsecondary institutions. A Cramer's *V* value of 0.05 indicates the relationship between race/ethnicity and college enrollment outcomes is very small, which means that students' college enrolment differences by race/ethnicity were not particularly large.

Table 4.2

Chi-square Analysis of Postsecondary Enrollment and Race/Ethnicity

| | Postsecondary Enrollment | | | | | |
	No (%)	Yes (%)	χ^2	p	Cramer's V	Fisher's Exact Test
White	404 (4.9%)	7,860 (95.1%)				
Black	118 (6.1%)	1,802 (93.9%)				
Hispanic	147 (7.1%)	1,912 (92.9%)				
Asian	52 (3.7%)	1,343 (96.3%)				
Other	118 (6.8%)	1,605 (93.2%)				
Total	839 (5.5%)	14,522 (94.5%)	47.28	<0.01	0.05	<0.01

SES. A third chi-square analysis was conducted to examine the association between postsecondary enrollment and students' family socioeconomic statuses (see Table 4.3). The initial results suggest a statistically significant difference between a students' family socioeconomic statuses and their actual postsecondary enrollment, $\chi^2(8, n= 15,244) = 155.942$, $p< 0.01$. Overall, there were 839 (5.5%) students who did not attend colleges across the four socioeconomic levels. To break them down by each level of socioeconomic statuses, the highest number of students (6.55%) did not attend colleges belonged to the second low SES category. A Cramer's *V* value of 0.07 indicates the relationship between students' family socioeconomic statuses and postsecondary enrollment is very small, which means that students' college enrolment differences by SES were not particularly large.

Table 4.3

Chi-square Analysis of Postsecondary Enrollment and SES

	Postsecondary Enrollment		χ^2	p	Cramer's V
	No (%)	Yes (%)			
Highest SES	223 (5.18%)	3,864 (94.82%)			
Third SES	220 (5.9%)	3,284 (94.1%)			
Second SES	236 (6.55%)	3,136 (93.45%)			
Low SES	160 (4.43%)	3,285 (95.57%)			
Total	839 (5.18%)	14,522 (94.82%)	155.94	<0.01	.07

Presentation of Latent Class Analysis Results

The process of exploring and selecting the "best" model solutions for T1 and T2 cross-sectional data took three stages. During the first stage, separate latent class analyses were conducted using the 14 indicators representing adolescents' future aspirations to describe the underlying class solutions for US students in 10th-grade (T1) and when they became high school seniors (T2). At this stage, the estimated models were evaluated, compared, and selected based on their information criteria. At the second stage, the models went through the process of conceptualization by defining and labeling the latent classes in each estimated model to see whether there were clear, non-overlapping response patterns between classes. The optimal model solutions were tested for the model fitness using three covariates (gender, race, and SES) and a distal outcome (postsecondary enrollment outcomes) to examine whether the model solution holds true across different groups and what predictive effects the models have on adolescents' eventual college enrollment.

LCA Model Identification and Selection

       Latent class analysis (LCA) was performed on 14 indicators representing adolescents' future aspirations using T1 and T2 cross-sectional data from the ELS:2002 student questionnaire to explore the classification of cases into distinct future aspiration classes. The model fit statistics/indices for T1 (baseline) and T2 (first follow-up) LCA models with the number of latent classes ranging from one to seven were reported in Table 4.4. Past studies often selectively report the fit statistics as an illustration of researchers' reasons and rationale of how they arrived at their decision in identifying and selecting the "best" model solution. However, I decided to report all the fit information due to model complexity caused by the great number of indicators included in this study, so that I would have sufficient information to guide my decision in model selection and identification. I also integrated Collins and Lanza's three-rules (2010) and Geiser's recommendation (2013) in my decision process of model identification and selection.

Table 4.4

Comparisons of Different LCA Models for Base Year and First Follow-up.

Model	Log-Likelihood	AIC	BIC	ABIC	ALMR LR p-value	BLRT p-value	Entropy
			T_1 (*baseline*)				
1-class LCA	-52001.2	104030.4	104136.75	104092.26	--	--	--
2-class LCA	-48646.67	97351.34	97571.65	97479.49	<.001	<.001	.85
3-class LCA	**-48067.64**	**96223.28**	**96557.54**	**96417.71**	**=.0001**	**<.001**	**.84**
4-class LCA	-47641.47	95400.95	95849.16	95661.67	=.016	<.001	.74
5-class LCA	-47398.49	94944.98	95507.15	95271.99	<.001	<.001	.71
6-Class LCA	-47229.91	94637.82	95313.94	95031.11	<.001	<.001	.72
7-Class LCA	-47130.98	94469.97	95260.05	94929.54	=.0007	<.001	.72

	T_2 (first follow − up)						
1-class LCA	44344.99	88717.98	88822.22	88777.73	--	--	--
2-class LCA	-42282.59	84623.18	84839.11	84746.95	<.001	<.001	.78
3-class LCA	**-41977.87**	**84043.74**	**84371.36**	**84231.54**	**<.001**	**<.001**	**.79**
4-class LCA	-41749.94	83617.89	84057.20	83869.71	=.02	<.001	.74
5-class LCA	-41590.23	83328.47	83879.48	83644.31	<.001	<.001	.80
6-Class LCA	-41467.83	83113.65	83776.35	83493.52	=.03	<.001	.70
7-Class LCA	-41415.43	83038.85	83813.24	83482.74	=.58	<.001	.80

Note. -- = Not applicable. The class highlighted in bold represents the final class solution.

T1 and T2 Model Results

In order to identify and select the "best" model solution, M*plus* offers a few useful commands and features that prevent the occurrence of incorrect fit statistics and biased parameter estimates, so-called *local likelihood maximum* (Geiser, 2010). For example, I used 1,000 random sets of start values with 250 starting value sets for each model identification (from 1 latent class to 7 latent classes) to arrive at a "solution with the highest log-likelihood value…as the final solution" for class model identification at each time point (Geiser, 2013, p. 238). I also followed Uebersax's (2000) recommendation to increase the number of start value set iterations to 50 for the initial stage of the optimization to ensure that each model identification has reached the true *Global Maximum* (Geiser, 2013).

During these analyses, several unexpected results emerged related to the fit statistics starting from the 4-class LCA model and onward (see Table 4.4). First, the fit statistics (except the log-likelihood and AIC values that remained consistent throughout the model identification) such as BIC and ABIC became unreliable as the class solution increased. For instance, the log-likelihood continued to get larger as the classes increased and the AIC values continued to drop

as the classes increased. However, the ABIC value for the 7-class LCA T2 model increased about 17 points more than the 6-class LCA T2 model. According to Nylund (2007) and Nylund et al. (2007), BIC and BLRT were supposed to be the most reliable fit statistics for model identifications. However, one result in this study was not clear in pointing out which latent class was appropriate for further consideration. It might be due to the complexity of the model caused by the great number of indicators (e.g., $n=14$) included in the analysis. For that reason, I also evaluated the entropy statistics and class sizes in the process of model identification and selection (Collins & Lanza, 2010; Geiser, 2013; Wang & Wang, 2019). I found that the 3-class and 4-class model solutions for T1 and T2 cross-sectional data were more appropriate for further classification. For instance, each model's entropy statistic was in the range between .60 and .80 (see Table 4.4). According to Clark (2010), a high entropy value would be ≥ .80, and a medium entropy would be ≥ .60. A poor entropy value would be ≤ .60 (Asparouhov & Muthen, 2014). Collins and Lanza asserted that the entropy value should be interpreted with caution since it tends to decrease as the number of latent classes increases (2010). Therefore, I examined the number of respondents assigned to each latent class (see Table 4.5) and the average latent class assignment probabilities as the next step (Table 4.6). The diagonal values of the matrix table 4.6 provided more information about the probability of correct class membership assignment. As a rule of thumb, a good class solution would have a value ≥ .70 on the main diagonal (Geiser, 2013; Nagin, 2005 cited in Wang & Wang 2020), and the off-diagonal values represented the measurement errors for the 3- and 4-class model solutions.

Table 4.5

Comparison of CLASS Counts and Proportions for the Latent Classes

Classes	T_1 (*baseline*) Model		T_2 (*first follow − up*) Model	
	3-Class LCA Model Solution	4-Class LCA Model Solution	3-Class LCA Model Solution	4-Class LCA Model Solution
	EPP *N* (%)	EPP *N* (%)	EPP *N* (%)	EPP *N* (%)
1-Class	12250 (83.2%)	10646 (72.3%)	9429 (74.5%)	9429 (74.5%)
2-Class	2351 (16%)	2762 (18.8%)	2007 (15.9%)	2001 (15.8%)
3-Class	117 (.8%)	1167 (7.9%)	1222 (9.7%)	1064 (8.4%)
4-Class	-	144 (1%)	-	164 (1.3%)

Note. EPP = Final class counts and proportions for the latent classes based on estimated posterior probabilities.
The final class counts for the estimated model (EM) and the EPP model were identical, so the EPP results were reported.
T_1: N = 13,971, HA = 11,636, MA = 2,229, LA =106
T_2: N = 12,658, HA = 9,272, MA = 2,365, LA =1,021

Table 4.6

The Matrices for the Average Latent Class Assignment Probabilities for Individuals Assigned to Each Class

T_1 (*baseline*)	3-Class			4-Class			
	1-Class	2-Class	3-Class	1-Class	2-Class	3-Class	4-Class
1-Class	**.95**	.06	0	**.77**	.06	.17	0
2-Class	.14	**.86**	.01	.10	**.81**	.08	.01
3-Class	0	.09	**.91**	.11	.01	**.88**	0

	3-Class			4-Class			
4-Class	-	-	-	.03	.08	0	**.89**
T_2 (*first follow-up*)	3-Class			4-Class			
1-Class	**.95**	.02	.03	**.89**	.09	0	.02
2-Class	.09	**.86**	.05	.21	**.72**	.01	.06
3-Class	.24	.06	**.70**	0	.06	**.85**	.09
4-Class	-	-	-	.11	.09	.03	**.77**

Although three models (e.g., 3-, 4-, and 5-class model solutions) appeared to represent both T1 and T2 cross-sectional data approximately equally well, I followed Collins and Lanza's (2010) rule of parsimony to select the 3-class model solution, a simpler and more parsimonious model for adolescents' future aspiration, for both data time points. Another piece of evidence that guided my decision was the relative size of each class. According to Wang and Wang (2020), when the size of the class proportion was close to zero could be a "sign of class over-extraction" (p.347). The over-extracted classes could make the task of defining and labeling the latent class memberships challenging. For instance, the 5-class LCA model's proportion was considerably smaller with $n= 46$ (.3%) at T1 and $n= 121$ (1%) at T2. This again suggested choosing the simpler solutions were more appropriate (Wang & Wang, 2020).

Although the same statistical procedures were used for the model identification of the adolescents' future aspiration model using T2 cross-sectional data (first follow-up) (refer to Table 4.4 for the fit statistics and the entropy statistics for each T2 model classification), the sample changed slightly for the T2 (first follow-up) cross-sectional data. There was 14% attrition from T1 to T2. The 14% of data loss consisted of all the American Indian, Alaska Natives, and multiracial students as well as some White, Asian, and Black students who failed to answer the 14 aspiration indicators at T2. Despite the loss of these racial groups of respondents, the

information criteria and model solutions suggested that the 3-class or 4-class models of adolescents' future aspiration at T2 were optimal.

