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MAKE OR BREAK: COLLEGE-GOING AND COLLEGE-LEAVING AMONG FOSTER  
CARE YOUTH

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## ABSTRACT

Over the past 30 years, troubling outcomes of older youth in foster care have attracted attention from federal lawmakers, advocacy groups, and other stakeholders. Without sufficient resources, support, and skills necessary to transition to adult independence, these youth experience higher rates of incarceration, homelessness, educational underachievement, and unemployment than peers not involved in foster care. Promoting college degree attainment has become an explicit target of recent legislation. Many past studies have documented poor postsecondary education outcomes for foster youth, but few have investigated factors that drive these outcomes. The goal of this dissertation is to examine individual, college, and policy factors that impact postsecondary education outcomes of foster youth. Analysis of secondary data collected from the Midwest Study examines college entry and completion for a representative sample of over 700 foster youth from three Midwestern states.

The findings show that more than nine in ten 17 year-olds in foster care aspired to go to college, but 12 years later only half had made it to college and just one in ten completed a certificate or degree. Among young people who enrolled in college, six-year completion rates were substantially lower for foster youth (17%) than for a high risk comparison group of low-income first-generation students (44%). Results from regression analyses arrived at the following conclusions. Factors pertaining to youths' academic history and skills and behavioral problems exerted the strongest influence on their likelihood of entering college. In terms of college persistence, youth who started college younger, who had higher reading proficiency, and who had experienced fewer foster care placement changes and school moves had higher odds of persisting. The strongest influences on college completion were life circumstances after youth had entered college (e.g., economic hardships, parental responsibilities) and characteristics of the

colleges they attended. The findings also indicated that aspects of youths' foster care histories predicted their level of avoidant attachment (i.e., emotional guardedness, reluctance to depend on others) in adolescence. In turn, youth higher in avoidant attachment had lower odds of persisting in and completing college. Finally, a policy that extended the age limit of foster care from 18 to 21 increased the likelihood that youth enrolled in college by age 21, but did not influence long-term college outcomes.

This study finds that about half of foster youth who enter college never make it past the first few semesters, and academic underpreparedness and financial hardships are formidable barriers to their college success. It is argued that early, targeted interventions that remain in place as other foster care supports phase out will be integral to supporting these young people through college. Recommendations for professionals, child welfare departments, colleges, and policy makers are offered in the concluding chapter.

## INTRODUCTION

Over the past 30 years, troubling outcomes of older youth in foster care have attracted attention from federal lawmakers, advocacy groups, and other stakeholders. Without sufficient resources, support, and skills necessary to transition to adult independence, these youth experience higher rates of incarceration, homelessness, educational underachievement, and unemployment than non-foster peers (Gypen et al., 2017). Promoting college degree attainment has become an explicit target of recent legislation as part of an effort to improve outcomes for foster care youth. In a labor market that increasingly requires postsecondary education (Carnevale, Smith and Strohl 2013), attaining education beyond high school is a concern for all young people. Foster care youth are roughly one-sixth as likely to earn a college degree by their mid-twenties compared to peers in the general population (Courtney et al., 2011), and are more likely than their college-going peers to drop out of college once they have started (Day, Dworsky, Fogarty, & Damashek, 2011; Frerer, Sosenko, & Henke, 2013). Further research is needed to assess whether foster youth face worse postsecondary outcomes than other high risk student groups, such as low-income first generation students.

Given the importance of completing college and the stark disparities that exist between foster youth and other young people, a critical task is to understand factors associated with college entry, persistence, and completion for this subgroup of college students. Over seven decades of theory development and empirical research on student in the general college student body has pointed to a number of background characteristics, experiences while in college, and institutional factors that influence persistence and degree completion. Vincent Tinto's (1975, 1993) theory of college student departure is one of the most widely used frameworks for

understanding college persistence and completion. Importantly, the field has also recognized that different risk sets may exist for subgroups of college students, which challenges a one-size-fits-all theory of college completion. Compared to the corpus of research on the general college student body, theoretical and empirical research on foster care youth attrition is perilously thin, and there are reasons to believe that this student subgroup may bring a particular set of challenges that jeopardize successful completion. For example, a history of maltreatment and fractured relationships may negatively affect their attachment with others and their willingness to depend on others in times of need.

To date, few quantitative studies have evaluated college outcomes for foster youth, and many of the studies are limited by sampling issues, small numbers of predictors available for investigation, and other issues. Qualitative studies of foster youth in college, on the other hand, rely on convenience samples of currently enrolled students, which may miss accounts of students who have already dropped out. Both sets of limitations can yield incomplete or misleading pictures of factors associated with college outcomes for foster youth. This dissertation addresses these limitations by using a representative sample of foster youth in three Midwestern states from the Midwest Study (Courtney et al., 2003) and investigates a broad range of youth characteristics, risk and protective factors, and college-level factors.

Three critical postsecondary education outcomes are examined in this dissertation: enrolling in college (entry), enrolling consistently through the first three semesters (persistence), and attaining a postsecondary certificate or degree (completion). Although the focus is on factors that explain college persistence and completion among youth who have entered college, investigating predictors of college entry helps to set the stage of understanding which foster youth make it to college.

Throughout this dissertation, “foster youth” is used to denote young people who have been in foster care on or after their 16<sup>th</sup> birthday. This includes transition-age youth who are still in foster care, as well as young adults who have exited care. Landmark pieces of federal legislation passed in the 1980s through the 2000s use age 16 as a cutoff that makes youth eligible for independent living services intended to help them transition to adulthood. Most studies on foster youth cited in later chapters include youth who were in foster care after age 16, although some use broader age categories (e.g., in foster care after age 14). Since only about 0.5 percent of U.S. children are in foster care at a given time (Child Trends, 2015), and since most of these individuals are under the age of 10 (AFCARS, 2016), older foster youth are a relatively small slice of our nation’s juvenile population. In September 2015, there were about 66,000 young people in foster care between the ages of 16 and 21 (AFCARS, 2016). Although few in number, many of these young people face formidable obstacles in their transition to adulthood. As wards of the state, the public is responsible for ensuring that they have similar opportunities to achieve successful and fulfilling lives as other young people who are not in state care.

The overarching goal of this dissertation was to gain a better understanding of individual-level, college-level, and policy-level factors that impact the college outcomes of foster youth. To this end, I analyzed secondary data collected from a representative sample of foster youth in three Midwestern states in the early 2000s. The aims of the dissertation were: (1) to extend Tinto’s theory of college departure to account for factors of college attrition that are specific to foster youth; (2) to compare rates of college persistence and completion for foster youth with those of first-generation low-income students, who have been identified as a subgroup of students at high risk of dropping out; (3) to investigate trends in college enrollment across semesters and to classify youth into groups based on characteristics of their college enrollment;

(4) investigate a wide range of individual-level predictors and college-level predictors of college entry, persistence, and completion; (5) to assess the extent to which avoidant attachment styles negatively affect college persistence and completion; and (6) to investigate whether the state policy option of extending foster care beyond age 18 promotes college entry, persistence, and completion. Specific research questions and hypotheses are presented at the beginning of Chapter 3.

These aims are intended to build on and extend what we know about college outcomes for foster youth. The aims are also intended be relevant to practice and policy. For example, identifying groups of foster youth based on their college enrollment patterns can inform differential responses to stemming attrition, avoidant attachment may be an important target of retention strategies for foster youth, and analysis of extended foster care is relevant to the half of U.S. states that have recently enacted extended care legislation and the other half of states that have yet to pass laws. In the last two decades, federal and state legislation, philanthropic organizations, and nonprofit organizations have zeroed in on promoting college completion for foster care youth (Dworsky & Perez, 2010; Okpych, 2012). There is unprecedented investment in ensuring these young people have an opportunity to be successful in college, but a more robust research base is needed to inform and guide these investments.

## **BACKGROUND, THEORETICAL FRAMEWORK, AND LITERATURE REVIEW**

This chapter presents the theoretical framework and empirical findings that motivated the dissertation questions. First, rates of college entry, persistence, and degree completion are presented for the general student body and for foster youth. This provides an overall picture of how often young adults enter and succeed in college. Next, a modified version of Vincent Tinto's theory of college student departure is presented, which provides a framework for explaining why some students persist in and finish college while others do not. Tinto's theory alerts us to pre-entry, post-entry, and institutional factors that are expected to influence college outcomes. Following this is a section summarizing empirical findings on the relationships between pre-college entry factors (called "pre-entry factors" henceforth), post-college entry factors (called "post-entry factors" henceforth), and institutional factors and college persistence and completion for the general population of college students. Finally, the small body of literature on pre-entry, post-entry, and institutional predictors of college outcomes for foster youth will be reviewed. This is followed by a presentation of three sets of factors unique to foster youth examined in this dissertation that may influence college success: characteristics of their foster care histories, avoidant attachment orientation, and a policy that extends the age limit of foster care from 18 to 21.

### **Clarification of Key Terms**

Before reviewing the literature, a few key terms deserve clarification. When considering higher education outcomes, an important distinction is drawn between an institutional view and a student view (Tinto, 2012). As the names imply, an institutional view pertains to outcomes of

students within a given college, whereas a student view pertains to outcomes that follow individual students whether they remain in the same institution or transfer to other institutions.

*Retention* and *persistence* exemplify this difference. A student is retained if she continues to enroll in the same college from one semester to the next, while student persists if she remains enrolled in college (in general) from one semester or next, including if she transfers to another college. This distinction is important because many existing studies examine college outcomes within particular institutions, which can fail to capture outcomes that occur in other colleges if students transfer. Since this dissertation followed individual students across different colleges, the measures of persistence and degree completion come from a student view.

Both college persistence and completion have been operationalized in various ways by education scholars (Mortenson, 2012). In this dissertation, persistence was operationalized as a student remaining enrolled through three non-summer semesters after first enrolling in college. This indicates that a student made it through the first year of college and continued into the second year. Beyond persistence is attainment of a postsecondary credential, denoted as *college completion*. In this dissertation, the postsecondary credentials investigated include postsecondary vocational certificates, two-year degrees, and four-year degrees. Unlike persistence, students need not have been continuously enrolled from the time they started college until the time they graduated. The key marker was that they eventually earned a degree or certificate.

### **Rates of College Enrollment, Persistence, and Completion**

#### **General Population of College Students**

About two-thirds of 16 to 24 year-olds enroll in a postsecondary institution within a year of completing high school, and most enroll in four-year colleges (National Center for Education Statistics, 2016). Female high school graduates are more likely than male graduates to go to

college (68.4% vs. 63.5%). When examining differences by race and ethnicity, higher proportions of Asian (80.1%) and White (68.8%) students than Hispanic (59.8%) and Black (56.7%) students enter college. There are also stark differences in college enrollment rates by socioeconomic status. About four-fifths of students in the top family income tertile enroll in college within a year of completing high school (78.5%) compared to less than one-half of students in the bottom income tertile (45.5%) (National Center for Education Statistics, 2016).