Model Defining and Labeling

The models with 3- and 4-classes at the two data time points, T1 (base year*)* and T2 (first follow-up) needed further model assessment and one of them could become a definitive model only when the model also made sense conceptually (Wang & Wang, 2002). The next step was to examine the response patterns along with the number of respondents assigned to each latent class to see whether clear, non-overlapping response patterns existed between classes.

Response Patterns and Class Sizes

While examining the response patterns for 3- and 4-class model solutions, I followed the rules of parsimony and model interpretability to guide my decisions in selecting the optimal model for the two data time points. First, I examined the class sizes for the 3-class and 4-class model solutions and found that the 4-class model solutions consisted of a small class with less than 2% of members (see Table 4.5). Next, I examined the response patterns for each model solution. I found the two latent classes in the 4-class models shared similar response patterns, suggesting the possibility of over-extraction and poor representations of the T1 and T2 membership classifications.

For the 3-class model solutions, on the other hand, the response patterns were separated, which made the labeling and class definition easy. I labeled the first class as High Aspiration (HA Class) because this group of students (83%) answered "important" on all 14 future aspiration indicators at both times. The second class was labeled as Moderate Aspiration (MA Class);16% of adolescents were classified into MA Class at T1 and 15.9% of adolescents were classified into MA Class at T2. The characteristics of this specific group included having high

aspirations about certain aspects of their life but medium aspirations on other aspects. Finally, the third class was labeled as Low Aspiration (LA Class) Class. The class size was small, about .8% of the students were classified into the LA Class at T1. There was a big increase in the number of students assigned to LA Class at T2, where 9.7% of the students were found to have low aspiration at T2. The respondents in LA had comparatively lower aspirations about all life aspects than the other two groups (more detailed information about each latent class can be found in the Finding section of Chapter 5). Even though the distinct response patterns assisted the model labeling and definition, one thing I have noticed about the commonality shared among all the respondents in the three classes that they believed "getting an education" (V14) was important. Another similarity shared among the respondents in HA and MA groups were their high career aspirations. For the T2 cross-sectional data, the model structure slightly changed due to the data attrition from T1 and T2. However, the loss of particular groups of students did not affect the T2 model classification. The three-class solutions were still applicable to the T2 cross-sectional data and the response patterns for each class were consistent with T1 classes.

Including Additional Covariates

To further test whether the 3-class adolescent future aspiration model was appropriate, covariates and outcome measures were included using the BCH three-step method (Bakk et al., 2013). I first conducted BCH three-step method on the three-class LCA model with the covariates. When the three-class model with the covariates was confirmed to be a good model, I then conducted a second BCH three-step method by adding the predictor, postsecondary enrollment. Before the BCH three-step analysis, two covariates, *race* and *SES*, were transformed into several dummy variables. I decided to choose male students as the reference group for *Gender,* White for *Race*, and the highest socioeconomic quartile (students from the most affluent

families) for *SES*. Table 4.7 provides the complete results of how students of different gender groups, races, and SES were distributed to the three-class models for the T1 and T2 models.

In terms of *gender*, most of the female (83.3%) and male (83.5%) students were classified into HA Class at T1. However, the number of female (73.6%) and male (72.9%) students in HA Class decreased at T2. MA Class as the second largest class consisted of 15.7% of male and 16% of female students at T1 and 18.6% male and 18.8% of female students at T2. The smallest class is LA class across the two times points. Only less than 1% of female and male students were classified into this class at T1. Nevertheless, the LA Class had an increase of 915 female and male students (863%) at T2. It is evident that most of the HA Class students at T1 moved to LA Class at T2.

In terms of *race*, White students made up about 57% of the entire sample in this study, and thus, it was apparent that the White students were the largest racial group in every future aspiration class. However, if the membership classifications were broken down by each racial group, we would expect more students of color (89% of Blacks, 85% of Hispanics, 89% of Asian students) were classified into HA Class than White students (82%) did at T1. A similar trend emerged for HA Class at T2. Students (73%) or other racial categories (i.e., Native Americans, Alaskan Native, and multiracial) were the least in terms of numbers in the HA Class.

When the same survey was administered to the same students in 2004 or at T2, two unexpected issues emerged in the LCA cross-sectional results. First, the T2 cross-sectional data lost all the Native American, Alaskan Native, and multiracial students, so the study no longer had any information about these students' future aspirations in their senior year and in relation to their postsecondary enrollment. Second, some students that remained in the T2 sample appeared to have experienced some challenges and adversities during the two years of gap. Consequently,

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HA class experienced a loss of students from all racial categories. LA class experienced a growth

of students from all racial categories at T2. For example, about 78% of the Whites, 82% of

Blacks, 96% of Hispanics and Asians remained in HA class at T2. The majority of the students

of color left HA class transitioned to MA class. The Black students ($n=402$) in MA class had a

twofold increase from T1 to T2, and the Hispanic and Asian populations also increased in MA

class by 21% and 77%, respectively. However, MA class lost about 3% of White students at T2.

All the Whites that left MA and HA classes (n=665) transitioned to LA class at T2. At T1, there

were a total of 106 (<1%) students in LA Class, but LA class had 863% increase at T2. Similar

trends were found among students with different socioeconomic statuses. Although students

from each SES category range low to high had an equal chance of being assigned to HA Class at

both data times points, an unexpected phenomenon was identified, there were more students

from the highest SES (from most affluent families) than students from lower socioeconomic

statuses were assigned to LA class at T1 and T2. Overall, the results implied that most of the

students, regardless of gender, racial backgrounds, or socioeconomic statuses, are all likely to

have high, moderate, and low aspirations about their future.

Table 4. 7

Covariates of Membership in Latent Classes of Adolescents' Future Aspirations Models.

	T_1 (baseline)			T_2 (first follow − up)		
	HA Class	MA Class	LA Class	HA Class	MA Class	LA Class
Prevalence N (%)	11636 (83.3%)	2229 (16%)	106 (.8%)	9272 (73.3%)	2365 (18.7%)	1021 (8.1%)
Gender						
Male	5818 (83.5%)	1092 (15.7%)	58 (.8%)	4543 (72.9%)	1159 (18.6%)	531 (8.5%)

Female	5818 (83.3%)	1115 (16%)	48 (.7%)	4729 (73.6%)	1206 (18.8%)	490 (7.6%)
Race						
White	6516 (81.8%)	1382 (17.3%)	70 (.9%)	5100 (71%)	1348 (18.8%)	735 (10.2%)
Black	1745 (89.3%)	201 (10.3%)	8 (.4%)	1484 (75%)	402 (20.3%)	92 (4.7%)
Hispanics	1745 (84.6%)	312 (15.12%)	6 (.3%)	1669 (76.9%)	378 (17.4%)	123 (5.7%)
Asian	1164 (89.3%)	134 (10.3%)	6 (.5%)	1113 (77.7%)	237 (16.6%)	82 (5.7%)
Other	582 (72.8%)	201 (25.2%)	16 (2%)	NA	NA	NA
SES						
Highest SES	3258 (83.7%)	646 (16.4%)	37 (.9%)	2689 (74%)	639 (17.6%)	306 (8.4%)
Third SES	2909 (84%)	535 (15.4%)	20 (.6%)	2133 (70.5%)	615 (20.3%)	276 (9.1%)
Second SES	2793 (84.3%)	490 (14.8%)	30 (.9%)	2133 (72.9%)	568 (19.4%)	225 (7.7%)
Low SES	2793 (83.4%)	535 (16%)	19 (.6%)	2225 (74.2%)	568 (19%)	204 (6.8%)

Notes. T_1: N = 13,971, HA = 11,636, MA = 2,229, LA =106;
T_2: N = 12,658, HA = 9,272, MA = 2,365, LA =1,021

Postsecondary Enrollment Outcomes for Different Aspiration Profiles

Adolescents' Future Aspiration T_1 LCA Model. Table 4.8 presents the multinomial

logistic regression model results relating LCA memberships to relevant covariates and an

outcome measure. Overall, students' gender, racial/ethnic backgrounds and socioeconomic

statuses in each class did not significantly affect the college enrollment outcomes, except for

students in LA Class. For example, students of the second socioeconomic quartile in LA class

had a positive effect on postsecondary enrollment (OR=1.56, SE=.21, p=.034), meaning the students who belonged to the second socioeconomic quartile in the LA class had 56% greater odds of getting a postsecondary education than students of other socioeconomic categories in that class.

Nevertheless, the likelihood of attending colleges differed significantly among the three future aspiration classes. In comparison to the postsecondary enrollment outcomes for LA class (the reference group) at T1, students who belonged to MA class had 2.67 times greater odds of attending a postsecondary institution. This is also true for students who were in HA class; the odds for HA class to enroll in a postsecondary institution was 2.73 times greater than that of students in LA class at T1. For the cross-sectional data at T2, the odds ratio of enrolling in a postsecondary institution for both MA and HA students were the same, 2.72 times greater than students in the LA class.

Table 4. 8

Summary Multinomial Logistic Regression Analyses for Adolescents' Future Aspiration Memberships Predicting Postsecondary Enrollment Outcomes.

	T_1 (baseline) LCA Model				T_2 (first follow − up) LCA Model			
	Logit	SE	Est/SE	Odds Ratio	Logit	SE	Est/SE	Odds Ratio
Postsecondary Enrollment (Predictor)								
High Aspiration Class	1.01***	.01	164.20	2.73	1.0***	.001	775.73	2.72
Moderate Aspiration Class	.98***	.04	26.55	2.67	.1.0***	.006	175.68	2.72
Low Aspiration Class	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
				1. High Aspiration Class				
Gender								
Female (vs. male)	.001	.001	.52		-.002	.001	-1.489	
Race								
Black (vs. White)	-.003	.003	-.961		-.001	.002	-.417	
Hispanic (vs. White)	.007	.008	.805		.002	.001	1.725	
Asian (vs. White)	.002	.004	.672		0	.001	.713	
Other (vs. White)	-.002	.002	-.945		NA	NA	NA	NA

Socioeconomic Quartiles							
Third SES (vs. Highest SES)	.002	.002	.957	0	.001	.225	
Second SES (vs. Highest SES)	.002	.002	.928	-.003	.002	-1.685	
Low SES (vs. Highest SES)	.001	.002	.481	0	.001	.274	

2. Moderate Aspiration Class

Gender							
Female (vs. male)	-.011	.011	-.978	-.004	.006	-.672	
Race							
Black (vs. White)	.014	.029	.494	-.002	.007	-.240	
Hispanic (vs. White)	.029	.033	.887	-.012	.007	-1.711	
Asian (vs. White)	.035	.019	1822	-.001	.006	-.178	
Other (vs. White)	-.006	.009	-.606	NA	NA	NA	NA
Socioeconomic Quartiles							
Third SES (vs. Highest SES)	-.007	.015	-.484	0	.010	-.008	
Second SES (vs. Highest SES)	-.016	.016	-1.006	0	.009	.015	
Low SES (vs. Highest SES)	-.012	.016	-.743	.002	.008	.274	

3. Low Aspiration Class

Gender							
Female (vs. male)	.082	.128	.639	-.002	.017	-.099	

Race

Black (vs. White)	.594	.637	.933		.017	.014	1.205	
Hispanic (vs. White)	-.260	.301	-.865		-.068***	.019	-3.637	.93
Asian (vs. White)	.156	.377	.414		.012	.013	.909	
Other (vs. White)	.174	.155	1.119		NA	NA	NA	NA
Socioeconomic Quartiles								
Third SES (vs. Highest SES)	.128	.192	.667		-.020	.024	-.826	
Second SES (vs. Highest SES)	.445*	.21	2.121	1.56	-.014	.021	.674	
Low SES (vs. Highest SES)	.051	.181	.280		-.008	.023	-.352	

Note. * $p < .05$. ** $p < .01$. *** $p < .001$. T_1: N = 13,971, HA = 11,636, MA = 2,229, LA =106; T_2: N = 12,658, HA = 9,272, MA = 2,365, LA =1,021

Adolescents' Future Aspiration T₂ LCA Model. Similar associations occurred between adolescents' future aspirations model with three classes and postsecondary enrollment outcomes for the T2 cross-sectional data. No significant associations were found between postsecondary enrollment outcomes and gender, race, and SES, except for respondents in LA Class. Hispanic students in LA Class were 7% less likely to enroll in a postsecondary institution (OR= .93, SE=.019, p<.001) than the White students in LA Class. Nevertheless, the effect was considerably small.

The postsecondary enrollment outcomes were statistically significant among the three future aspirations classes. The likelihood of enrolling in postsecondary institutions was the same for students in both moderate and high aspiration classes (OR =2.72, p<.001) and they were all statistically significantly higher than students' postsecondary enrollment in LA class.

Presentation of Latent Transition Analysis

I followed recommendations from Ryoo et al. (2018) and Nylund et al. (2007) to break down the latent transition analytical procedures into six general steps to address the final two research questions of this study. Step 0: LCA procedures to explore cross-sectional data; Step 1: study measurement model alternatives for each time point. Step 2: explored transitions based on cross-sectional results. Step 3: analyzed the specification of the latent transition model without covariates. Step 4: included covariates in the LTA model. Step 5: added distal outcomes and advanced modeling extensions. The five procedures helped answer the questions concerning whether there was a change between latent classes across time, the transition probability of individuals in a different class at T2, and the postsecondary enrollment outcome for T1 and T2.

Step 0: LCA Diagnose and Explore Cross-sectional Data Using LCA

Step 0 was completed during the model selection and identification of the separate LCA on the two data time points. To briefly recap, the adolescents' future aspirations LCA model with three classes for each time point was identified to be the optimal model solution. The respondents were classified into either high aspiration (HA) class, moderate aspiration (MA) class, or low aspiration (LA) class. Therefore, for the LTA, I imposed the same three-class model solution. Nevertheless, there is a possibility that the three-model solution classified using LCA statistical techniques could not converge due to the following reasons.

First, 21% of data attrition from T1 to T2 could affect the model structure of the adolescents' future aspiration model in LTA. Second, one of the limitations imposed by M*plus* was how it dealt with missing data; the software treated the missing values in the manner of case-wise deletions. This also cost the reduction of sample size ($n=11,380$) for the latent transition analysis. After removing all the missing cases from the sample and revisited the data, the data lost all the students who were Native American, Alaskan Native, and multiracial at T2, which limited the understanding of the association between adolescents' future aspirations and postsecondary enrollment outcomes for these particular groups of students. The deficiencies due to different levels of prevalence rates of missing data across time "may limit the usefulness of examining the latent class structure at one particular time" (Collins & Lanza, 2010, p.190). If the three-class model solution did not converge, then the next optimal model solution should be applied, the 2-class model solution.

To ensure the two separate future aspirations LCA models with three classes were the appropriate models for latent transition analysis, I employed the same LCA procedures to

Table 4.9

LTA Step 1: Results of LCA at Each Time Point.

	Log-likelihood	AIC	BIC	ABIC	Entropy	LMRT	BLRT
			T_1(Base Year)				
2-Class solution	-39854.27	79766.54	79981.28	79889.12	.85	*p*<.001	*p*<.001
3- Class solution	-39396.02	78880.04	79205.85	79066.02	.84	*p*<.001	*p*<.001
			T_2(First Follow-up)				
2-Class solution	-40443.53	80945.05	81159.79	81067.63	.76	*p*<.001	*p*<.001
3- Class solution	-40125.93	80339.86	80665.66	80525.83	.77	*p*=.088	*p*<.001

explore the fit of the measurement model for each time point using the combined T1 and T2 data

without any missing information on the 14 indicators. The fit criteria and model information for

the three-class model using non-missing data were very similar to the results derived from the

independent latent class analysis on T1 and T2 cross-sectional data. Although the fit criteria

suggested the 2-class model was a better model than the 3-class model, the statistical fit criteria

should work in conjunction with theoretical and practical consideration (see Table 4.9). The LTA

results also suggested that the three-solution model was the preferred model to move forward in

the analysis.

Based on the preliminary LCA cross-sectional results (Table 4.10), HA class was

consistently the largest at each time point. However, the class size for HA class was reduced

from T1 to T2, and both MA and LA classes had an increase of membership at T2. Though these

were based on cross-sectional analyses, these values implied a movement between the three

aspirations classes.

Table 4.10

LTA Step 0: Percent of Students in of the Future Aspiration Classes in T_1(Base Year) and T_2(First Follow-up) Based on Cross-sectional LCA Results.

Classes (*N*=12145)	T_1(Base Year)	T_2(First Follow-up)
High Aspiration Class	10561 (87%)	8852 (73%)
Moderate Aspiration Class	1507 (12%%)	2091 (17%)
Low Aspiration Class	77 (1%)	1202 (10%)

Step 1: Longitudinal Measurement Invariance Testing

Next, I conducted a longitudinal measurement invariance test. The goal of testing

measurement invariance was to assess how the observed variables related to the underlying latent

variable (Nylund et al., 2007). The choice of which measurement invariance specification tests to run depends "on the nature of the observed outcomes, the length of time considered, and the nature of the construct" (Nylund et al., 2007, p. 15). The purpose of this study is to examine the consistency of the model structure across time by assessing whether the three-class model solution was a good fit to the two cross-sectional data as well as the class definition and label for the three levels of future aspirations remained the same over time (Collins & Lanza, 2010; Ryoo et al., 2018).

In this study, I explored the full measurement non-invariance and full measurement invariance tests. The longitudinal measurement invariance tests served a very similar purpose as the measurement invariance tests for the confirmatory factor models in a variable-centered approach; wherein the measurement non-invariance test, the conditional item probabilities (parameters) or loadings were freely estimated for each time point, and in the full measurement invariance test the loadings were constrained across groups from T1 to T2 (Ryoo et al., 2018). The full measurement invariance model for the three-class future aspiration model fit the data better than the measurement non-invariance model (see Table 4.11). The fit statistics such as the Log-likelihood, AIC, BIC, and ABIC for the measurement non-invariance were smaller than the fit statistics of the full measurement invariance model. However, there were many concerns with the convergence of the non-invariance model. For example, after running multiple estimation algorithms with different parameter starting values, the global maxima could not be reached in the measurement non-invariance model. The failure for the global maxima to converge may suggest the measurement non-invariance was an unreliable model. Furthermore, the model parameter estimates' standard errors also indicated the three-class measurement non-invariance model could not be identified. Finally, the full measurement invariance was well-aligned to the

purpose of this study, in which the three future aspiration classes were the same across T1 and T2, and no restrictions were made on the class sizes over time (Nylund et al., 2007). Therefore, given consideration to the theoretical and practical reasons about the model structure for the adolescents' future aspirations, I assumed a full measurement invariance model in this study.

Step 2: Define Latent Statuses

Step 2, label and define the latent statuses, was skipped at this stage because the three latent classes have already been identified and labeled during the LCA procedures. The solutions for the latent classes in the LCA models and for the latent statuses in the LTA models were similar in terms of class sizes and response patterns.

Step 3: Test Latent Statuses and Transition Probability Invariance

There were two parts made up for Step 3: 1) test latent statuses and 2) examine transition probability invariance. The second part of Step 3 was skipped in the analysis because it was not needed for this study, particularly with only two data time points (Ryoo et al., 2018). Moreover, it would not make sense to impose restrictions on the transitions of adolescents' future aspiration classes from time 1 to time to be the same (Nylund et al., 2007). Bronfenbrenner's ecological model proposed that different environments and experiences over time impact children's development differently (1979). Thus, assuming similar transitions may not be realistic even for students who have been identified to be in the same aspiration classes at T1. Moreover, one of the primary study's aims was to examine the covariate relationships with each aspiration class. Once the covariates were included in the models, the current transition probabilities might be distorted and become meaningless under covariates' influence.

Table 4.11

LTA: Step 1, Test Measurement Invariance Results.

	MI		Log-likelihood	AIC	BIC	ABIC	Diff. Log-likelihood	Entropy
2-solution	Free	a	-78775.86	157725.73	158369.93	158093.46		.64
	Full	b	79109.08	158364.17	158904.71	158672.72		.80
3-solution	Free	a	-77187.19	154670.38	155766.28	155295.95		.71
	Full	b	-77733.87	155707.74	156596.30	156214.95	546.68	.71

Note. [a]Free = Full measurement invariance where all the conditional item probabilities (loadings) are freely estimated for each timepoint.

[b]Full = Full measurement noninvariance where the conditional item probabilities (loadings) are constrained to be equal across time.

Based on the full measurement invariance model test, HA class remained the largest

class, with 54% of the adolescents at T1 and 51% at T2. According to the matrix table of the

latent transition probabilities based on estimated models (see Table 4.12), the most stable class

was MA class; about 90% of the people in MA class remained in the same membership from T1

to T2. The latent transition probabilities matrix table also illustrated the percentage of stayers and

movers of each status from T1 to T2. For example, the diagonal values reflected the percentage

of stayers that remained in the same Class from T1 to T2, and the off-diagonal values reflected

the movers (Nylund et al., 2007). Based on the results, 20% of HA class members moved to MA

class (12%) and LA class (9%) at T2. Although 13% of students from HA and MA classes

moved to LA class, about 33% of students in the T1 LA class became moderately ambitious

(8%) and highly ambitious (25%). This was a good sign that more students became more

moderately and highly ambitious as they grew older.

Table 4.12

LTA Step 3: Matrix Table of the Latent Transition Probabilities Based on Estimated Models.

	T_2 (First Follow-Up)		
T_1 (Base Year)	HA Class (*n=5,225*)	MA Class (*n=4,328*)	LA Class (*n=1,827*)
HA Class (*n=5677*)	.80	.12	.09
MA Class (*n=3916*)	.07	.90	.04
LA Class (*n=1787*)	.25	.08	.67

Notes. N= 11,380. Due to data attrition, the student sample for latent transition
analysis is smaller than the sample size for the latent class analysis.

Step 4 and 5: LTA With Covariates and Distal Measure

The associations between the covariates and the future aspiration models were explored next to see how gender, race, and SES affected the LTA model's latent class memberships. The inclusion of three covariates further complicated the model, which created many challenges to calculate the accurate values for the three latent classes' parameters. After multiple attempts in M*plus*, the researcher decided to use STATA SE 16 to complete the final two steps (LTA with covariates and distal outcome measure) using multinomial logistic regression. Due to the practical disadvantage of M*plus*, its approach and coding for these types of analyses (i.e., logistical regression) are much less straightforward than using SAS, STATA, or even SPSS. Therefore, it is recommended by Acock (2010) and Wang and Wang (2018) to use alternative statistical software to complete the final steps. I saved the full measurement invariance model with three latent classes and transition probability information, and then merged the results with the original dataset and completed the analysis in Stata 16.