Of the 20.4 million undergraduates enrolled in postsecondary institutions in fall 2013, more were enrolled in four-year colleges and universities (65.7%) than in two-year and less-than-two-year colleges (34.3%) (National Center for Education Statistics, 2016). More students were attending public institutions (72.3%) than private not-for-profit (19.5) or private for-profit (8.2%) institutions. The majority of students were enrolled full-time (62.8%) rather than part-time (38.2%). There were also differences in enrollment status by institution type. Nearly three-quarters of four-year college students were enrolled full-time (72.9%) compared to only two-fifths of two-year college students (40.7%).

Data from the National Student Clearinghouse provides a picture of college persistence and completion of U.S. college students. Among first-time students entering college in fall 2014, just over 70 percent (72.1%) were still enrolled in college the following academic year (National Student Clearinghouse, 2016). Persistence rates were highest in private four-year colleges (86.7%) and public four-year colleges (82.3%), and were lower for students in public two-year colleges (60.0%) and private for-profit four-year colleges (49.3%).<sup>1</sup> In terms of completion of a postsecondary credential, 54.8 percent of first-time college students beginning in 2010 had earned a certificate, two-year degree, or four-year degree six years later (Shapiro et al., 2016).

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<sup>1</sup> Rates for two-year private colleges and two-year for-profit colleges are not provided because they constitute a very small proportion of the college student population (<0.5%) (Shapiro et al., 2016).

Following a similar ordering as persistence rates, six-year completion rates were highest among students beginning at private four-year colleges (73.9%) and public four-year colleges (62.4%), followed by students first attending public two-year colleges (39.3%) and private for-profit four-year colleges (37.1%).<sup>2</sup>

Findings from the *Beginning Postsecondary Students (BPS-03)* study, a nationally representative longitudinal study of first-time college students beginning in 2003-2004, provides degree completion rates that are similar to rates reported by the NSC. Overall, just under 50 percent (49.4%) attained a college degree or certificate by six years after first enrolling (Radford, Berkner, Wheless, & Sheperd, 2010). A total of 9.4 percent of students earned a vocational certificate as their highest credential, 9.3 percent attained an associate's degree as their highest credential, and 30.7 percent attained a bachelor's degree. Completion rates were highest among students beginning at private four-year colleges (69.9%) and public four-year colleges (64.9%), followed by students attending public two-year colleges (34.5%) and private for-profit four-year colleges (30.3%).

## **Foster Care Youth**

To summarize the statistics above, most high school graduates enter college, most college entrants make it through the first year of college, and over half of college entrants earn a postsecondary credential by six years after first enrolling. Foster youth, by comparison, are less likely than their non-foster peers to enroll in college, persist through college, and ultimately complete a college degree (Gillum, Lindsay, Murray, & Wells, 2016). Although nearly 80 percent of older adolescents in foster care aspire to complete college (Courtney, Terao, & Bost, 2004; Courtney et al., 2014; McMillen &, 1999; Reilly, 2003), it is estimated that only 2-10

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<sup>2</sup> The NSC report does not break down types of postsecondary credentials that were earned.

percent will earn a two-year or four-year college degree by their mid-20s (Pecora et al., 2006; Wolanin, 2005; Courtney et al., 2011). Compared to same-aged peers from the general population, the rate of college degree completion for foster youth is about one-sixth (Courtney et al., 2011).

To understand the considerable gap in long-term college outcomes between foster youth and their peers, it is important to examine disparities present at earlier rungs of the educational achievement ladder. Disparities are evident in rates of high school completion (Frerer et al., 2013). By age 19, 60 to 70 percent of foster youth have graduated high school or earned a GED compared to about 90 percent of peers in the general population (Courtney et al., 2016; Courtney et al., 2005). Since college entry is related to completion of a secondary credential, high school completion gaps carry over to college entry gaps (California College Pathways, 2015; Frerer et al., 2013). Only 24 percent of foster youth in three Midwestern states and 32 percent of foster youth in California were enrolled in college at age 19, compared to over 55 percent of youth in a national sample of 19 year-olds (Courtney et al., 2016; Courtney et al., 2005). Another point of disparity in college success is academic performance and persistence early in college. Foster youth are more likely than their peers to require remediation, tend to earn lower GPAs than peers, complete a smaller percentage of attempted courses than peers, and progress slower through college overall (California College Pathways, 2015; Day, Dworsky, & Feng, 2013; Unrau, Font, & Rawls, 2012). Moreover, foster youth are less likely than their peers to make it through their first year of college (California College Pathways, 2015; Day et al., 2011; Frerer, Sosenko, Henke, 2013). Thus, disparities in rates of high school completion, college entry, and college persistence ultimately culminate in marked disparities in rates of college completion observed between foster and non-foster youth. As summarized later in the chapter, these

observed educational disparities are often attributed to characteristics of foster youths' educational histories, maltreatment, experiences in the child welfare system, behavioral health needs, criminal justice involvement, and life circumstances during the transition to adulthood (e.g., Geenan et al., 2015; Pecora, 2012; Stone, 2007).

### **College Enrollment Trends**

In the last few decades, the timing and patterns of enrollment in college have increasingly deviated from what was once considered the “traditional” route—entering college immediately following high school, remaining at one institution, and continuously attending college to graduation (Peter & Cataldi, 2005). For example, over 40 percent of all entering college students will attend more than one institution (Peter & Cataldi, 2005).

Most of the research in this area has focused on describing patterns in students' college attendance. This has led to distinguishing different movements in and out of college, such as continuously enrolled students, stopouts (students who stop attending but reenroll later), and dropouts (students who leave school without a degree and do not return) (Ramist, 1981). Scholars have also described several patterns of multi-institutional attendance, such as swirling (enrolling in multiple institutions over time) and double-dipping (simultaneously enrolling in multiple institutions) (de los Santos & Wright, 1990; Gose, 1995; McCormick, 2003). Moreover, students may attend other institutions on a temporary basis without changing their home institution, or they may transfer from their home institution laterally (e.g., from one two-year college to another two-year college) or vertically (e.g., from a two-year to a four-year school, or vice versa). In general, time-off from college and mobility between colleges have negative

effects on college completion; students who swirl, stop-out, transfer vertically<sup>3</sup>, and transfer horizontally are less likely to earn college degrees than are students who remain consistently enrolled at the same institution (for review see Pascarella & Terenzini, 2005). Low-income students and two-year college students are particularly likely to have interrupted enrollment patterns, contributing to lower rates of degree attainment (Cabrera, Burkum, La Nasa & Bibo, 2012; Goldrick-Rab, 2006; Hearn, 1992; Terriquez, Gurantz, & Gomez, 2013).

There is less research that has identified the distinct pathways students take through college. In contrast to aggregate enrollment patterns, college pathways involve classifying students into subgroups based on the sequence of their attendance or progress toward earning a degree. Some scholars have identified college pathways by sorting students into groups based on certain criteria. For example, Adelman (2005) drew on data from a nationally representative sample of community college students and created three groups based on the number of competed credits and the ratio of completed credits to all undergraduate credits. Using the metaphor of a community, “Homeowners” (37%) were students oriented to completing a two-year degree, “Tenants” (18%) were students oriented to transferring to four-year colleges, and “Visitors” (45%) were students who typically left college without a credential. More recently, scholars have begun to identify latent groups and latent trajectories. For example, Bahr (2010) analyzed data on over 165,000 students in California community colleges and used cluster analysis to identify six trajectories based on students’ course taking and credit accumulation.<sup>4</sup>

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<sup>3</sup> Pascarella and Terenzini (2005) note that students who initially start at two-year colleges but successfully transfer to four-year colleges (upward vertical transfer) are the exception. The graduation rates for these students is not different from rates of students who began at four-year institutions.

<sup>4</sup> The six clusters included: Drop-in (32%, attempted few non-transferrable units), Experimental (30%, very short period of enrollment with few completed courses), Exploratory (19%, enrolled nearly full-time in mix of transferrable and non-transferrable courses), Transfer (13% attempted most courses each semester and had greatest persistence), Vocational (3%, enrolled in many non-transferable occupational courses), and Noncredit (3%, enrolled in many noncredit courses, attempted few for-credit courses).

Although identification of latent groups and trajectories is a relatively new area in education research, recent statistical advances are making it a more promising and feasible undertaking (Barban & Billari, 2012; Beath & Heller, 2009; Lanza & Collins, 2006; Verbeke, Fieuws, Molenberghs, & Davidian, 2014).

To my knowledge, enrollment trends have not yet been investigated for foster care youth. This dissertation investigated aggregate enrollment trends of foster youth, and also assigned youth into groups based on features of their college attendance.

### **Theoretical Framework: A Revision of Tinto's Theory of College Student Departure**

#### **Summary of Tinto's Theory**

Over the past half-century, more than a dozen psychological, economic, and sociological theories have been introduced to explain why students leave college (e.g., Astin, 1977; Bean, 1980; Braxton et al., 2013; Seidman, 2005; Summerskill, 1962; for review see Melguizo, 2011). Although first proposed over 40 years ago, Tinto's (1975, 1987, 1993) theory of college student departure remains one of the most widely used frameworks. Similar to Bronfenbrenner's (1979) ecological model, Tinto offers a complex picture of students interacting with multiple, overlapping social systems over time (see Figure A1 in Appendix A). He writes that, "individual departure from institutions can be viewed as arising out of a longitudinal process of interactions between an individual with given attributes, skills, financial resources, prior educational experiences, and dispositions (intentions and commitments) and other members of the academic and social systems of the institution" (1993: 115).

Three sets factors associated with college persistence can be discerned in Tinto's (1993) theory. First, students enter college with a wide range of pre-entry attributes that will influence their college experience and performance. These include personal attributes (e.g., sex, race,

physical handicaps), characteristics of their family background (e.g., family socioeconomic status, parental education), skills and abilities (e.g., aptitude in different subjects, social skills), and prior schooling (e.g., quality of schooling, high school grades, school mobility). Second, since Tinto views student experience at college as an interaction between the student and the institution, characteristics of the institution will shape this interaction. These include factors such as the composition of the student body (e.g., demographic characteristics, proportion of residential students, proportion of part-time students), investment in instruction and student support, and the selectivity of the institution. Third, experiences at college (e.g., integration into the social and/or academic spheres of the college) shape students' decisions to stay or leave. These post-entry factors and experiences on campus play a central role in Tinto's theory and will now be described in more detail.

At the heart of Tinto's theory of student departure is a process of sociocultural integration into communities that make up the college. By focusing on the interaction between students and institutional communities, Tinto breaks from previous psychological theories that emphasized characteristics of the students (e.g., personality traits, academic drive) as key drivers of student departure. Changing status from an outsider to a member entails passing through three stages: a stage of separation from one's past community, a welter transition stage in which old norms and patterns of behavior loosen, and a stage in which the individual cements ties, adopts the norms and behaviors, and becomes *integrated* into the life of the college. Tinto identifies two distinguishable but interrelated spheres of the college environment in which students can experience varying degrees of integration. *Academic integration* is when students possess the skills and knowledge needed to succeed academically along with a feeling that they belong in academic contexts (e.g., classes, study groups, feeling part of a major or department). In his later

work, Tinto (1993) succinctly defines academic integration as “competent membership” (p.208).