The multinomial logistic regression results are summarized in table 4.13. In terms of gender, the odds ratios (OR) for male students to be in HA and MA classes were significantly greater than the probability of being in LA Class (the reference group) at T1 (HA: OR =3.63, SE =.061, $p<.001$; MA: OR=.1.948, SE= .066, $p<.001$) and T2 (HA: OR=3.22, SE =.06, $p<.001$; MA: OR=.1.98, SE = .064, $p<.001$). On the other hand, for female students, the slopes were not statistically significant for both HA and MA classes at the two-time points, which indicated that female students did not have a higher probability of being assigned to either of the three aspiration classes than male students.

In terms of *race,* the White students in each latent class served as the reference group. All students of color (Black, Hispanic, and Asian) have significant and greater odds of being

Table 4. 13

LTA Step 4: Covariates of Membership in Latent Statuses of Adolescents' Future Aspirations Models (T_1 and T_2).

Class	Effect	T_1 (Base year)			T_2 (First Follow-up)		
		Logit	SE	Odds Ratio	Logit	SE	Odds Ratio
High Aspiration Class	Gender						
	Female (vs. male)	-.003	.056	0.997	-.003	.086	.997
	Race						
	Black (vs. White)	.457***	.093	1.579	.458***	.093.	1.581
	Hispanic (vs. White)	.28***	.083	1.323	.335***	.085	1.398
	Asian (vs. White)	.462***	.104	1.587	.469***	.104	1.598
	Socioeconomic Quartiles						
	Third SES (vs. Highest SES)	-.117	.077	0.89	-.128	.076	.88
	Second SES (vs. Highest SES)	-.116	.079	0.891	-.054	.079	.947
	Low SES (vs. Highest SES)	-.084	.083	0.919	.009	.083	1.009
Moderate Aspiration Class	Gender						
	Female (vs. male)	.003	.06	1.003	-.001	.059	.999
	Race/ethnicity						
	Black (vs. White)	.86***	.096	2.363	.834***	.095	2.303

Hispanic (vs. White)	.299***	.09	1.349	.358***	.09	1.431
Asian (vs. White)	.483***	.111	1.621	.478***	.095	1.613
Socioeconomic Quartiles						
Third SES (vs. Highest SES)	-.072	.083	.093	-.03	.08	.97
Second SES (vs. Highest SES)	-.095	.085	0.909	-.015	.084	.985
Low SES (vs. Highest SES)	-.145	.089	0.865	-.025	.088	.975

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

assigned to HA and MA classes than the White Students. Notably, the Black students' probability of being in MA class was the highest among the four racial groups at T2 (OR= 2.303, SE=.095, $p<.001$). The likelihood for Asian and Black students to be in HA class was about the same at each data time point, and they were both statistically significant. Although Hispanic students had slightly lower odds of being in HA and MA class than Black and Asian students, these odds of differences were considerably small.

The third covariate I explored was the students' family socioeconomic (SES) statuses. The reference group was chosen to be the highest SES quartile or the most affluent families. Although the slopes for the third quartile, second quartile, and low SES quartile were negative, meaning these three groups have lower odds of being in HA and MA at both time points, these odds were not statistically significant. Therefore, the results suggested that students of different socioeconomic statuses had equal chances of being in HA, MA, and LA classes.

In the final step, *postsecondary enrollment* was included as a predictor in the LTA model. First, I explored its relationships with the covariates. Then, I explored its relationship with the LCA models with three classes at T1 and T2. The logistic regression analysis between the distal measure and the covariates results are shown in Table 4.14, indicating that female students' likelihood of enrolling in postsecondary institutions was not statistically significant (OR = .964, SE=.087, $p=.68$) compared to the male students. For the family socioeconomic quartiles, compared to the highest SES/most affluent families as the reference group, students in the third, second, and low SES groups have lower odds of enrolling in colleges. For example, the odds for students in the low SES group to enroll in postsecondary institutions were 54% (OR = .55, SE.=.667, $p<.001$) lower than the highest SES group. For the second SES group students, the odds were 46% lower than the highest SES group, and the odds for the third SES group were

33% lower than the highest SES group to enroll in colleges. The statistically significant

relationships between the socioeconomic quartiles and postsecondary enrollment outcomes

suggested that family wealth, financial status, and parents' educational levels were important

predictors of whether students would attend colleges or not. The variable *race* was suggested to

remove from the analysis as the coefficients did not converge with a message "omitted". Out of

curiosity, I conducted a separate logistic regression analysis on postsecondary enrollment (DV)

and transformed the Black, Asian, and Hispanic students as dummy variables. The results were

identical. Therefore, I decided to exclude race in the final logistic regression model.

Table 4.14

LTA Step 5: Summary Logistic Regression Analyses for the Covariates Predicting Postsecondary Enrollment Outcomes.

Postsecondary Enrollment Outcome	Logit	SE	Odds Ratio
Gender (female vs. male)	-.037	.087	.964
Highest SES	Ref	Ref	Ref
Third SES	-.405***	.081	.667
Second SES	-.609***	.667	.544
Low SES	-.788***	.061	.455

Note. * $p < .05$. ** $p < .01$. *** $p < .001$. N= 11,380. Male and the Highest SES are the reference groups. The likelihood for college enrollment was not statistically significant for female and male students. The differences of postsecondary enrollment for the three SES groups were found statistically significant as were compared to the Highest SES students.

For the final three-solution LCA models for T1 and T2, I first explored the postsecondary

enrollment outcome on adolescents' future aspiration LCA model with three classes at T1. The

results suggested that students in MA class had the highest probability of enrolling in

postsecondary education among the three future aspiration classes. For instance, in comparison

to the reference group, Low Aspiration (LA) Class at T1, students in MA had 2.22 times

(SE= .295, *p*<.001) greater odds of enrolling in postsecondary institutions. Similarly, students in High Aspiration (HA) class had 1.49 times (SE= .168, *p*<.001) greater odds to enroll in postsecondary institutions than students in LA class. The result patterns were identical for students in the three future aspiration classes at T2 when they were high school seniors. MA Class had consistently found to have the highest probability (OR =1.91, SE=.248, *p*<.001) of enrolling in postsecondary institutions among the three classes, but it was slightly smaller than the odds at T1. Even though the probability for HA and MA classes to enroll in colleges were still high at T2, their odds ratio decreased slightly as they compared to the odds ratios for the two classes at T1. The goodness of fit test and true classification test were also conducted to assess whether the three-solution LCA model at both time points were appropriate models in predicting students' postsecondary enrollment outcomes. The results suggested the two LCA models were good models representing the data and predicted the probability of the memberships correctly.

Movers Vs. Stayers

I also examined the college enrollment patterns between movers and stayers. The transition probability in the LTA results demonstrated that students' attitudes or aspirations about their future changed from T1 during the second semester of their sophomore year in high school to T2 when they were about to exit from high school. Although the majority of the students (89%) remained in the same aspiration class memberships from T1 to T2, there were about 7% of the students moved to a lower aspiration class membership at T2, and 4% of the students moved to a higher aspiration class membership in their senior year. Students who became more ambitious about their future and moved up to another future-aspiration class were referred to as move-up students, and students who became less ambitious about their future and moved down to another future aspiration class were referred to as move-down students.

Next, logistic regression analysis was performed on two types of movers and stayers to predict the postsecondary enrollment along with the covariates, race, gender, and SES. Similar to the previous LTA three-class student aspiration model results, the variable race was dropped by Stata automatically because the model did not find it had any variation on the postsecondary enrollment (Acock, 2010). After controlling for students' status (mover or stayer) and SES, whether students enrolled in postsecondary institutions did not statistically differ between male and female students ($p =.5$). However, the postsecondary enrollment outcomes differed among students of different socioeconomic statuses. The high-income (4th socioeconomic quartile) students as the reference group, the odds of enrolling in a postsecondary institution were reduced by 25% (OR= .75, SE=.09, $p =.016$) for students in the higher (2nd socioeconomic quartile) and reduced by 21% (OR= .79, SE=.094, $p=.044$) for the middle (3rd socioeconomic quartile) SES categories. Although the odds of enrolling in a postsecondary institution for students in the low-income category (lowest socioeconomic quartile) was 14% greater than high-income students, it was not statistically significant (OR= 1.14, SE=.149, $p=.329$). Finally, the odds of enrolling in a postsecondary institution for students who were classified as movers during the LTA analysis were slightly lower than students who remained in the same future-aspiration classes. For instance, after controlling for variables gender and SES, the odds of enrolling in a postsecondary institution for move-up students were 39% (OR= .61, SE=.112, $p =.007$) less likely to enroll in a postsecondary institution than students who remained in the same future aspiration classes. Similarly, the odds of enrolling in a postsecondary institution for move-down students were 23% (OR= .78, SE=.121, $p=.107$) less than students who remained in the same future-aspiration classes. However, the lower odds of enrolling in a postsecondary institution for movers who moved down in their future aspiration classes were not statistically significant.

Chapter 5 – Discussion and Conclusion

This chapter discusses the research findings by connecting them to the social factors in the ecological theoretical framework and the existing literature on the relationship between adolescents' future aspirations and their postsecondary enrollment. It concludes with a discussion of the practical implications of the findings and recommendations for future research. This study used a national, longitudinal dataset, the National Center for Education Statistics' Education Longitudinal Study of 2002 (ELS:2002), added to the seminal works of previous scholars (Hill et al., 2004; Hill & Chao, 2009; Jodl et al., 2001; Schneider & Stevenson, 1999; Venezia & Kirst, 2005) in the field of educational attainment, specifically postsecondary enrollment, by investigating adolescents' future aspirations as a multidimensional construct concerning postsecondary enrollment, while attending to demographic and background variables such as students' gender, race, and family SES.

Findings

This study explored the multidimensional construct of adolescents' future aspirations and assessed the relationship between the adolescent's future aspirations and postsecondary enrollment using person-centered statistical approaches. The results illustrated the multidimensional construct of the adolescents' future aspirations, which is different from the four-factor adolescents' future aspirations model derived from the previous study using variable-centered approaches (see Lu et al., under review). Instead of identifying the unique latent construct representing different aspects of adolescents' future aspirations, such as school and work factor, relationships with family and friends factor, civic engagement (community engagement) factor, and personal goals factor, this study has identified three classes of adolescents' future aspirations representing the levels or the intensity of adolescents' aspirations

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about their future ranges from high to low. In other words, according to the participants' response patterns on the 14 variables in the sample, the study has identified students who had high, moderate, and low aspirations about their future. Despite the definitions and numbers of factors or classes differed due to the unique statistical procedures that variable- and person-centered methods took, both results have proven that adolescents' future aspirations are multidimensional and influenced by many facets of students' daily lives and experiences (Sipsma et al., 2012), such as school, family, peer, and community contexts. Combining these environments altogether could have different and mixed impacts (complementary and competing) on children's development (Sipsma et al., 2012), including their educational attainment. Although this study could not tease out the specific competing and complementary effects that these social factors have on student development, this study compels readers and research in the direction of considering the overall impact (not just only one or two) of different social factors play in shaping and reshaping adolescents' beliefs and plans about their future.