*Social integration* is when students feel a sense of membership in the larger college community (e.g., establishing a network of friends, joining clubs or groups, participating in social events).

Integration within the academic and social arenas of college is accompanied by experiencing a sense of competency, belongingness, in-group identity, and ties to support and resources. As students come to experience themselves as part of the college and adopt its normative values and behaviors, their goals about completing college (intentions) and their effort in carrying out requisite tasks (commitment) are reinforced.

Ideally, Tinto says that students would experience integration in both the academic and social spheres, but he emphasized that integration into both arenas is not a necessary condition for persistence (1993: 120). Rather, it is the failure to integrate into either system that is a main driver of departure from college. When there is a misalignment or disconnection between the student and these two spheres of the college, this ultimately leads to a diminution of the student’s desires, expectations, and directed efforts to remain at the college.

While Tinto acknowledged that external influences such as work or family commitments may pull students away from engagement with the institution, he maintained that external events play a secondary role for most students, with their experience on campus being the primary driver of whether they stay or leave.

### **Critiques of Tinto’s Theory of Student Departure**

Numerous critiques of Tinto’s theory that have been raised over the past decades (Metz, 2004).<sup>5</sup> I draw attention to five critiques that are pertinent to the population of young people in

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<sup>5</sup> As Metz (2004) and others have acknowledged, Tinto’s (2011) later work did more explicitly address issues of race and socioeconomic status, as well as an expansion of his theory to consider two-year colleges. However, some scholars argue that more attention needs to be paid to these issues, as discussed in the critiques.

the foster care system, which is disproportionately comprised of Black and Hispanic youth from low-income families and communities, and who commonly attended low-performing primary and secondary schools (Frerer, Sosenko, & Henke, 2013; Fries, Klein, & Ballantyne, 2014; Summers, Wood, & Russell, 2012; Wildeman & Emanuel, 2014). First, some scholars take issue with Tinto's separation phase, which involves severing or loosening ties to past communities to make way for the adoption of norms and behaviors of the college (Fischer, 2007; Guiffrida, 2006; Nora & Crisp, 2009; Tierney 1999). Continuing relationships with home communities may be particularly important for students who are underrepresented on college campuses, and scholars have proposed that a more appropriate goal entails the formation of mutual identities and maintenance of connections to both outside communities and college communities. This likely applies to foster care youth who may look for support from existing and longstanding relationships as they make the transition into the new college environment. Second, scholars have critiqued Tinto's conceptualization of integration as the process of students acculturating to the prevailing norms and patterns of behavior of the institution (Rendón, Jalomo, & Nora, 2000). Given that many colleges reflect the social and economic inequalities prevalent in U.S. society, framing the path to success as eschewing one's own mores and customs and adopting the dominant culture places the onus of adaptation on the student (Carter, Locks, & Winkle-Wagner, 2013; Núñez, 2014; Smerek, 2010; Tierney, 1999). Consequently, scholars argue that "connectedness" should replace "integration", which more explicitly acknowledges the shared responsibility of institutions and students.

Third, scholars have critiqued Tinto's model for placing too little emphasis on the powerful influence that outside events exert on college persistence, such as changes in financial circumstances among low-income students and parental and employment responsibilities of

nontraditional students (Braxton, et al., 2014; Cabrera, Nora, & Castaneda, 1992; Davidson & Wilson, 2016; Goldrick-Rab, Harris, & Trostel, 2009; Hossler et al., 2009; Ozaki, 2016). Since the looming threat of external events may be more the rule than the exception for low-income students, a theory of college departure should place greater emphasis on the disruptive nature of these events. In a similar vein, a fourth critique is that a view of the departure decision may be better conceptualized as constrained choice—selecting the lesser of two evils—rather than from a rational actor model that is implicit in Tinto’s theory. With regard to external influences, Tinto writes: “Like all decisions, individual judgments concerning continued participation in college may be viewed as weighing the costs and benefits of college persistence relative to alternative forms of investment of one’s time, energies, and scarce resources” (1993: 128). For low-income students, the departure decision involving choosing between meeting basic needs or not (e.g., paying for rent or paying tuition), rather than on optimizing their return on investment (Goldrick-Rab, 2016).

Fifth, Tinto’s original model does not explicitly include the larger policy context, particularly higher education and other policies that affect the available funding for college (St. John, Cabrera, Nora, & Asker, 2000).<sup>6</sup> Given that low-SES student persistence is sensitive to the availability of adequate financial aid, it is important to explicitly model relevant policies in a theory of college departure. This may be particularly true for foster youth, whose funding for college is heavily dependent on the patchwork of provisions made available through federal and state policies rather than on family contributions or personal savings.

The critiques summarized above are relevant to foster care youth. For young people in foster care during their late adolescence, a primary focus entails preparing them for adulthood

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<sup>6</sup> Tinto (1993) eventually revised his model to account for the influence of financial circumstances on college (St. John, Cabrera, Nora, & Asker, 2000).

should a permanent placement (e.g., reunification with family, adoption, guardianship) not be established. For youth who “age out” of care by reaching the foster care age limit, basic necessities such as housing are no longer provided by the child welfare department, and foster youth are faced with the reality of having to become financially self-sufficient (Curry & Abrams, 2015; Furstenberg, 2008; Samuels & Pryce, 2008). Unlike other young people at this age who often receive considerable financial, material, and emotional support from their families, foster youth are not necessarily afforded this familial safety net upon exiting care (Collins, Paris, & Ward, 2008). It is also the case that a nontrivial proportion of foster youth become parents at a relatively early age, introducing caregiving responsibilities (Avery & Freundlich, 2009). For example, at age 21 more than half of females and about one-third of males who have aged out of foster care have a living child (Courtney et al., 2007).

This suggests that the factors that assume a secondary role in college departure in Tinto’s model are likely in the foreground for foster youth. For example, difficulty paying for college, needing to work to cover life expenses, parental responsibilities, and the role of external communities and commitments will likely play a large role in the chances of foster youth making it through college. The confluence of these and other external factors can have a direct effect on hampering college persistence by requiring foster youth to devote limited time and resources to responsibilities other than school. The external factors can also indirectly hamper persistence by prohibiting foster youth from more fully engaging with the institution, thereby missing many of the supports and benefits derived from connecting to college communities as proposed by Tinto.

In summary, from Tinto’s theory and the subsequent critiques, three distinguishable sets of factors can be expected to predict college outcomes: pre-entry student characteristics, post-entry factors (including external events and commitments), and institutional characteristics.

Since data were not available about specific on-campus experiences, the post-entry factors analyzed in this dissertation pertain to circumstances at play while students attend college (e.g., becoming a parent, amount of social support).

## **Literature Review**

### **Predictors of College Outcomes for the General Population**

This section summarizes research on predictors of college persistence and completion for students enrolled in postsecondary institutions in the United States organized around the three sets of factors described above. Over 70 years of research has culminated into an expansive body of empirical work on predictors of college persistence and degree completion. This review focuses on factors examined in this dissertation, and offers a brief review of factors that were not available for my dissertation but have shown to be impactful.

#### **Pre-entry student characteristics.**

Student background characteristics has been one of the most widely studied areas of predictors of college outcomes. These characteristics will be reviewed in the following order: demographic characteristics; academic history, performance, and preparation; psychosocial skills that promote academic success; and behavioral issues that hinder academic success.

Regarding demographic characteristics, studies generally find that females earn higher GPAs than males during their first year of college, that rates of persistence and degree completion are slightly higher for females than males (Leppel, 2002; Radford, Berkner, Wheless, & Sheperd, 2010), and these differences are generally not statistically significant after controlling for other factors (e.g., Chen, 2012; Elliot, 2016; Peter & Horn, 2005; St. John, Hu, Simmons, & Musoba, 2001). Much more consistent and pronounced are disparities in college outcomes by race/ethnicity and socioeconomic status. Although the number and relative

proportion of Black and Hispanic college students have risen over the past 30 years, these students are more likely to leave college without a degree compared to White and Asian students, in part, because Black and Hispanic students are more likely to come from low-income families, have inadequate preparation in high school, and to be first generation college students (Adelman, 2006; Bowen & Bok, 1998; Bowen, Chingos, & McPherson, 2009; Fischer, 2007; Greene, Marti, & McClenney, 2008; Peltier, Laden, & Matranga, 1999; Reason, 2009).<sup>7</sup> Other scholars have indicated that college-going experiences may be fundamentally different for Black and Hispanic students, and this may lead to isolation and underperformance (Allen, 1999; Fischer, 2007; Nora & Crisp, 2009; Terenzini & Pascarella, 1998; Steele & Aronson, 1998). Age of entry is another important demographic factor. Students who delay entering college after completing high school generally have lower graduation rates than students who enter soon after finishing high school, and much of these differences are accounted for by differences in socioeconomic status, academic preparation, and external commitments (e.g., work, parental responsibilities) (Aldeman, 2006; Attewell, Heil, & Reisel, 2011; Berkner, He, & Cataldi, 2002; Goldrick-Rab & Han, 2011; Goldrick-Rab, 2016;).

Some of the strongest predictors of college persistence and completion are measures of past academic performance, such as high school GPA and standardized test scores (Astin, 1997; Astin & Oseguera, 2005; Lotkowski, Robbins, & Noeth, 2004; Peltier, Laden, & Matranga, 1999; Pike, Hansen, & Childress, 2014; Radunzel & Noble, 2012; Robbins et al., 2004). College students who earned a high school diploma are less likely to drop out than GED holders

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<sup>7</sup> Although limited, research does indicate that other student groups such as Native Americans and certain Asian ethnic groups (e.g., Pacific Islanders, Loatians, Hmong, Vietnamese), and certain Hispanic ethnicities (e.g., Puerto Ricans and Mexican Americans) are at greater risk of dropping out (Kao & Thompson, 2003; Larimore & McClellan, 2005; Yeh, 2004). However, small sample size of these subgroups do not allow me to model more nuanced racial differences.

(Heckman, Humphries, & Mader, 2010; Tyler & Lofstrom, 2008). Other factors, such as learning disabilities and grade retention, also influence postsecondary outcomes. Most studies find that students with learning disabilities and other issues requiring special education are less likely to enter and complete college than students without these difficulties (Berkner, Cuccaro-Alamin, McCormick, & Bobbit, 1996; Mamiseishvili & Koch, 2012; Murray, Goldstein, Nourse, & Edgar, 2000)<sup>8</sup>, although receiving appropriate services in college can improve the likelihood of college success (Mamiseishvili & Koch, 2011; Troiano, Liefeld, Trachtenberg, 2010). Students retained in elementary or secondary school are less likely to enter and to complete college than are youth who were not held back a grade (Fine, 2003; Jimerson, 1999; Ou & Reynolds, 2010). College preparatory programs such as SAT preparation classes have shown to increase student's likelihood of entering college (Buchmann, Condron, & Roscigno, 2010; Ishitani & Snider, 2006), although the benefits on later college outcomes are typically not found and may be limited to intensive, high quality programs (Loyalka & Zakharov, 2014).