As we know from the previous work discussed in this study, different methodological approaches were implemented to investigate the connections or the impact of various environments on educational attainment in general. Most of these studies focused on one or two particular aspects of the environments and assessed their associations with children's educational attainment and career aspirations (see Giujarro et al., 1999; Heinrich, 1993; McCabe & Barnett, 2000a). Also, most of the quantitative studies in this area employed variable-centered statistical approaches. Nevertheless, such approaches limited our understanding of adolescents' future aspirations without addressing the complexity of the inherent multidimensional nature of student life in shaping and reshaping how they plan for their future (Nurmi, 1991; McCabe & Barnett, 2000b). Consequently, less attention has been given to what combined, within-person effects

these social contexts have had on children's development, particularly their postsecondary enrollment (Sipsma et al., 2012). For instance, inequitable access to school resources significantly reduced the college-going culture in high-need and high-poverty schools. The lack of resources reflects the types of programs and services that these schools could offer to their students and resembles the intangible resources such as qualified teachers and experienced counselors that these schools could not afford. Moreover, family factors were found to have a much longer impact on child development and academic achievement. For instance, the effects of family wealth and parents' educational attainment statuses could be traced back to children's early childhood when they first learned how to read letters and accumulated vocabularies. We also learned that peers served as a benchmark for personal development, whether they want to pursue a college degree to which colleges they attend. To avoid conflicts and negative peer pressure, adolescents also learned how they celebrate their academic success and when they should mask their academic achievement. Community engagement concerning educational attainment in higher education has been discussed only at the geographic location level in terms of urban, rural, and suburban schools. Nevertheless, more studies are needed to investigate how adolescents perceive issues related to social injustices and equality. Finally, we also need more studies about how adolescents' non-education-related ambitions and goals are associated with their postsecondary education. Although contemporary teens are more ambitious than the earlier generations, most of them are directionless and unable to actualize their ambitions due to the misaligned support they received from their parents and school (Schneider & Stevenson, 1999).

Therefore, to further our understanding of these social factors' overall impact on higher education attainment in higher education, this study first used LCA to determine the appropriate number of future aspiration classes according to the students' answers on the 14 variables. Next,

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the adolescents' future aspiration LCA models for both T1 and T2 were further studied using three covariates, gender, racial, and family socioeconomic statuses, before conducting multinomial logistic regression on the adolescents' future aspirations classes to predict its effect on adolescents' postsecondary enrollment at two adolescent stages. Finally, the study explored the transition of adolescents' future aspirations between T1 and T2 using latent transition analysis (LTA) and what preliminary predictive effects the transition of these memberships had on adolescents' actual postsecondary enrollment.

The Multidimensional Construct of Future Aspirations

This study's findings support the conceptualization of future aspirations as a multidimensional construct that consists of a combination of social factors and individual experiences (Sirin et al., 2007). Fourteen indicators were extracted from the ELS:2002 student questionnaire surveyed adolescents' attitudes and perceptions concerning their future education, career, family relationship, friendship, community engagement, and personal goals. Based on their response patterns (see Table 5.1 for the response patterns), the students have been clustered into three latent classes at two data points, and later the three-solution of adolescents' future aspirations were confirmed in the latent transition analysis. These classes are defined as the High Aspiration Class, the Moderate Aspiration Class, and the Low Aspiration Class.

Table 5.1

Response Patterns from the LTA Results

	Base Year			First Follow Up		
Indicators	HA Class	MA Class	LA Class	HA Class	MA Class	LA Class
V1 Being successful in my line of work						

not important	0	0.03	0.8	0	0	0.06
Yes	1	0.97	0.2	1	1	0.94
V2 Finding the right person to marry and having a happy family life						
not important	0	0.27	0.68	0.01	0	0.37
Yes	1	0.73	0.32	0.99	1	0.63
V3 Having lots of money						
not important	0.06	0.17	0.63	0.09	0.11	0.28
Yes	0.94	0.83	0.37	0.91	0.89	0.72
V4 Having strong friendships						
not important	0	0.06	0.54	0.01	0.01	0.13
Yes	1	0.94	0.46	0.99	0.99	0.87
V5 Being able to find steady work						
not important	0	0.06	0.82	0	0	0.09
Yes	1	0.94	0.18	1	1	0.91
V6 Helping other people in my community						
not important	0.03	0.29	0.75	0.01	0.15	0.26
Yes	0.97	0.71	0.25	0.99	0.85	0.74
V7 Being able to give my children better opportunities than I've had						
not important	0	0.17	0.7	0	0.01	0.21
Yes	1	0.83	0.3	1	0.99	0.79
V8 Living close to parents and relatives						
not important	0.1	0.47	0.64	0.12	0.25	0.54
Yes	0.9	0.53	0.36	0.88	0.75	0.46
V9 Getting away from this area of the country						
not important	0.46	0.39	0.64	0.47	0.64	0.39
Yes	0.54	0.61	0.36	0.53	0.36	0.61
V10 Working to correct social and economic inequalities						
not important	0.22	0.53	0.75	0.1	1	0.45
Yes	0.78	0.47	0.25	0.9	0	0.55
V11 Having children						

not important	0.07	0.53	0.71	0.09	0.11	0.7
Yes	0.93	0.47	0.29	0.91	0.89	0.3
V12 Having leisure time to enjoy my own interests						
not important	0.01	0.07	0.59	0.01	0.02	0.1
Yes	0.99	0.93	0.41	0.99	0.98	0.9
V13 Becoming an expert in my field of work						
not important	0.02	0.1	0.79	0.01	0.06	0.13
Yes	0.98	0.9	0.21	0.99	0.94	0.87
V14 Getting a good education						
not important	0	0.04	0.7	0	0.01	0.06
Yes	1	0.96	0.3	1	0.99	0.94

The response patterns on the 14 variables were unique among the three aspiration classes. HA class students reported "important" on all the 14 variables, which suggested how easily they could be distracted by the immediate environments and issues concerning school, work, family, friendships, community, and personal matters that could compete and interfere with their schooling plans. For LA class students, the response patterns showed this particular group of students lacked motivation or aspiration about their future, and thus, they had the lowest odds of enrolling in postsecondary education.

High Aspiration Class (HA class). This class was the largest across both time points. More than 83% of the students were classified to this group at T1 (base year) and 73% at T2 (first follow-up). Most of the students in this class have high aspirations about almost everything- at least 97% of students in this class answered "important" on each of the fourteen survey items/indicators (see Table 5.1) except on V9 and V10. Almost half of the adolescents in HA Class at both time points answered it not important to "stay away from this area of the country" (V9), and 22% at T1 on V10, "working to correct social and economic inequalities".

The importance of correcting social and economic inequalities for HA class students differed both within the class from T1 to T2 and between classes. As students in HA class transitioned onto 12th grade, more than 90% reported that they were more aware of social injustice issues and were more inclined to redress social and economic disparities. Additionally, the HA class consisted of more students willing to work on these issues than students in other classes.

Moderate Aspiration Class (MA class). MA class was the second largest across the two-time points. About 16% of the students were classified to this group at T1 (base year) and 18% at T2 (first follow-up). What differentiated the MA class from the HA and LA classes was that MA Class students reported "not important" and demonstrated a lower aspiration on a few selected survey items, such as family, having children, and social justice were less important to MA students. For example, more than half of the MA Class students selected not important on V10, "working to correct social and economic inequalities" and V11, "having children" at T1. More students in MA class also reported not important on V8, "living close to parents and relatives". The response pattern for these items changed at T2. There were 11% of MA class senior students who felt not important to "have children" (V11), and 25% felt not important to "live close to parents and relatives" (V8). For V10, all the seniors in MA class reported "working to correct social and economic inequalities" not important. I had also noticed that when students reported not important on topics related to family and civic engagement, they also reported moderately low on other survey items related to these topics. For instance, close to 30% of MA class students at T1 (10th grade) felt it was not important to "help other people in their community" (V6) and "find the right person to marry and have a happy family" (V2). In fact, 61% of MA class students wanted to "get away from this area of the country" (V9) at T1. However, some students' attitudes in MA class toward family issues gradually changed as they

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got older (T2). For example, no senior students in MA class felt "finding the right person to marry and having a happy family" (V2) was not important. Moreover, they became family-oriented as they got became older; there were about 22% students less in the MA class reported not important to "live close to parents and relatives" (V8), and 42% fewer in the MA class answered, "having children" (V11) was not important at T2 than T1. Despite the fact that the increase in their positive perceptions of their family and relationships with their relatives from T1 to T2, their response patterns at T2 continued to show that MA class adolescents were quite selective about what was important and not important to them.

Low Aspiration Class (LA Class). The Low Aspiration class consisted of the least number of students at both time points (less than 1% at T1 and 8.3% at T2), meaning that most of the adolescents had high or moderate aspirations and kept their aspirations consistent two years later. Interestingly, there was a drastic increase in the LA class membership as students became older. Students with low aspiration at T1 reported not important to nearly all the 14 items. These LA class students showed the lowest interest in their future education and careers at T1. For instance, 70% of the students in the LA class reported not important to "get a good education" (V14), and more than 80% of the students felt "becoming an expert in their field of work" (V13), "being successful in their line of work" (V1), and "being able to find steady work" (V5) not important. These 10th-grade students also demonstrated less desire for money- about 63% of students in the LA Class reported "having lots of money" (V3) not important. They also showed less interest in having a family, children, strong friendships, and helping others.

One change occurred when the class separation between the MA and LA classes at T1 became less clear at T2. This might be due to adolescents' maturity. When adolescents were surveyed about their perceptions on all aspects of their future in 10th grade for the first time, not

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all the students had a clear idea about their future. Therefore, it was easier for them to answer how important these issues were to them at T1. However, answers to these questions became clearer as they experienced two more years of a high-school education, college preparation and underwent social and emotional development in dealing with stress and anxiety while handling human relationships. Their cognitive ability became more fully developed. Despite the fact that LA adolescents' future aspirations were still comparatively lower than the MA and HA adolescents' at T2, they were significantly higher than at T1. For example, results showed that 70% of the LA class sophomores at T1 reported that "getting a good education" (V14) was not important, but 94% of the LA class seniors believed getting a good education was important at T2. Similarly, 59% of LA Class sophomores at T1 felt that "having leisure time to enjoy their interests" (V12) was not important, but 90% of the LA Class seniors at T2 believed leisure time was important. The only indicators that remained not important across the two-time points for LA Class students were "having children" (V12) and "living close to parents and relatives" (V8). The transition probabilities for the LTA results' aspiration memberships showed that students moved from one aspiration class to another from T1 to T2. The results suggested that some adolescents could have experienced ups and downs in their life within the two years between T1 (10th grade) and T2 (12th grade), which affected their levels of aspirations differently (Sirin et al., 2007). Table 4.11 illustrated the transition probabilities from T1 to T2, in which 9% of the students classified into HA class at T1 moved to LA class at T2. In contrast, 25% of LA class students T1 moved to HA class at T2. The transition from HA to LA suggested that adolescents' future aspirations were volatile and suggested the severe impact of burnout on HA students. Previous studies had found that when students experienced burnout problems and pressure, they tended to feel tired, less motivated and confident, and less engaged in schooling, which

drastically lowered their academic performance (Rana, 2016; Tsigilis et al., 2011). Although more LA seniors' aspirations increased substantially, their upward transition is equivalent to downward transition (i.e., HA to LA), which suggested that these students have experienced emotional and social instability. For the upward aspiration transition, we could assume that students who had taken advanced and rigorous classes in the last two years that satisfied with their academic and career expectations, the academic preparation would boost their confidence and increase their motivation to attend colleges (Schneider & Stevenson, 1999; Zimmer-Gembeck & Mortimer, 2006). However, that was just one possible outcome in relation to school factors. Not all previous studies found a positive effect among these social factors on educational attainment. For instance, students who experience instability at home could also experience other types of instability, such as residential, financial, parent employment, and out-of-home instabilities (Sandstrom & Huerta, 2013). These are more prevalent among children from low-income families. Instability certainly has different adverse impacts on children's sense of security and development (Evans et al., 2011; Shonkoff & Garner, 2011). They are toxic to children's emotional and cognitive development (Evans et al., 2011; Shonkoff & Garner, 2011) and detrimental to children's academic performance, social competence, and inaptitude to control emotions (Sandstrom & Huerta, 2013). Some of these instabilities also have an adverse influence on adolescents' adult life which could directly affect their postsecondary enrollment (Evans & Schamberg, 2009). Therefore, these abrupt, involuntary changes in individual or family situations, their aspirations about the future could falter and have low aspirations (Sandstrom & Huerta, 2013).

On the other hand, MA class students appeared to be the most stable of the three classes. Only 11% of MA class students transitioned to HA (7%) and LA (4%) classes from T1 to T2.

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Additionally, the MA class at T2 also had 8% of LA class seniors and 12% of HA class seniors joining the class. Stability and selectiveness were the two critical characteristics of MA class that greatly impacted students' postsecondary enrollment outcomes, which are discussed more in detail in the following section.

The Covariates and Postsecondary Enrollment

The study also investigated the relationships between the covariates (i.e., gender, racial backgrounds, and family SES) and the three adolescents' future aspirations classes. The results found the odds to be in the three future aspirations classes were not statistically significant for gender and SES. In other words, the probability of being assigned to the three aspirations classes was the same for both male and female students and all socioeconomic statuses. Nevertheless, the likelihood for students of color to be in MA and HA classes was greater than White students, which implied that students of color had higher aspirations than their White peers[3]. This result disagrees with the previous findings (i.e., Cooper & Liou, 2007; Turcios-Cotto & Millan, 2013), where the researchers argued that students of color tended to have lower educational and career aspirations than their White peers. However, Akos et al. (2007) argued that conflicting results could be affected by the studies' covariates (see Kao & Tienda, 1998; Cooper, 2009). For example, parental expectations and cultural factors that were accounted for in some studies could have a mediating effect on the aspiration discrepancy among students with different racial/ethnic backgrounds (Gil-Flores et al., 2011; Sirin et al., 2004; Lippman et al., 2008; Strand & Winston, 2008).

Next, the distal outcome measure was included in the LCA models and the LTA model. The LCA results suggested that HA class students at both time points had the highest likelihood

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[3] Those differences between students of color and White students were extremely small.

of attending colleges than did the students in MA and LA classes. The LCA results were in

agreement with the previous literature. Adolescents who aspire for higher learning tend to have

higher academic achievement and more active participation in school than their peers with lower

aspirations (Duncan & Featherman, 1972; Goodman & Gregg, 2010; Reynolds & Burg, 2008).

However, the LTA results suggested that MA class students had the highest likelihood of

attending colleges than students in the other two classes. The LCA and LTA results differed were

probably due to LCA's limited statistical ability in examining the associations between

postsecondary enrollment outcome and adolescents' future aspirations cross-sectionally. LCA

cannot detect the transition probabilities from T1 and T2 or capture the change and identify the

two types of movers had on the change of aspiration classes. Additionally, the data structure was

slightly altered for latent class and latent transition analysis, which affected the different

statistical results. If we were solely relying on the LCA results, we would encourage students to

be as ambitious about every aspect of their life as they can be.

Nevertheless, through LTA approaches, this study provided longitudinal information

about the associations between each latent future aspiration class and adolescents' postsecondary

enrollment outcome through LTA. For example, the LTA transition probabilities captured the

changing memberships of future aspiration between T1 and T2. Some students identified with

high aspiration at T1 drastically moved down to LA class at T2. By contrast, students identified

with low aspiration at T1 significantly moved up to HA class at T2. Their instabilities and

changes in how they planned for their future caused them to have lower odds of attending

colleges and universities. According to the National Scientific Council on the Developing child

(2007), the long exposure to toxic stress could negatively affect child development, such as

disrupting normal brain and organ development that would eventually lead to poor academic

performance and troubled social and emotional behaviors (Sandstrom & Huerta, 2013).

Consequently, the study found maintaining balanced, moderate aspirations about their academic and nonacademic life is important to higher education attainment. These adolescents knew what was important and less important, which helped them stay focused and be persistent in actualizing their educational and career goals.

Finally, only the covariate, *SES*, significantly impacted the likelihood of attending colleges. For instance, the likelihood of attending colleges for students whose parents did not have high-paying jobs, a college degree, or did not have high income was significantly lower than students from affluent families. As previous studies have found that despite students of color having higher aspirations than the White students (Farmer, 1985; Solorzano, 1991; Wilson & Wilson, 1992), they tended to have less human and social capital than the Whites did. (Harrison & Bennett, 1995). Thus, discrepant resources caused by socioeconomic gaps negatively affect children's academic performance and aspirations (Coleman, 1988; Qian & Blair, 1999). The statistical results showed that gender and race did not statistically significant impact the postsecondary enrollment outcomes were in agreement with the small effect sizes found in the strengths of these two variables with postsecondary enrollment.

Implications and Recommendations for Practice

Postsecondary educational attainment research is not new. As noted in the literature review in Chapter 2, students with higher education and career aspirations tend to do better in school and are more likely to attend colleges (Duncan & Featherman, 1972; Goodman & Gregg, 2010; Reynolds & Burg, 2008). Previous studies concluded that factors related to schools, family, and peers were significant predictors of individuals' educational achievement and educational and career aspirations. For instance, students who attend schools that cultivate a

college-going culture and provide sufficient personal and financial support are more likely to enroll in college (Bryan et al., 2017; Holland & Farmer-Hinton, 2009; McClafferty et al., 2002). Similarly, in the family context parents' educational attainment and family income significantly impact the likelihood of college enrollment (Choy, 2001). However, these studies offered a limited understanding of the constraints imposed by the variable-centered statistical approaches employed in their studies (Sipsima et al., 2012). For example, in studies on future aspirations and youth delinquency and risky behaviors (see. Nurmi, 1991; Quinton et al., 1993) and minority and low-income youth' emotional and social development (see. Werner & Smith, 1982; Wyman et al., 1993), often these measures of future aspirations were conceptualized and hypothesized inconsistently (Sipsima et al., 2012). There was little emphasis in their research on the importance of adolescents' nonacademic aspirations and their impact on adolescents' education and career aspirations and their actual postsecondary enrollment. Therefore, this study examined multidimensional, longitudinal effects of different social contexts on postsecondary enrollment within the ecological framework. The study's results have several implications and recommendations to the policymakers and educators at both secondary and postsecondary levels.

Implications for Policy

Policymakers who are still debating over whom they should target to promote participation in postsecondary education should focus on nurturing all students' expectations and providing the necessary support to help them realize their life goals. The study identified that all children, girls or boys, students from low-income or high-income families, Whites, Blacks, Hispanics, or Asians, can have high, moderate, and low aspirations about their future. How confident they feel about their future cannot be divorced from their environments and daily experiences. There are a few policy areas that policymakers can improve to protect and increase

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students' future aspirations to increase social diversity at the postsecondary level and in the workforce in the long run.

First, raising awareness of adolescents' future aspirations in education policy. Research on aspirations in relation to educational and occupational attainment has been central to the U.K. education policy and found understanding and raising young adults' aspirations would have multiple benefits to the people and the society (Allen & Hollingworth, 2013). For instance, it would reduce the poverty gap by increasing individuals' social mobility (Gorard et al., 2012), ultimately minimizing the social structural inequalities found at both micro-and-macro-levels. The literature review in Chapter 2 recognized that the recent research on American adolescents' aspirations has a limited scope, predominantly focusing on the connections between individuals' educational expectations and educational and occupational outcomes (e.g., Goodman & Gregg, 2010; Gorard et al., 2012). This study's results recommend researchers and policymakers expand the concept of adolescents' future aspirations in the discussion of increasing higher educational attainment. The need to understand other aspects of adolescents' future aspirations, such as their perceptions of forming their own families, relationships with others including friends and relatives, civic engagement, and personal goals, in relation to educational attainment would have a much longer impact on individuals' later life experiences. For example, students' resilience, happiness, healthy behaviors, and being concerned citizens are also desirable educational outcomes (Gorard & Smith, 2010; Gorard et al., 2012; Hagenauer & Hascher, 2010).

Second, education is not one size fits all (Barnes & Slate, 2013) because students are not homogenous. They are different not only because of their gender, racial backgrounds, and socioeconomic statuses but also different because of the levels of aspirations they have about their future. One of the important findings of this study is identifying the three levels of

adolescents' aspirations about their future, ranging from high to low, which illustrated the different expectations that these students have about the multiple aspects of their future. The unique response patterns reflected by the three future aspirations classes also suggested that adolescents' future aspirations are not entirely made up of their educational and career expectations. Instead, the adolescents' future aspirations are also concerned with their future family, relationships, personal interests, and community perceptions. Therefore, the federal government's educational agenda on promoting college- and career-readiness for all high school students should "look beyond high-stakes testing, stringent accountability measures, and mountains of statistical data as indicators of college-readiness" (Barnes & Slate, 2013, p.1). Although maintaining academic rigor and improving student academic achievement at all levels are important educational goals, the heavy emphasis on standardized testing and the effort of closing achievement gaps between middle- and upper-socioeconomic students and their urban and rural lower-socioeconomic counterparts have narrowed the purpose of education as well as limited the education access to all learners (Goldrick-Rab & Mazzeo, 2005). The purpose of getting an education is more than just receiving good grades, getting a job, and being a good student; it serves a larger purpose in life and our society. At the individual level, the purpose of education is to foster students' creativity and critical thinking, equip students with the right tools to accomplish their goals in life, and prepare students to be efficient, independent, successful, and respectful participants of society (Blake, 2015; Fazzaro, 2007). At the societal level, meaningful education is the bedrock of good citizenship (Blake, 2015); it ensures the state and local governments function smoothly and effectively while preserving the democratic system of government (Dewey, 1966; Hansen, 2012).

Third, the levels of adolescents' future aspirations demonstrate the amount of motivation and academic resilience that young adults possess in dealing with challenges and managing stress (Ernst & Burcak, 2018). These qualities can be learned and procurable through the individuals' contacts with their environments. When all schools from middle school to high school are striving for high academic achievement, the effort of closing the achievement gap is not a reflection of equitable and high-quality education to all children. Rather, the over-emphasis on standardized testing is to uniform learners to be good test-takers and exclude those who cannot conform to the same academic standards. Therefore, we need to make amends for the impact of some policies' (i.e., the No Child Left Behind Act (NCLB) of 2001) strict and punitive measures have on both the K-12 and postsecondary education (Barnes & Slate, 2013). The narrow path to college hurts the higher education attainment and the labor market in the long run because it alienates and costs the uncountable talented and skilled young individuals from making connections between their early schooling and higher education, which eventually cuts them off from middle-class professions. Therefore, a better alignment between K-12 education and postsecondary education is needed (Domina & Ruzek, 2012; Kirst, 1998; Kirst & Usdan,2009; Perna & Armijo, 2014), so the education policy could develop effective outreach programs to help K-12 students to develop a better understanding of the connections between K-12 and college (Schneider & Stevenson, 1999). Moreover, the education landscape should offer multiple and diverse paths to college as educational alternatives in meeting the best interest of student learning while making sure the students are not constructing their own high school curriculum "with little assurance that those they select[ed] constitute a meaningful education" (Schneider & Stevenson, 1999, p.114).