A number of psychosocial and non-cognitive factors have been shown to have a modest positive influence on college persistence and completion. These include high educational aspirations and goals, academic self-efficacy, grit and self-discipline, and academic-related skills (e.g., study skills and habits, coping strategies, leadership skills) (Farrington et al., 2012; Fong et al., 2016; Kitsantas & Zimmerman, 2009; Lotkowski, Robbins, & Noeth, 2004; Pascarella & Terenzini, 2005; Porchea, Allen, Robbins, Phelps, 2010; Robbins et al., 2006; Robbins et al., 2004). Psychosocial factors are largely thought to work indirectly, helping students adjust to the new college social environment, meet the more intensive academic demands and expectations for independent work, and to effectively utilize help when needed.

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<sup>8</sup> Wessel and colleagues (2009) did not find differences in persistence and graduation rates between college students with and without learning disabilities.

Pre-entry student characteristics that can hinder college outcomes relate to behavioral issues. Indicators of adolescent behavior problems such as school truancy and expulsion, arrest, and alcohol and substance use have been associated with decreased risks of entering and completing college (King, Meehan, Trim, & Chassin, 2006; Kirk & Sampson, 2013; Maggs et al., 2015; Wood, Sher, Erikson, & DeBord, 1997). While these risk factors negatively predict college outcomes separately, when multiple risk factors are entered into regression models the predictive association diminishes, leading some scholars to posit that the separate factors may be markers for an underlying risk construct (King et al., 2006).

Some additional pre-entry student characteristics have been found to be important predictors but were not available for this dissertation. These include characteristics of students' parents (e.g., educational attainment, financial resources) and characteristics of elementary and secondary schools attended (e.g., availability of advanced placement courses, academic rigor, college-going culture) (Aldeman, 2006; Attewell, Heil, & Reisel, 2011; Choy, 2001; Fischer, 2007; Ishitani, 2006; Karp, Hughes, & O'Gara, 2010; Kuh et al., 2008; Pascarella & Terenzini, 2005; Porchea, Allen, Robbins, & Phelps, 2010).

This section has highlighted many factors in place before students enroll in college that have an enduring effect on their college experiences and success. Before turning to the literature review on post-entry factors, two issues that are especially pertinent to low-income, first generation college students are briefly reviewed: college advising and college match. Since many low-income students are raised in families and communities where going to college is not the norm, these young people lack access college knowledge and individuals equipped to provide guidance about college that is commonplace for students from more affluent backgrounds. Findings from research on low-income high school students show that even well-qualified

students can be overwhelmed by the unfamiliar and complicated tasks of searching for, applying to, and selecting colleges (Roderick et al., 2008). Unfortunately, students most in need of sound college advising often attend schools where guidance departments are understaffed, under-resourced, busied by extraneous responsibilities, and focus more on assisting youth with completing high school than on entering college (Bryan et al., 2011; Plank & Jordan, 2001). Without structured guidance from competent adults, even well-qualified low-income students struggle to complete critical steps in the college search and application process. Students mistime the application windows, constrain their search to only familiar colleges that may not match their qualifications, apply to few schools, miss or delay important financial aid deadlines that affect their chances of receiving state and institutional aid, focus on the sticker price of college rather than the out-of-pocket cost once aid is factored in, and often select “safe” colleges that are below their qualifications (Roderick et al., 2008). Students applying to selective colleges must face additional demands of meeting earlier application deadlines, completing applications that are more involved and complex, and balancing these time-intensive college application tasks with demands from their academic programs (Roderick, Nagaoka, Coca, & Moeller, 2009). Consequently, some capable low-income students forgo applying to or enrolling in college, while many others land in colleges that are well below their academic qualifications (Smith, Pender, & Howell, 2013).

Inadequate guidance from school personnel and other adults is not the only reason that low-income students under-enroll and undermatch in college, but it is one important factor. In schools that have a strong college-going culture and where hands-on support with the college search, application, and selection process is provided, low-income students are much more likely to go to college and to attend schools that match their academic qualifications (Roderick et al.,

2008). Starting out at an undermatched college has implications for low-income students' long-term college outcomes. As will be reviewed in an upcoming section, institution-level factors such as the selectivity of the college have demonstrable impacts on individual student outcomes. Low-income students who enroll in colleges that match or overmatch their qualifications fare better than students with similar qualifications and background characteristics who start out in undermatched colleges (Alon & Tienda, 2005; Melguizo, 2008).

### **Post-entry factors.**

Factors that impact college success after enrollment include life events and the constellation of supports and risks present for students. The post-enrollment factors investigated in this dissertation include behavioral health issues, financial hardship, paid employment, parental responsibilities, and social support.

Mental health problems such as depression and bipolar disorder have been found to increase the likelihood that students will leave of college before completing a degree (Bachrach & Read, 2012; Eisenberg, Golberstein, & Hunt, 2009; Hunt, Eisenberg, & Kilbourne, 2010; McEwan & Downie, 2013; Markoulakis & Kirsh, 2013). Other studies have shown that alcohol and substance use predict lower college GPA and completion rates (e.g., Foster, Caravelis, & Kopak, 2014; Martinez, Sher, & Wood, 2008; Pascarella et al., 2007).

In addition to behavioral health issues, financial hardship can hamper college success. With the rising costs of postsecondary education, affordability is a salient issue for many college students. This is particularly true for low-income students whose families are able to contribute less and who are more reliant on loans and other types of aid cover the cost of college. Unmet financial need and hardship have been shown to negatively affect college persistence and completion (Advisory Committee on Student Financial Assistance, 2010; Choitz & Reimherr,

2013; Cox, Reason, Nix, & Gillman, 2016; Dwyer, Hodson, & McCloud, 2012). For example, one study found that having more student loan debt and other types of debt predicted increased risks of needing to enroll in fewer credit hours due to financial constraints, dropping out because of financial reasons, and having higher levels of stress about to financial burdens (Robb, Moody, & Abdel-Ghany, 2012).

Many students offset the costs of college attendance by working during college. In 2013, about 40 percent of full-time students and about 75 percent of part-time students were employed (National Center for Education Statistics, 2015). Researchers have found that working long hours (e.g., 20 or more hours per week) increases students' likelihood of dropping out (Bozick, 2007; Perna, 2010). Juggling work with school creates logistical challenges (e.g., finding classes that fit work schedules), limits the amount of time students spend on campus (e.g., faculty office hours, study groups) and on academic tasks, and increases students' stress level (Heller, 2002; Horn & Malizio, 1998; Mounsey, Vandehey, & Diekhoff, 2013). For similar reasons, students who are parents are less likely to persist and graduate than non-parents (Cabrera, Burkum, La Nasa, & Bibo, 2012; Adelman, 1999).

Although not available for my dissertation, findings on academic integration and social integration are briefly summarized. In reviews of empirical studies, Braxton, Sullivan, and Johnson (1997) found strong empirical backing for the role of social integration in promoting college persistence and Braxton and Lien (2000) found modest empirical support for the role of academic integration in promoting college persistence. One difficulty that has plagued the field is a lack of clear operational definitions for academic and social integration, leading to inconsistencies in how these constructs are operationalized (Barnett, 2011; Melguizo, 2011). Furthermore, social and academic integration stand beside related constructs that capture

students' interaction with college communities, such as *student engagement* and *student involvement* (Pascarella & Terenzini, 2005; Wolf-Wendel, Ward, & Kinzie, 2009). A broad read of the literature indicates that student connectedness in college plays an important role in promoting success in college, but opportunities for engagement may differ by institution type (e.g., two-year versus four-year colleges) and student groups (e.g., working students) (Davison & Wilson, 2016; Deil-Amen, 2011; Ishitani, 2016; Longwell-Grice & Longwell-Grice, 2008; Pascarella & Terenzini, 2005).

### **Institutional characteristics.**

Student level characteristics explain more variation in college outcomes than do college-level factors (Bowen, Chingos, & McPherson, 2009; Marsh, 2014; Porchea, Allen, Robbins, & Phelps, 2010; Robbins et al., 2006). However, several institutional factors have shown to influence the likelihood that students will graduate, net of their background characteristics. Attending four-year versus two-year colleges increases students' likelihood of graduating, in part because two-year students enter college less prepared, have more work and family obligations, and face more obstacles to degree completion (Bailey, Jagers, & Jenkins, 2015). Students enrolled in private colleges have a small, positive advantage over students in public colleges in their likelihood of graduating (Astin, Tsui, & Avalos, 1996; Astin & Oseguera, 2005; McCormick & Horn, 1996; Oseguera, 2006; Pascarella & Terenzini, 2005), although not all studies find this association to be statistically significant (e.g., Titus, 2004). Similarly, some but not all studies find that institutions with smaller student bodies tend to create a small advantage on students' likelihood of graduating (e.g., Chen, 2012; Titus, 2004). Scholars propose that the effects are indirect (Calcango et al., 2008; for review see Pascarella & Terenzini, 2005). For

example, smaller schools appear to increase student engagement with personnel and resources, which in turn increases the chances that students will graduate (Stoecker & Pascarella, 1991).

A consistent and modest predictor of student graduation is the selectivity of the institution. Schools that set a higher bar in admissions criteria have higher rates of persistence and degree completion than do colleges with less stringent admissions criteria or an open admission policy (Adelman, 2006; Astin & Oseguera, 2005; Astin, Tsui, & Avalos, 1994; Bowen, Chingos, & McPherson, 2009; Oseguera, 2006; Pascarella & Terenzini, 2005; Titus, 2004). Aside from differences in the composition of the student body (e.g., academic skills and preparation, education goals, family resources), scholars posit that highly selective institutions may create a different college experience compared to other institutions stemming from differences in faculty quality, expenditures on academic support, and academic standards and expectations (Pascarella & Terenzini, 2005). However, some scholars find that after rigorously adjusting for student background characteristics, the selectivity advantage diminish (Heil, Reisel, & Attwell, 2014). Greater proportions of students living on-campus has been found to increase graduation rates, as schools with a large population of residential students are better poised to cultivate campus climates favoring student engagement and utilization of campus resources (Astin, 1993; Bowen, Chingso, & McPherson, 2009; Oseguera, 2006; Titus, 2004).

There are several other institutional characteristics that have been less well studied but that are pertinent to the types of colleges disproportionately attended by low-income students (i.e., two-year colleges and less selective four-year colleges). Examples include the proportion of part-time faculty (Calcango et al., 2008; Porchea, 2010), the average cost of in-state tuition (Porchea et al., 2010; Calcango et al., 2008) and measures of financial need among the student body (Calcango et al., 2008; Porchea et al., 2010; Titus, 2004). Included in the category are

measures of institutional expenditures. Some researchers have found that greater expenditures on instruction (Oseguera, 2006; Titus, 2004), academic support (Oseguera, 2006; Titus, 2004), and student services (Astin, 1993; Chen, 2012) positively impacts college outcomes, although others examining these factors did not find significant associations (e.g., Calcango et al., 2008).