Lastly, when we understand that students and patterns of college attendance are changing due to the important role that adolescents' future aspirations play in their lives (Schneider & Stevenson, 1999; Symond et al., 2011), educators and policymakers should also consider the discrepant resources and social capitals that are associated with adolescents' socioeconomic statuses. Previous studies have consistently found that families with the lowest incomes and least educated parents are less likely to have children that attend college (Choy, 2001). This study showed that the higher adolescents' socioeconomic statuses statistically increase the odds of postsecondary enrollment for adolescents in the three aspiration classes. Also, confirmed with previous findings that parents with higher educational level are more likely to have the social and financial capitals to help their children in schooling and transition to higher education (Egalite, 2016; Kim & Schneider, 2005; McNeal, 1999; Morgan & Sorensen, 1999; Smith et al., 1995; Stanton-Salazar & Dornbusch, 1995; Sun, 1999; Teachman et al., 1997; Zhou & Bankston, 1994). Although we cannot examine how individuals' home culture impacts children's development and prepares them for higher education, students in each of the future aspiration classes in this study suggest that there is a type of dominant or shared culture within each of the future aspiration classes due to the social, economic and cultural capital gaps created by their socioeconomic differences. In order to minimize those gaps, policymakers should identify what opportunities and challenges are embedded in the three future aspirations classes and created by the social structural inequalities that hamper young people's aspirations (Allen & Hollingworth, 2013; Archer & Yamashita, 2003). This may also suggest that students with different level aspirations may need additional support at the school level, discussed in the following section.

Implications for School Personnel

As many researchers have argued, adolescence is a critical and confusing period for teenagers (Arnett et al., 2018). During the transition to adulthood, teenagers pick up many responsibilities and develop their individual identity, whether in relationships, work, or worldviews (Arnett, 2000). Adolescents are a vulnerable group as they often experience stress, conflict, and depression (Arnett, 2000; McFarlane et al., 1995). Sometimes they might develop unhealthy and risky behaviors or even mental illness during their transition to adulthood (Arnett, 2000; McFarlane et al., 1995). Thus, instead of having adolescents figure out everything in this critical time by themselves, they may need appropriate social and emotional support from the social and health services to care for their needs and prevent the difficulties (Wall et al., 1999). Also, secondary school educators need to have a thorough understanding of the adolescent developmental phases and their impact on their future aspirations. Previous studies have consistently found a strong correlation between academic and career aspirations and academic achievement and attainment, but this study has found that students' non-academic aspirations also affect their educational aspirations. Since adolescents spend most of their day in school, the purpose of school is not only preparing students to be academically successful but also having much broader responsibilities and impact on other aspects of students' life, such as their physical, health, and social development (Marin & Brown, 2008). For this reason, school is the place where these policies, interventions, and programs should be implemented and carried out to influence students to develop healthy behaviors and safe practices and increase their civic engagement.

Because there is no one-size-fits-all education, there is no single school type that meets student learning's best interest either. Thus, the state and federal governments should let their local schools decide what equitable and effective educational support and resources to offer to

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their students, how funds should be spent, what kinds of intervention, and what appropriate measures to take that align with the needs of their students. The idea of aligning with adolescents' future aspirations does not mean lowering the education standard or sacrifice educational rigor. Instead, it should offer the necessary academic support for students to gain the experiences that help them realize their dreams. One of the characters in Schneider and Stevenson's (1999) study offered an example of what constitutes an alignment between education and student's aspiration: Elizabeth Houghton aspired to become a journalist, and she had been working toward realizing her dream since she started high school. Her school and community provided the appropriate environment that allowed her to gain the right experience in journalism. For instance, she was the chief editor and founder of a student newspaper at her school. Because the prestigious colleges and universities surrounded her school, Elizabeth's idea of creating a third student paper for the community was supported and well-received. She had received proper guidance and support at home because of the alignment of her aspirations and her parents' careers. Her father was a documentary journalist for a major television station. Before her mother passed away, her mother was a writer and photojournalist. Her success did not attribute solely to her high academic achievement and outstanding performance on her college entrance examinations. There were many intellectual conversations and activities at her home and at her school prepared her for journalism.

Nevertheless, schools cannot do this alone. The purpose of this study is to help build greater awareness of how immediate environments (school, family, friends, and community) affect all aspects of adolescent development. Schools must coordinate their practices with the rest of the community – with health care providers, after-school programs, and perhaps most importantly, students' families (Brindis, 2005; Marin & Brown, 2008).

Moreover, to ensure the programs and interventions' effectiveness, schools must learn about their students, backgrounds, and experiences beyond the statistics of their student population's racial, demographic, and gender makeup. Through student-educator interaction, educators should better understand their students' academic and non-academic interests and goals that these children aspire to achieve in the future. This study's results agree and support Schneider and Stevenson's (1999) recommendation that aligning education with students' aspirations should not only limit students' academic and career aspirations. The three future aspiration classes' response patterns clearly show that while students may have different levels of aspiration about their future, they all believed "getting an education" and "being successful at their work" are important. Although the LA class students had comparatively lower academic and career aspirations than students of HA class and MA class at T1, their perceptions on education and career at T2 had reached equally high. Thus, the differences in odds of attending colleges were affected by how students in each of the future aspiration classes view their life's non-academic aspects, such as their relationships with family and friends, civic engagement, and personal interests.

Recommendations for postsecondary institutions are similar. Postsecondary institutions should continue to provide social and health care services to their students throughout the transition to adulthood, which is now commonly called emerging adulthood (Arnett, 2000). As they are figuring out their new social circles and obtaining education and training in college, students continue developing and making decisions that would significantly impact their later life experiences (Arnett, 2000). There are many important decisions they must make during this time, and their choices would substantially affect their future career and relationships. Thus, their aspirations about the future are volitional (Arnett, 2000). According to the LTA transition

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probabilities, students with different future aspirations changed their class memberships at T2. Some students who were identified to hold low and moderate aspirations transitioned to MA and HA classes from LA class as they increased their future aspirations. Other students who were identified to have high or moderate aspirations transitioned to MA and LA. The changes in class memberships suggest that all students are vulnerable to lose or gain aspirations. The changes in loss and gain cannot be separated from their immediate environments and daily experiences. For example, the sudden announcement of the withdrawal of F-1 Visas for international students if classes were moved entirely online during the outbreak of COVID-19 and the abolition of the DACA program for the dreamers was a stressful and confusing period for young adults. These uncertainties waver young adults' motivation and determination in continuing or pursuing higher education. Therefore, postsecondary institutions need to respond to these unexpected situations effectively.

Strengths and Limitations

This study has several strengths, including using a large, longitudinal, and racially diverse sample to explore the role of adolescent's future aspirations in postsecondary enrollment (Sipsma et al., 2012). This study also used advanced statistical approaches to obtain the correct number of future aspirations classes based on multiple indicators to prove that adolescents' future aspiration is a multidimensional construct that consists of students' academic and career expectations and nonacademic-related aspirations. The person-centered approaches are important to this study in several ways. First, the person-centered approaches do not treat the entire sample as homogeneous (Laursen & Hoff, 2006). From a methodological perspective, the mixture model analysis treats the population in a more realistic manner. Unlike most variable-centered approaches based on a general linear model, the person-centered approaches permit the entire

sample to consist of two or more distinct groups, one with low scores and others with higher scores (Acock, 2010). For example, this study used latent class and latent transition analyses to explore the embedded construct under the fourteen aspiration indicators. Such approaches broaden the research scope to improve our understanding of how personal experiences, culture, and several other social factors play with respect to adolescents' perceptions and expectations of their future as well as capturing their combining effects on adolescents' development (Acock, 2010; Sipsma et al., 2012), specifically on students' actual postsecondary enrollment. Second, the person-centered statistical approaches could more accurately account for within-person differences. Based on how individuals responded to the fourteen aspiration indicators, similarities and differences were detected to determine the appropriate number of latent classes (Laursen & Hoff, 2006; Magnusson, 2003). Finally, one of the person-centered statistical approaches that this study applied, latent transition analysis, was able to capture the membership changes among the three future aspiration classes (Laursen & Hoff, 2006). The purpose of identifying the changes of memberships among the three classes was to illustrate that adolescents' perceptions and expectations are not fixed nor context-free.

In order to better understand why some adolescents would enroll in higher education, and some do not, novel approaches are important for determining new areas for future research and effective interventions. For instance, this study found that students' gender and race were not significantly associated with a student being classified into the HA, MA, or LA classes. These results suggest that it is important for educators to avoid deficit thinking or hold different expectations and unequal treatment to particular groups of students. Regardless of gender and race, all adolescents' future aspirations can be affected by their unique social contexts and daily experiences. For this reason, to foster students' future aspirations, we need to think more

ecologically or multidimensionally by expanding the definition of adolescents' aspirations. Additionally, fostering students to have balanced and moderate aspirations is vital. In the studies on students' development and behavior, different types of stable environments (i.e., family, school, economic, residential, and out-of-home context) are critical to child development (Sandstrom & Huerta, 2013). For instance, students who experienced family instability such as parental divorce, change of schools, or family financial crises tended to not only perform poorly on their academics but also unlikely to pursue higher learning (Amato 2000; Cavanagh & Huston 2008; Craigie, et al. 2012; Sandstrom & Huerta, 2013).

Nevertheless, there are several limitations to this study as well. For instance, due to data attrition at T2 and a small sample of Native Americans, Alaskan Natives, and multiracial students, the latent transition analysis significantly limited the generalizability of the results pertaining to students in these groups. Secondly, future aspirations' multidimensional construct still needs further testing and improvement to ensure the construct's quality and composition. Even though 14 indicators already complicated model identification and selection, these many indicators may not be comprehensive enough to portray adolescents' daily experiences from a theoretical perspective. Third, the binary nature of the dependent variable, *postsecondary enrollment,* also provided limited information about the association between adolescents' future aspirations and the types of postsecondary institutions. This was mostly due to the reason that this study used ELS:2002 publicly available data. These drawbacks are served as recommendations for future research and are discussed in the following section.

Future Directions

Finally, instead of providing answers to many questions, this study has opened up more research questions about this topic. For example, because of the limited number of available

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variables about the types of postsecondary institutions in the publicly available data, it was

challenging to know how different future aspirations affect the types of postsecondary

institutions they attended. This study used a composite variable representing SES as a control

variable. Thus, it was challenging to identify which factors about family socioeconomic statuses,

such as family income, parent occupations, and parent education levels, significantly affected

adolescents' actual postsecondary enrollment. Despite these limitations, this study's primary goal

was to explore how students cluster into distinct future aspirations as a multidimensional

construct. Therefore, these limitations served as opportunities for me to expand the research on

this topic in several ways in the near future.