The studies of college-level factors summarized above investigated the outcomes of individual students. A separate set of studies investigates college-level outcomes, such as institutional retention rates or graduation rates. Institutional factors that have been found to positively affect institution-level persistence and degree completion include the selectivity and type of college (i.e., selective over less selective, four-year over two-year), private colleges, and higher in-state tuition (Bailey et al., 2006; Goenner & Snaith, 2004; Horn & Lee, 2015; Ryan, 2004; Scott, Bailey, Kienzl, 2006; Webber & Ehrenberg, 2010). Institutional factors that have been found to negatively impact persistence and degree completion include larger undergraduate enrollment, greater proportion of part-time students, greater proportion of minority students, greater average age of students, and higher proportions of part-time and non-tenured faculty (Bailey et al., 2006; Ehrenberg & Zhang, 2005; Goenner & Snaith, 2004; Horn & Lee, 2015; Jacoby, 2006; Scott, Bailey, Kienzl, 2006). Similar to studies of student-level outcomes, research on different types of expenditures has been less well-studied (Calcango et al., 2008; Webber & Ehrenberg, 2010).

### **Predictors of College Outcomes for Foster Youth**

Compared to the expansive body of research on predictors of college outcomes for the general student population, research on foster care youth is far less developed. Prior research tells us that foster youth tend to be disproportionately overrepresented by racial and ethnic groups that have lower rates of college success (e.g., African American and Hispanic youth;

Padilla & Summers, 2013). Foster youth take longer and are less likely than their peers to finish high school (Courtney et al., 2016; Courtney et al., 2005; Mason & Halpern, 2001), score lower on standardized English Language Arts and mathematics tests in high school (Courtney et al., 2015; Courtney, Terao, & Bost, 2004; California Department of Education, 2016a, 2016b; Mason & Halpern, 2001), and are held back a grade and placed in special education classrooms at high rates (Courtney et al., 2015; Courtney, Terao, & Bost, 2004). Foster youth disproportionately attend low-resourced and underperforming high schools (Frerer et al., 2013), and experience school mobility (Clemens, Lalonde, & Sheesley, 2016; Courtney, Terao, & Bost, 2004; Fawley-King et al., 2017; Sullivan, Jones, & Mathiesen, 2010). These young people present with behavioral health problems at higher rates than their peers (Deutsch et al., 2015; Havliceck, Garcia, & Smith, 2013), have high rates of criminal justice involvement (Courtney et al., 2005; Cusick, Havliceck, & Courtney, 2012; Vaughn, Shook, & McMillen, 2008), and have high rates of early parenthood (Svoboda, Shaw, Barth, & Bright, 2012). Not surprisingly, foster youth are less likely than peers to enter college within a year after finishing high school (California College Pathways, 2015), are more likely to be required to take remedial coursework upon entering college (California College Pathways, 2015; Frerer et al., 2013), earn lower GPAs than their peers in the first year of college (California College Pathways, 2015), and are at risk for encountering economic hardships and homelessness in early adulthood (Byrne et al., 2014; Dworsky et al., 2012; Dworsky, Napolitano, & Courtney, 2013; Peters, Sherraden, & Kuchinski, 2016). Many of these risk factors for poor college outcomes have been investigated among general college students, but scant empirical research has investigated them among foster youth. Moreover, an important question for this dissertation is whether these factors will predict college outcomes *among* foster youth. There may be some factors that are influential in a broad sample

of college students but may have different or diminished relationships among a high risk student group. For example, past maltreatment has been shown to negatively affect educational outcomes in general samples of students (e.g., Lansford et al., 2002) but may play a diminished role among youth who have all (or nearly all) experienced maltreatment. Similarly, racial/ethnic disparities in college outcomes observed in the general student body may not be present in a sample of youth facing multiple, profound barriers to college success.

The literature review that follows includes findings from qualitative, descriptive, and predictive studies of college outcomes for foster youth.

### **Pre-entry student characteristics.**

Two quantitative studies examined pre-entry characteristics as predictors of postsecondary attainment among foster youth. The Northwest Alumni Study included interviews with 479 adults who had been in foster care in Oregon or Washington State between 1988 and 1998, or who were alumni of the Casey Family Programs in either of these two states (Pecora et al., 2009). Researchers conducted simulation analyses to identify how educational attainment outcomes might be improved if foster youth had experienced the best possible foster care experiences (e.g., no placement changes) rather than the experiences that actually occurred. The authors concluded that two areas could have the largest impacts on improving educational outcomes: foster care placement history experiences and supports after exiting foster care.

A second study examined educational outcomes of Midwest Study participants (Courtney & Hook, 2017). The primary focus of the analysis was to assess the role that extended foster care (i.e., remaining in care beyond age 18) played in promoting educational attainment among foster youth. The outcome was an ordered measure of highest level of education attained by the last interview wave at age 25: no high school credential, high school diploma or GED, and

completion of one or more years of college. Results from ordinal logistic regression analyses and an instrumental variable model indicated that extended care was positively associated with increased levels of educational attainment. Some predictors measured at age 17 were also found to predict higher levels of educational attainment, including gender (females more likely than males), race/ethnicity (“other” race/ethnicity more likely than White youth), college plans, reading level, and being employed at least 10 hours per week. Conversely, four factors measured at age 17 were found to hinder educational attainment: ever repeated a grade, residing in a group home or residential treatment center (vs. foster care home), having a child, and experiencing substance use problems. History of physical abuse, sexual abuse, and neglect were not associated with the outcome, nor were measures of depression symptoms, PTSD symptoms, and social support. One drawback of this analysis is that secondary and postsecondary outcomes are combined into a single outcome, and the highest level of attainment measured was completion of one year of college or more.

### **Post-entry factors.**

More scholarly attention has been paid to factors associated with college success or difficulty among foster youth *after* they have entered college. One quantitative study by Salazar (2012) included on-line surveys completed by 329 foster care alumni who partook in a college scholarship program between 2001 and 2009. Participants were asked to retrospectively answer questions about their past maltreatment and foster care history, college fit, academic skills, mental health, independent living skills, social support, and participation in foster care-specific programs. The outcome was a binary measure: one indicated that a participant completed a two-year degree or higher and had never stopped out of college (“no disengagement”), and a zero indicated that the participant either did not complete a degree or they completed a degree but had

stopped out before finishing college (“disengagement”). The author found that satisfaction with college and the frequency of attending social events at college decreased the odds of college disengagement, and insufficient academic support and number of hours worked per week increased the odds of disengagement. However, characteristics of sample (i.e., only including foster youth awarded a competitive scholarship), low response rate (43%), and potential for recall bias warrant caution when generalizing the findings. Moreover, about 90 percent of respondents had earned a two-year degree or higher, which is a rate of college completion that is substantially higher than that of the general college student population and is unheard of among representative samples of foster youth.

A second quantitative study included 444 foster youth and a comparison group of 378 low-income first generation students all attending the same Midwestern university (Day, Dworsky, & Feng, 2013). Survival analysis was used to predict time to degree. In addition to foster care status, only gender, race/ethnicity, and a time-varying lagged measure of good academic standing (GPA of 2.0 or higher vs. not) were examined as predictors. The main finding was that foster youth took longer to graduate than their peers.

Descriptive findings from a survey of foster youth about their college experience sheds light on post-entry factors that may influence their likelihood of succeeding. These findings are from the same study used in this dissertation. At age 25/26, respondents who had dropped out of college were asked about the main reasons for leaving college before finishing (Courtney et al., 2011). The three most common reasons were needing to work (61%), not being able to afford tuition and fees (44%), and childcare responsibilities (37%). Experiencing academic difficulties in class (26%) and having to take too many classes that were not useful (27%) were reported by over a quarter of student who had left college.

Responses from interviews with college administrators shed light on these and other issues that could hinder college completion for foster youth in college. Interviews with 21 college professionals working in 16 colleges in California Central Valley identified six major barriers: financial difficulty (reported by 79% of respondents), lack of adequate housing (79%), academic difficulties (50%), lack of support from a caring adult (50%), unmet mental health needs (42%), and transportation issues (42%) (Lopez & Duran, 2016). Similarly, in interviews with directors of 10 campus support programs for foster care youth, Dworsky and Perez (2010) reported barriers such as inadequate academic preparation, lack of affordable housing and college break housing options, and insufficient mental health services. Another perceived barrier was youths' lack of information about financial aid availability and on-campus services.

Several qualitative studies interviewed foster youth who were enrolled in college. Findings from these studies recapitulate many of the considerable personal, educational, and situational obstacles identified in interviews with professionals. Additionally, two common themes arise in these analyses: the presence of resiliency and self-resourcefulness, and the utilization of help from others (Batsche et al., 2012; Hass, Allen, & Amoah, 2014; Hines, Merdinger, & Wyatt, 2005; Merdinger et al., 2004; Rios & Rocco, 2014; Salazar, Jones, Emerson, & Mucha, 2016; Watt, Norton, & Jones, 2013). While these studies highlight the strength, personal resources, and willingness to engage available support among many foster youth who were interviewed, a limitation of these studies is they typically involve successful foster care youth—young people who were either still enrolled in college or who graduated from college. Missing from these narratives are young people who had dropped out. Also not included in these studies may be currently enrolled students who less inclined to participate in the study (e.g., students who were struggling). Thus, the findings of these studies may paint an incomplete

picture of the characteristics and experiences of foster youth in college, omitting the voices of those who, arguably, were at greatest risk of not succeeding in college.

### **Institutional characteristics.**

Very little research has examined the role that institutional characteristics play on college outcomes of foster youth. One report found results consistent with the findings of previous studies on the general college study body. The rate of persistence was higher among foster youth attending four-year versus two-year colleges (California College Pathways, 2015). Much of the other literature has described campus-based programs and services for foster youth that are intended to promote persistence and completion (e.g., California College Pathways, 2013; Dworsky & Perez, 2010; Salazar et al., 2016; Watt, Norton, & Jones, 2013).

### **Factors Relevant to Foster Care Youth**

In this section I review three issues affecting foster care youth that will be tested as predictors of college outcomes: aspects of youths' maltreatment and foster care histories, avoidant attachment style, and the extension of foster care to age 21.

#### **Maltreatment history and foster care history.**

There are several characteristics of youths' foster care histories that could impact college success. Since school changes and residential mobility have detrimental impacts on learning (Gasper, DeLuca, & Estacion, 2012; Reynolds, Chen, & Herbers, 2009), the number of foster care placement and school changes that foster youth experience are pre-entry attributes expected to negatively impact college outcomes. Maltreatment has been shown to disrupt concentration and learning (Cicchetti, 2016; Klein et al., 2015; Romano, Babchishin, Marquis, & Fréchette, 2015) and to increase the chances of experiencing later mental health problems in college (Holt et al., 2016). Thus, it was expected that youth who reported more instances of physical abuse,

sexual abuse, and neglect would be less likely to persist and complete college. Finally, youth who had ever been placed in congregate care settings (i.e., group homes or residential treatment centers) were expected to be less likely than youth with no history of congregate care placements to enter and complete college. These therapeutic placement types have increasingly been reserved for foster youth with emotional and behavioral problems (Lee, Fakunmoju, Barth, & Walters, 2010; Whittaker, 2006).

### **Avoidant attachment resulting from maltreatment and relational instability.**

Another predictor that was investigated in my dissertation is avoidant attachment. An individual's attachment style is a durable pattern of relationship expectations, emotions, and behaviors that affects interpersonal interactions throughout the lifespan (Ainsworth, 1979; Bowlby, 1973). Attachment theory postulates that individual differences in attachment can be characterized along the dimensions of attachment avoidance and attachment anxiety (Mikulincer & Shaver, 2005). Individuals low on both dimensions are said to have a secure attachment orientation, and individuals high on either or both dimensions are said to have an insecure attachment orientation. Anxious attachment is characterized by concern that relationships with others will be severed (e.g., fear of abandonment and rejection, jealousy, neediness for validation), whereas avoidant attachment is characterized by a preoccupation with maintaining distance from others (e.g., avoidance of intimacy, discomfort with closeness, self-reliance).

Attachment theory emphasizes the importance of caregiver-child interactions early in life as creating a template for one's attachment style. Bowlby (1973) argued that humans are born biologically primed to form attachments with their caregivers to protect them from harm, but when caregivers are not reliably available and supportive in meeting needs and alleviating distress, infants begin to develop auxiliary attachment strategies. In the face of perceived or

actual unavailability of attachment figures, infants initiate strategies to solicit the attention of attachment figures (anxious attachment) and/or inhibit their striving for the attention of attachment figures (avoidant attachment). Anxious attachment strategies involve, “energetic, insistent attempts to attain proximity, support, and love,” while avoidant attachment strategies involve, “denial of attachment needs and avoidance of emotional involvement, intimacy, and dependence in close relationships” (Mikulincer & Shaver, 2005, p.151). Repetition of these responses becomes internalized as customary patterns of expectations and reactions that young children carry over into future relationships with peers, intimate partners, and others.

Features of an avoidant attachment orientation include a tendency to downplay threats, avoid intimacy and emotional closeness, minimize dependence on others by being highly self-reliant, and suppress acknowledgement of personal faults and shortcomings (Mikulincer & Shaver, 2003). Individuals high in avoidant attachment view relationships with distrust, assume a defensive posture, and are reluctant to acknowledge needing others. This last characteristic is what Bowlby (1982) called “compulsive self-reliance.”

While attachment theory views early childhood as formative in establishing individuals’ internal working models, traumatic experiences later in life can influence attachment orientations, particularly when the experiences are long lasting and there is an absence of effective resources needed to restore psychological functioning (Dieperink, Leskela, Thuras, Engdahl, 2001; Mikulincer et al., 1999; Murphy, Elkliit, Hyland, & Shevlin, 2016). Mikulincer and colleagues (2015) note that although attachment orientations are generally stable over time, “they can be altered by powerful experiences that affect a person’s beliefs about the value of seeking help from attachment figures and the feasibility of attaining safety, protection, and comfort” (p.85).

In this dissertation, it is argued that foster youth who had been subjected to increased amounts of maltreatment and who had experienced more relational instability while in foster care (i.e., more placement changes and more school changes) would present with higher levels of avoidant attachment in adolescence. These circumstances are argued to be “powerful experiences” that shake youths’ sense of safety, stability, and basic trust in relationships. One response entails adopting avoidant attachment strategies, in which youth avoid intimacy and emotional closeness and disavow their need to depend on others. By not allowing themselves to become emotionally attached to and reliant on others, they protect themselves from re-experiencing the distress and profound loss that accompanied past trauma (Boss, 1999, 2006).

Several studies in which in-depth interviews were conducted with young people currently or formerly in foster care recapitulate themes of self-protection (Curry, 2014; Jones & Kruk, 2005; Kools, 1999; Lee & Whiting, 2007; Perry, 2006; Riebschleger, Day, & Damashek, 2015; Samuels, 2009; Unrau, Sieta, & Putney, 2008). For example, Samuels and Pryce (2008) interviewed a subsample of over 40 participants in the Midwest Study after they had exited care, and found that most participants developed “survivalist self-reliance,” which includes a strong sense of independence, disavowal of dependence on others, and survivors’ pride about having endured past hardships and trauma. One study participant described his reflections on how broken relationships had compromised his ability to form close ties with others:

[Foster care] affects my ability to wanna latch on to somebody, because every time it seems like I’ve latched on to someone, I lose them. And not in a sense of latching on to ‘em, but just getting close to ‘em, like... Through the years of latching on to people, from adult figures, to even friends...it’s affected my ability to want to, for the fact that, every time I do, somethin’ bad happens. And it really tears me apart every time it happens. I

take it harder than I should. So, it really affects me, so it jus' feels like I haven't really been tryin' to latch close to people as much as, you know, one would. Jus' because of everyone that I've lost. I don't know how to deal with it. It's hard. (Samuels 2008, p.56).

Repeated change and loss can have an enduring effect on the relationships foster youth form with others. Kools (1999) summarizes the experience of the participants in her study in the following way: "The repeated transitions in caregiving that the adolescents experienced seemed to recapitulate losses and rejections in their preplacement histories. The adolescents talked about their difficulties in continuing to invest in relationships with adults that might have little future. The willingness to trust or get close to new caregivers seemed to subside with this instability" (p.145).

Although the term was not explicitly used, many of the findings from in-depth interviews with foster youth describe the adoption of avoidant attachment strategies, such as avoiding intimacy and emotional closeness, minimize dependence on others by being highly self-reliant, and downplaying emotional needs and personal shortcomings (Curry, 2014; Jones & Kruk, 2005; Lee & Whiting, 2007; Perry, 2006; Riebschleger, Day, & Damashek, 2015; Samuels, 2009; Unrau, Sieta, & Putney, 2008). In this dissertation, it was hypothesized that youth who had experienced particularly high amounts of maltreatment and relational instability would have presented with higher levels of avoidant attachment when they were interviewed at age 17.

While the first hypothesis pertains to precursors of avoidant attachment, a second hypothesis pertains to its consequences. I hypothesized that higher levels of avoidant attachment would decrease youths' likelihood of persisting in college and earning a credential. My reasoning for this expectation was that youth higher in avoidant attachment would be less likely to disclose emotional difficulties and less likely to rely on others when they needed help while in college—

particularly in situations that require them to show vulnerability. Since college is a new, challenging, and unfamiliar environment, and since most foster youth enter college underprepared, many of them will need and/or benefit from help from others in order to succeed.

The hypothesized negative impact of avoidant attachment on college outcomes relates to Tinto's concept of social integration and academic integration. I suspected that youth high in avoidant attachment would both have less dense social networks in the academic and social spheres, and would be less likely to utilize resources that are potentially available to them in their social networks when faced with challenges beyond their own capacities. Unfortunately, data were not available to examine these specific mechanism. Data would be needed on study participants' social networks (especially networks at their college) as well data on their *received* social support, which is the actions performed by others to help an individual in need (Haber, Cohen, Lucas, & Baltes, 2007). However, information was collected on youths' *perceived* social support, which is an individual's subjective appraisal about assistance that is available to them in times of need (Haber et al., 2007). Empirical research on the association between attachment styles and perceived social support indicates that individuals with an avoidant attachment style perceive lower levels of social support than do securely attached individuals (see Feeney & Collins, 2014 for review). This was also found in studies in which social support is experimentally manipulated (e.g., Collins & Feeney, 2004). Individuals' internal working models of attachment include explicit and implicit expectations about the extent to which others will be available in times of need (Baldwin, Fehr, Kedian, & Seidel, 1993). Thus, the hypothesis that was tested was whether the association between avoidant attachment and persistence and completion was mediated by youths' amount of perceived social support.

Avoidant attachment orientation is also pertinent to limitations of qualitative interviews of foster youth who were in college that were raised in the previous section. If it is the case that foster youth who are high avoidant attachment are less likely to remain in college, and thus were less likely to partake in the qualitative studies, this may explain why respondents were generally described as being receptive to help from others. Youth high in avoidant attachment may be underrepresented in these studies. This means that the findings are missing accounts from a group of students who are demonstrably at greater risk of dropping out of college.

Before proceeding to the next topic, two relationships that were not expected to be statistically significant are briefly described. First, avoidant attachment was expected to be unrelated to college entry because the types of colleges foster youth overwhelmingly attend (i.e., two-year colleges and less selective four-year colleges) do not have stringent admissions requirements, and youth would not need to seek help from others to enter these institutions. Second, it was expected that anxious attachment would be unrelated to college persistence and completion because participants who were high in anxious attachment would not deprive themselves of help from others when they encountered obstacles in college. Although youth with high levels of anxious attachment may have engaged in behaviors that subsequently damaged relationships that they entered (e.g., being in a frequent state of crisis, displaying high levels of neediness and jealousy), it was expected that they would be open to soliciting help from others in college.

### **Extended foster care.**

Extended foster care is another factor that was examined in this dissertation. Beginning in 2010, the Fostering Connections to Success and Promoting Adoptions Act gave states the option to extend the foster care age limit up to age 21 and receive federal reimbursement (Geen,

2009). At the time of the law's enactment, the age limit for foster care in all but a few states was 18. However, one state in the Midwest Study (Illinois) had allowed youth to remain in care up to age 21 prior to the passage of the Fostering Connections law, while youth in the other two states (Iowa and Wisconsin) had typically exited foster care by age 18. Thus, there was a unique opportunity to evaluate the role that extended care played in promoting educational attainment of foster care youth in this study.

EFC was expected to operate primarily as a source of financial resources to young adults who remained in care. Given the mounting body of rigorous research that shows that need-based financial aid has a positive impact on persistence and completion for low-income college students (Attewell, Heil, & Reisel, 2011; Bettinger, 2015; Bettinger et al., 2016; Goldrick-Rab et al., 2016; Paulsen & St. John, 2002), it was expected that extended care would promote college success of foster youth.

The limited research investigating the role of extended foster care and college outcomes suggests that remaining in care has a positive impact on college attendance and completion. Some of this evidence has come from previous analyses of Midwest Study data. For example, Peters and colleagues (2009) analyzed college outcomes of youth from data collected during the third interview wave, when respondents were 21, and found that youth in Illinois were nearly twice as likely to have enrolled in college and more than twice as likely to have completed at least one year of college than were youth in the other two states. A second analysis of Midwest Study data was conducted by Dworsky and Courtney (2010). The authors examined data from the fourth interview wave to examine state differences in rates of completion of one year of college and rate of degree attainment. At age 23, the authors found that Illinois youth were still more likely than youth in Iowa and Wisconsin to have completed a year of college (44% vs.