First, I will continue testing and making improvements on the multidimensional construct

of adolescents' future aspirations. Instead of transforming the 14 variables from three-Likert

scales to two-value variables, I will test the latent structure in their original form. I will enhance

the reliability and validity of this multidimensional construct using the ELS data from previous

studies and investigate more in-depth its associations with different social contexts described in

this study, such as school, family, peer, and community, to examine the effects of social contexts

on adolescents' development in the ecological framework. Second, it is not only essential to find

out about the likelihood for students in the three aspiration classes to enroll in different types of

colleges and universities, but it is also important to know the associations between adolescents'

future aspirations and college completion and career aspects. Finally, this study was able to

identify who were the movers and stayers for each future aspiration class in the LTA. To better

support our students academically and emotionally, it is also necessary to investigate the reasons

and the influence of different social contextual factors that caused adolescents' future aspirations

to change over time. Thus, it will be worthwhile to study the relationships and the impact of

different social contextual factors on the development of adolescents' aspirations in the upcoming research. Finally, this study runs counter to other findings of ambitions and students of color. Students of color and their aspirations are not so different from their White peers, which is an important message to educators, policymakers, and educational researchers because, in our effort of promoting educational equity and empowerment for student minorities, we should realize that skin tone and racial background represented only a tiny piece of a student's identity (Dayton, 2018). Instead, student identity is comprised of shared ideas, ideologies, past experiences, and ways of seeing the world and their future, which is what the future aspiration was trying to capture. If we take this approach in studying adolescents and their development, we will find all students are subject to have high, moderate, and low aspirations about their future. Thus, to better support our students academically and emotionally, we should reform our education to emphasize a better alignment between K-12 and postsecondary education to increasing resources for students in high-need and high-poverty schools and fostering adolescents' aspirations about their future and diversifying the paths to higher education for students from all walks of life.

Conclusion

Given the importance of college completion for future income and well-being, recognizing the relationships between students' future aspirations (academic and nonacademic goals) and postsecondary enrollment helps policymakers make better decisions about how funds should be allocated to schools to support these children. Also, educators at both the K-12 and postsecondary education levels should learn from this study that all students, regardless of race and gender, can have high, moderate, and low expectations about their future. Their aspirations are changeable over time due to the impact of their daily experiences and social impact.

Therefore, what measures and interventions that schools should implement should be determined at the school levels to meet the students' unique needs. However, schools should not focus only on providing a rigorous curriculum to maintain a high academic quality for their students. However, they should also provide other opportunities and services to help students balance their school life and personal lives. This study found that students in the three aspiration classes have different perceptions about their education, career, future family, friendship, civic engagement, and self-pursuit, which indicates that these students need different kinds of support and care from school, family, and community. These different needs deserve further study to better inform policymakers and educators and offer more equitable education to all children.

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Appendix A – M*plus* Syntax

LCA Model

INPUT INSTRUCTIONS

 TITLE: LCA BY Analysis;

 DATA: File = "C:\Users\Forest\Desktop\MPLUS
Analysis\MPLUS_binary\ELS2002_by.csv";

 VARIABLE:
 NAMES = studid   bysex female byrace other white latino asian   black byses1qu
 highest   third   second lowest bys54a bys54b bys54c bys54d bys54e bys54f bys54g
 bys54h   bys54i bys54j bys54k bys54l bys54n bys54o f3evratt;

 !Time 1

  USEVARIABLES = bys54a   bys54b bys54c bys54d bys54e bys54f
 bys54g   bys54h bys54i bys54j bys54k bys54l
 bys54n   bys54o;

  !Time 2

 !USEVARIABLES = f0s40a   f0s40b f0s40c f0s40d f0s40e f0s40f
 !f0s40g   f0s40h f0s40i f0s40j f0s40k f0s40l
 !f0s40m   f0s40n;

 MISSING are all (-999);

 CLASSES = c(3);

 CATEGORICAL = bys54a bys54b bys54c bys54d bys54e bys54f
 bys54g   bys54h bys54i bys54j bys54k bys54l
 bys54n   bys54o

!CATEGORICAL = f0s40a   f0s40b f0s40c f0s40d f0s40e f0s40f
!f0s40g   f0s40h f0s40i f0s40j f0s40k f0s40l
!f0s40m   f0s40n;

ANALYSIS:

TYPE = mixture;
STARTS = 1000 250;
STITERATIONS = 50;
      K-1STARTS = 25 9;
      LRTBOOTSTRAP = 200;

MODEL:
%OVERALL%
OUTPUT: tech11 tech14;
Plot: type=plot3;

series bys54a(1)   bys54b(2)   bys54c(3)   bys54d(4)   bys54e(5)   bys54f(6)
 bys54g(7)   bys54h(8)   bys54i(9)   bys54j(10)   bys54k(11)   bys54l(12)
bys54n(13)   bys54o(14);

! series f0s40a(1)   f0s40b(2)   f0s40c(3)   f0s40d(4)   f0s40e(5)   f0s40f(6)
      f0s40g(7)
!   f0s40h(8)   f0s40i(9)   f0s40j(10)   f0s40k(11)   f0s40l(12)   f0s40m(13)
      f0s40n(14);

LCA Model with Covariates

BCH – Step 1

INPUT INSTRUCTIONS

  TITLE: LCA BCH Covariates_step1;

  DATA: File = "C:\Users\Forest\Desktop\MPLUS Analysis\LCA covariates\by.csv";

  VARIABLE:
  NAMES = studid   bysex male   female
  byrace   other   white latino asian   black
  byses1qu   highest third   second lowest
  bys54a   bys54b bys54c bys54d bys54e bys54f
  bys54g   bys54h bys54i bys54j bys54k bys54l
  bys54n   bys54o
 !ff
  !f0s40a   f0s40b f0s40c f0s40d f0s40e f0s40f
  !f0s40g   f0s40h f0s40i f0s40j f0s40k f0s40l
  !f0s40m   f0s40n
  f3evratt;

 !Time 1

   USEVARIABLES = bys54a   bys54b bys54c bys54d bys54e bys54f
  bys54g   bys54h bys54i bys54j bys54k bys54l
  bys54n   bys54o
 female white other   latino   asian   black
  highest third   second lowest; !f3evratt;

  MISSING are all (-999);

  CLASSES = c(3);

  CATEGORICAL = bys54a bys54b bys54c bys54d bys54e bys54f
  bys54g   bys54h bys54i bys54j bys54k bys54l

bys54n   bys54o;

auxiliary= female other latino   asian   black
 third second lowest; !f3evratt;

 !FF

! USEVARIABLES = f0s40a   f0s40b f0s40c f0s40d f0s40e f0s40f
!f0s40g   f0s40h f0s40i f0s40j f0s40k f0s40l
!f0s40m   f0s40n female white other   latino asian   black
!highest third   second lowest f3evratt;

!CATEGORICAL = f0s40a   f0s40b f0s40c f0s40d f0s40e f0s40f
!f0s40g   f0s40h f0s40i f0s40j f0s40k f0s40l
!f0s40m   f0s40n;

ANALYSIS:

TYPE = mixture;
STARTS = 1000 250;

MODEL:
    %OVERALL%

    SAVEDATA: File=by_BCH3.csv;
 SAVE=BCHweights;
 format = free;
 missflag = 9999;

BCH – Step 2

INPUT INSTRUCTIONS

  TITLE: LCA BCH Covariates_step2;

  DATA: File = "C:\Users\Forest\Desktop\MPLUS Analysis\LCA covariates\by_BCH3.csv";

  VARIABLE:
  NAMES =   BYS54A
   BYS54B
   BYS54C
   BYS54D
   BYS54E
   BYS54F
   BYS54G
   BYS54H
   BYS54I
   BYS54J
   BYS54K
   BYS54L
   BYS54N
   BYS54O
   MALE
   FEMALE
   OTHER
   WHITE
   LATINO
   ASIAN
   BLACK
   HIGHEST
   THIRD
   SECOND
   LOWEST
   BCHW1
   BCHW2
   BCHW3;

```
USEVARIABLES = MALE FEMALE   WHITE OTHER  LATINO   ASIAN   BLACK
  HIGHEST THIRD   SECOND   LOWEST   BCHW1-BCHW3;



 MISSING  are all (9999);

   CLASSES = c(3);
  Training = BCHW1-BCHW3(BCH);


 ANALYSIS:
   TYPE = mixture;
   Estimator = MLR;
   STARTS =1000 250;



    MODEL:
    %OVERALL%
```

LTA Model

INPUT INSTRUCTIONS

Title: Step 1: Test Longitudinal Measurement Invariance using LTA

   DATA: File = "C:\Users\Forest\Desktop\MPLUS Analysis\LTA\ELS2002lta.csv";

   VARIABLE:
   NAMES ARE
   studid   bysex   female byrace white   latino   asian   black
   byses1qu   highest third   second lowest
   bys54a   bys54b bys54c bys54d bys54e bys54f bys54g bys54h
   bys54i   bys54j bys54k bys54l bys54n bys54o
   f0s40a   f0s40b f0s40c f0s40d f0s40e f0s40f f0s40g f0s40h
   f0s40i   f0s40j f0s40k f0s40l f0s40m   f0s40n
   f3evratt;

     !Time 1:

    USEVARIABLES = bys54a   bys54b bys54c bys54d bys54e bys54f bys54g bys54h bys54i
        bys54j
    bys54k   bys54l bys54n bys54o
    f0s40a   f0s40b f0s40c f0s40d f0s40e f0s40f f0s40g f0s40h f0s40i f0s40j
    f0s40k   f0s40l f0s40m   f0s40n
    female   white latino   asian   black
        highest third   second lowest;

   CATEGORICAL = bys54a   bys54b bys54c bys54d bys54e bys54f bys54g bys54h bys54i
        bys54j
    bys54k   bys54l bys54n bys54o
    f0s40a   f0s40b f0s40c f0s40d f0s40e f0s40f f0s40g f0s40h f0s40i f0s40j
    f0s40k   f0s40l f0s40m   f0s40n;

   MISSING are all (-999);

   CLASSES = c1(3) c2(3);

   ANALYSIS:

```
    TYPE = mixture;

  STARTS = 1000 250;

  MODEL:
  %OVERALL%
  C2 on C1;
  C1 on  female white latino      asian   black
     highest third    second lowest;
! Model needs to be set up with the number of assessment
 Model C1:     %C1#1%

      !For non-measurement invariance
       [bys54a$1   bys54b$1      bys54c$1      bys54d$1      bys54e$1      bys54f$1
        bys54g$1  bys54h$1      bys54i$1      bys54j$1    bys54k$1  bys54l$1
        bys54n$1  bys54o$1];

c2 on female latino   asian   black
     highest third    second lowest;


          %C1#2%
  !For non-measurement invariance
        [bys54a$1   bys54b$1      bys54c$1      bys54d$1      bys54e$1      bys54f$1
         bys54g$1 bys54h$1      bys54i$1      bys54j$1    bys54k$1  bys54l$1
         bys54n$1  bys54o$1];

c2 on female latino   asian   black   highest third    second lowest;


  Model C2:     %C2#1%

     [f0s40a$1      f0s40b$1      f0s40c$1      f0s40d$1      f0s40e$1      f0s40f$1
      f0s40g$1      f0s40h$1
       f0s40i$1   f0s40j$1   f0s40k$1  f0s40l$1      f0s40m$1      f0s40n$1];

      %C2#2%
```

[f0s40a$1   f0s40b$1   f0s40c$1   f0s40d$1   f0s40e$1   f0s40f$1
f0s40g$1   f0s40h$1
f0s40i$1   f0s40j$1   f0s40k$1 f0s40l$1   f0s40m$1   f0s40n$1];

Output: Tech1 Tech8 Tech15;