26%), but there was no difference in rates of two- or four-year degree completion (5.3% vs. 7.7%). Finally, as summarized previously, Hook and Courtney (2017) more directly examined the role of extended foster care on educational attainment by evaluating the number of years individual youth spent in care past age 18, rather than just examining aggregate state differences. Results from an ordinal logistic regression analysis, which examined three levels of educational attainment at wave five when participants were 25/26 years old, found that each additional year in care predicted a 46 percent increase in the expected odds of attaining the next higher category of attainment ( $OR = 1.46, p <.001$ ). The role of extended care on educational attainment held even after conducting a more rigorous instrumental variable analysis, using state as the instrument for years in care past age 18.

More recently, early findings from the California Youth Transitions to Adulthood Study (CalYOUTH Study; Courtney et al., 2014; Courtney et al., 2016) suggest that participating in EFC plays a positive role on college entry. The CalYOUTH Study includes a representative sample of young people who were in California foster care for at least six months between the ages of 16.75 and 17.75 in late 2013. Okpych and Courtney (in press) found that the number of months participants remained in care past age 18 significantly predicted their likelihood of enrolling in college by age 20, and this difference held after accounting for a wide range of risk and protective factors related to college entry.

The evidence thus far suggests that extended foster care appears to have a positive impact on getting youth into college, but college outcomes beyond entry have not been thoroughly examined. How might EFC promote college access? And why might its effects not translate to improved outcomes for degree completion? First and foremost, extended care most likely buffers young people from economic hardships that would arise should they have been required to leave

care at age 18. Housing is one of the biggest costs that is covered or supplemented by participation in extended care. Indeed, existing research shows that remaining in care past age 18 diminished the likelihood of becoming homeless or having to couch-surf (Courtney et al., 2016; Courtney et al., 2005; Courtney & Okpych, 2017). In addition to housing costs, youth in EFC have access to health care through the Medicaid program, which can cut down on the cost of medical expenses for both routine visits as well as conditions requiring more intensive medical attention. Remaining in care can also connect youth to discretionary funding for emergency situations (e.g., running out of food) and routine educational expenses (e.g., supplies and textbooks). Finally, EFC participation maintains lines of contact with professionals who can assist youth with acquiring education funding earmarked for foster care youth, such as the annual \$5000 Education and Training Voucher grant.

A second way that extended care was believed to promote college access and persistence is increasing youths' social capital. Youth who stayed in care past age 18 were found to be more likely than youth who had left care to have specific professionals in their social network whom they can turn to for emotional support, tangible support, and advice and guidance (Okpych et al., under review). Professionals within child welfare (e.g., caseworkers) and professionals associated with child welfare (e.g., Court Appointed Special Advocates) can serve as cultural guides, motivators, resource bridges, and brokers of information that can help underrepresented students get into and succeed in college (Stanton-Salazar, 2011). For example, Okpych and Courtney (in press) found that having an increased number of professionals with college experiences significantly increased foster youths' likelihood of entering college by age 20. These adults can help youth navigate the time-sensitive logistical tasks required to gain entry to college and access various sources of aid, ensure youth are connected to resources that will promote their

continued enrollment (e.g., tutoring), advocate for youth, assist them with setting realistic intermediary goals on their road to college degree, and serve as an accountability check to ensure youth are following through on their plans.

Under the present Fostering Connections law, an additional mechanism by which extended care may promote college enrollment is a consequence of the eligibility requirements. One of the five eligibility requirements for continued participation in extended care is being enrolled in a postsecondary education institution. As such, continued enrollment in college is a self-reinforcing mechanism by which youth continue to receive benefits associated with extended care. This endogenous effect is less of an issue for the present study, since Illinois' state-funded extended care program had no such education requirement (personal communication with Mark Courtney, December 2016).

Finally, what might be the long-term effect of extended care on postsecondary educational attainment? Findings from Dworsky and Courtney (2010) suggest that the postsecondary educational benefits may diminish after age 21, and they posit that after housing and other support services were phased out, Illinois foster youth face many of the same hardships as Iowa and Wisconsin foster youth. On the other hand, extended care may give youth a critical leg up in completing the first year (or years) of college, and this may better position them to ultimately earn a degree even after aging out of care. For example, completing some college may give youth access to better paying jobs with more flexibility (Okpych & Courtney, 2014), which can help stave off later economic hardship while attempting to finish college. Completing some college may also allow youth to sustain high expectations about completing a degree. Having made it partway to the finish line, youth who completed some college may be more motivated to finish the task than youth earlier in their postsecondary education pursuits. Whether or not EFC

participation ultimately promotes degree completion in later life is an empirical question that has not yet been addressed. One advantage of this dissertation is that college outcomes can be observed for a considerably longer period of time (up to age 29/30) than the previous analysis of EFC and college completion, which examined outcomes up to age 23/24. Along with the other factors that were investigated, this dissertation was intended to contribute to the field's understanding practice and policy relevant factors influencing college outcomes for foster youth.

## **RESEARCH METHODS**

This chapter begins with a brief statement of the purpose of this dissertation, followed by the research questions and hypotheses. Next, the research design and secondary data sources are presented. I then describe the variables investigated, and the data analysis methods. The chapter closes with a summary of the main limitations of the dissertation.

### **Purpose, Research Questions, and Hypotheses**

The purpose of this dissertation is to investigate patterns and predictors of college outcomes for foster care youth. As stated in the Introduction, the primary focus is on persistence and degree attainment among foster youth who enrolled in college. However, one of the chapter (Chapter 5) is devoted to understanding factors that influence the likelihood that foster youth enroll in college, both because this is a substantively important outcome in its own right but also because it sets the stage for the investigation of later college outcomes. Seven sets of research questions guide this dissertation:

1. The first set of questions pertain to rates of college outcomes (Chapter 4):
  - a. What are the rates in college entry, persistence, and degree completion for foster youth?
  - b. How do rates of persistence and completion for foster youth compare to a representative sample of low-income, first generation college students?
2. What are the most common enrollment patterns for foster youth? (Chapter 5)
3. What individual-level factors predict the likelihood and the timing of college entry for foster youth? (Chapter 6)
4. Among foster youth who enrolled in college, what student-level pre-college factors and institutional factors influence youths' likelihood of persisting in college? (Chapter 7)

5. Among foster youth who enrolled in college, what student-level pre-college and post-college factors and institutional factors influence youths' likelihood of completing a postsecondary credential? (Chapter 8)
6. The sixth set of research questions pertains to avoidant attachment (Chapter 9):
  - a. Do youth who experienced more instances of maltreatment and relational instability (i.e., number of placement changes, number of school changes) have higher levels of avoidant attachment?
  - b. Does higher avoidant attachment predict college persistence and completion?
  - c. If avoidant attachment does predict college persistence and completion, are these relationships mediated by youths' amount of perceived social support?
7. Does extended foster care promote college entry, persistence, and completion? (Chapter 10)

Based on the theoretical framework and empirical findings presented in the previous chapter, several hypotheses were proposed. These hypotheses correspond to the research questions above.

**H1a:** Rates of college persistence and completion will be lower for foster youth than for the comparison group of first-generation, low-income students.

**H2:** In terms of college enrollment patterns, a high percentage of foster youth will fall into a category similar to what Adelman (2005) called "Visitors"—students who enroll in college and leave without earning a degree or transferring.

**H3:** It is expected that many predictors will have similar relationships to college entry for foster youth as they do for the general college student body. Factors that signal academic difficulties (e.g., grade repetition, special education), behavioral problems (e.g., school expulsion, delinquency score), and other hindrances (i.e., early parenthood, mental health problems, alcohol/substance use problems) will decrease the likelihood of college entry. Factors that signal academic preparedness (e.g., high school GPA, reading assessment scores), motivation (e.g., educational aspirations), and support and resources (e.g., social support, receipt of education related services) will promote college entry. Some foster care history characteristics are expected to negatively impact college entry (i.e., experiencing more instances of maltreatment, having ever been placed in a congregate care setting, number of placement changes, number of foster care-related school changes).

**H4:** It is expected that factors that signal academic difficulties and behavioral problems will have a small or nonsignificant role in college persistence, largely because youth with these difficulties will be selected out of college. However, indicators of academic preparedness and motivation are expected to positively influence college persistence, as are indicators of support and resources. Some foster care history characteristics are expected to negatively affect persistence (i.e., number of instances of maltreatment, number of placement changes, number of school changes), while history of placement in congregate care is expected to be unrelated to persistence due to selection. Finally, students that attend colleges that are more selective; have higher tuition; and invest more in spending per student on instruction, academic support, and student services are expected to increase the likelihood of student persistence. Conversely, institutions with a higher proportion of students receiving Pell grants and a higher proportion of part-time students will be negatively associated with persistence.

**H5:** It is expected that few pre-entry factors, either measured at the baseline interview (age 17) or measured before students enroll in college, will predict the likelihood of degree attainment. Measures of academic preparedness and motivation are the exceptions; they are expected to increase the likelihood of completing college. In contrast, it is anticipated that post-entry characteristics and institutional characteristics will be more influential in predicting college completion. Several post-entry characteristics are expected to decrease foster youths' likelihood of earning a degree, such as working full-time, greater number of economic hardships, experiencing food insecurity, having a child, experiencing behavioral health problems (i.e., mental health issues or alcohol/substance use issues), and delinquency. Conversely, the likelihood of earning a credential is expected to be positively impacted by youths' amount of social support, marital status, and their college aspirations after enrolling in college. Institutional factors are expected to be related to degree completion in similar ways as persistence.

**H6a.** More instances of maltreatment and relational instability (placement changes, school moves) are expected to predict higher avoidant attachment scores.

**H6b.** Higher levels of avoidant attachment is expected to decrease the likelihood that youth will persist in college and to earn a credential.

**H6c.** If a statistically significant association is present between avoidant attachment and college persistence and completion, it is expected that these associations will be explained (i.e., reduced to nonsignificance) after measures of youths' pre-entry and post-entry social support are added to the regression model.

**H7.** More time spent in extended foster care is expected to increase youths' likelihood of entering college, completing more semesters, and persisting in college. However, the long-term impact of EFC on degree completion remains unclear.

One point deserves to be quickly addressed. The analysis of college completion (Question 5) examines both pre- and post-entry factors, while the analysis of college persistence (Question 4) examines only pre-entry factors. This is because most youth were not interviewed between the time they entered college and the time they dropped out (as early as few weeks) or persisted through three semesters. Thus, post-entry factors were not available for most youth in the analysis of college persistence.

### **Research Design**

This dissertation involved the analysis of secondary data drawn from several sources. The sample came from participants in the Midwest Evaluation of the Adult Functioning of Former Foster Youth (Midwest Study), one of the largest and most comprehensive longitudinal studies of older adolescents in foster care (Courtney, Terao, & Bost, 2004). The Midwest Study included youth who were 17 years old in 2002, who lived in one of three Midwestern states, and who had been in foster care for at least one year.<sup>9</sup> The entire populations of eligible foster care youth in Wisconsin and Iowa were included in the study, as well as a random sample of two-thirds of the population of Illinois youth. The response rate during the baseline interview in 2002/2003 was 95 percent (n=732). Youth were interviewed every two years thereafter until 2011, when study participants were 25 or 26 years old. Each of the four follow-up interview waves had response rates above 80 percent. Interviews at each wave gathered extensive information on a broad range of topics such as youths' living arrangements, mental health, education and employment,

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<sup>9</sup> Youth were excluded from the study if they were incarcerated, in a psychiatric hospital, ran away, had moved out of the state, or had a developmental disability.

parental status, social support, and delinquency. Some but not all interview waves collected data on other topics such as youths' relationship status and experiences of financial hardships. The Midwest Study is a natural experiment in that Illinois permitted youth to remain in care until age 21 while participants in the other two states exited by age 18 with few exceptions (discussed in Chapter 10).

The main outcomes investigated in this dissertation come from the college enrollment and completion data collected by the National Student Clearinghouse (NSC). After being granted approval from the School of Social Service Administration/Chapin Hall Institutional Review Board in May 2015, NSC data were requested for the 732 Midwest Study participants. NSC is a 501(c)(6) nonprofit and nongovernmental organization that provides enrollment and degree records for more than 3,600 public and private U.S. postsecondary institutions. In the academic year 2015, institutions that participate with NSC comprise more than 98 percent of the college student body. NSC provides the following types of information on college attendance and degree completion for each marking period youth were enrolled: name of institution, characteristics of the institution (i.e., two-year or four-year, and private or public), enrollment start date and end date, enrollment status (full-time, part-time, and less than part-time), class level (e.g., freshman), major, graduation date, degree title, and degree major. NSC records were requested from the date of participants' sixteenth birthday to May 2015.

Two additional data sources were used to construct institution-level covariates. First, a measure of college selectivity was retrieved from *Barron's Profiles of American Colleges*, which classifies four-year institutions into six categories (noncompetitive, less competitive, competitive, very competitive, highly competitive, and most competitive) based on factors such as admission rates and characteristics of the incoming student body (e.g., standardized test

scores). Since only paper versions of *Barron's Profiles* were available for most years between 2002 and 2015, which had to be purchased and manually reviewed, college selectivity ratings were obtained for three years: 2003, 2007, and 2011. The selectivity score from the year most proximal to the marking period start date was selected. For example, if a youth enrolled in a college from 2003 to 2007, the 2003 *Barron's* score was used the semesters in 2003 and 2004, while the 2007 *Barron's* score was used for the semesters in 2005 and 2006.

The second source of data used to construct institution-level covariates was the Integrated Postsecondary Education Data System (IPEDS). Administered by the National Center for Education Statistics within the U.S. Department of Education's Institute for Education Sciences, IPEDS collects data from all institutions of higher education that participate in any federal Title IV financial assistance program. Data are collected annually on institutional characteristics, costs, admissions, enrollment, student financial aid, degrees and certificates conferred, student retention, and institutional resources. Similar to the strategy used for institutional selectivity, the IPEDS covariates were obtained for 2003, 2007, and 2011, and the year most proximal to the students' enrollment dates were used.

The final data source was used to estimate rates of college persistence and completion for a nationally representative sample of low-income first generation college students, which serves as a meaningful comparison group for the Midwest Study participants. These data were obtained from the *Beginning Postsecondary Survey Longitudinal Study (04/09)*, a large, nationally representative study of nearly 16,700 college students who enrolled in college for the first time in the 2003-2004 academic year. These students were followed for six years, and data was available for their one-year persistence status and six-year credential completion status. *BPS* is a fortuitous comparison study for the Midwest Study because 2003-2004 is the year when most Midwest

Study participants first enrolled in college. Since the birth families of many foster youth are low-income and have low rates of higher education participation, I restricted the *BPS* sample to just students who were the first in their families to attend college and who were classified as low-income (i.e., they either received a federal Pell grant or had family income at or below the federal poverty level).

### **Strategy to Address NSC Limitations in Identifying College Enrollees**

The NSC report indicates that 351 of the 732 Midwest Study participants enrolled in an institution of higher education by May 2015. However, this number is problematic for two main reasons. First, there were some youth who verily enrolled in college, but who did not appear in NSC records. Second, there were students who show up as being enrolled in college but who had not completed a high school credential by the time they were enrolled (based on self-report data from Midwest Study interviews). These youth should not be counted as college students because they were most likely taking adult basic education classes (e.g., in preparation for the GED) that would not count toward graduation. In this subsection I present these two issues in more detail, along with my assessment of each issue and the steps I took to address them.

After a careful examination of the Midwest Study data on self-reported high school completion dates (collected at wave 2) and high school status (collected at all waves), 20 of the 351 youth appearing in the NSC report were identified as not having earned a high school diploma, GED, or certificate of completion by the time they entered college. It was possible that some of these students had enrolled in college classes as high school students. If this were the case, these students should be expected to be academic high flyers. However, I did not find evidence of this after examining several measures of academic progress and proficiency for each youth (e.g., high school GPA, reading proficiency score, history of skipping a grade, history of

grade retention). Moreover, none of these youth enrolled in college at later ages after they completed a high school credential. Thus, these 20 youth were counted as being not enrolled in college, decreasing the number of participants who had enrolled in college to 331.

The second issue pertains to under-identification of participants who had verily enrolled in college but who did not appear in NSC data (Dynarski, Hemelt, & Hyman, 2013). There are two main ways that could lead to a college student not being identified in NSC data. The first is blocked records, which occurs when either the student or the institution indicates that the students' enrollment records should not be released. This is an instance of known under-identification, because the NSC report provides the number of blocked records. In total, there were 12 youth who should have been counted as being enrolled in college but whose records were blocked. Since their identities were not revealed, it is not possible to know with certainty who these youth were. The second way a student could fail to appear in NSC records is if the college they attended did not participate in NSC reporting during the year they were enrolled. A coverage rate is the percent of students enrolled in institutions of higher education (as reported in IPEDS) who appear in NSC records. Although the NSC coverage rate in NSC has been very high in recent years (e.g., 96.4% in Fall 2014), the coverage rate was lower in the early 2000s, when the most of Midwest Study students had entered college (e.g., 86.5% in fall 2003) (National Student Clearinghouse, 2017). Coverage rates are particularly low for two-year colleges, which are the types of institutions where Midwest Study participants overwhelmingly attended. For example, the fall 2003 coverage rate for two-year colleges is 83.7 percent, compared to 88.2 percent for four-year institutions. What this means is that there is likely a nontrivial proportion of Midwest Study participants who were enrolled in college but who did not appear in NSC records due to undercoverage.

When considering both blocked records and undercoverage, this amounted to a problem that could have led to underestimations of college participation and completion, and that could have potentially affected the results of the regression analyses (e.g., increase standard errors). Fortunately, the five waves of the Midwest Study collected information on the college enrollment and completion statuses of the participants, which could be used to identify college students missing from NSC records. Although some youth missing from NSC records will have enrolled after their last completed Midwest Study interview, which means that their college enrollment would not be known, this is expected to affect a small proportion of the sample. For example, of the 331 youth enrolled in the NSC data, only 30 (9.1%) first enrolled in college after the median date of the last Midwest Study interview.

My strategy for recovering missing college students entailed closely inspecting all five waves of the Midwest Study data to identify youth who reported being enrolled in college at some point but who did not appear in the NSC data. Youth were counted as having been enrolled in college if (a) they had completed their secondary credential by the time they reported enrolling in college, and (b) there was no contradictory information about their secondary credential status or their highest completed grade in subsequent interview waves. For example, if a youth reported that she completed a GED at wave 2 and was currently enrolled in a two-year college, but in subsequent interview waves reported that “some high school” was the highest education she completed, the youth would not be counted as being enrolled in college. In total, examination of the Midwest Study data identified 71 youth who reported that they had enrolled in college but who did not appear in the NSC data. This brings the total number of college students 401, which is the sample of college students used in this dissertation. Since the 71 youth did not appear in

the NSC data, specific information about the college(s) they attended, their dates of enrollment, and their credential completion date were not available.

One point that adds confidence to the strategy for identifying missing students is the high rate of agreement between the NSC dataset and Midwest Study dataset on college enrollment status. As shown in Table 1, there is an 82.5 percent agreement between the self-report data and the NSC data. This rate is far beyond what would be expected by sheer chance (Cohen's kappa=0.648, Z=17.55,  $p<.0001$ ). Moreover, this agreement rate is underestimated because it includes (a) the youth who truly enrolled in college but were not reported as such in NSC due to NSC data limitations (estimated to be 71 in this analysis), and (b) youth who first enrolled in college sometime after their last Midwest Study interview. Of the 57 youth who reported never enrolling in college but who show up as enrolled in NSC data, 30 of these youth first enrolled in college sometime after their last Midwest Study interview. If these 30 youth were moved to "enrolled" in Midwest Study, the agreement rate would be 86.6 percent. If it was the case that the 71 youth missing from NSC accurately reported their college enrollment status, and thus their status was changed in the NSC record, the agreement rate would be 96.3 percent. This estimate would be the ceiling for the agreement rate, but the actual agreement rate is somewhere between about 87 percent and 96 percent.

To assess the extent to which the 331 college students identified in NSC differed from the 71 college students identified by the Midwest Study self-report, I compared these two groups along all of the covariates and outcomes included in this dissertation. Only four statistically significant differences ( $p < .05$ ) were found. Compared to youth in the NSC sample, youth identified by self-report were less likely to have experienced pre-entry food insecurity (21.9% vs. 35.2%,  $p = .020$ ), experienced fewer pre-entry economic hardships (0.98 vs. 1.69,  $p = .018$ ), had

lower post-entry delinquency scores (0.07 vs. 0.15,  $p = .015$ ), and were less likely to report post-entry alcohol/substance use problems (32.4% vs. 49.7%,  $p = .009$ ). Thus, a few of the measures suggest that the self-reported youth were lower than NSC youth on a few of the risk factors. However, this was not consistent across all measures of the variables. For example, the groups differed on rates of post-entry alcohol/substance use problems, but not pre-entry measure or the baseline measure of alcohol/substance use problems. The same was true for delinquency (only significant for the post-entry measure) and economic hardships and food insecurity (only significant for the pre-entry measures). Moreover, it is important to keep in mind that over 50 statistical tests were conducted to assess group differences. With this many comparisons, there is a high probability that one or more of these differences were found by sheer chance.<sup>10</sup> In the analyses of college completion, an indicator variable for the source of college identification will be included in regression models as a control variable.<sup>11</sup>

*Table 1. College Enrollment Status Agreement between NSC Data and Midwest Study Data*

		Midwest Study		TOTAL
		Not enrolled		
NSC	Not enrolled	330	71	401
	Enrolled	57	274	331
	TOTAL	387	345	732

<sup>10</sup> For example, if we use a less stringent alpha level (.10) and apply the Bonferroni correction, each hypothesis would be tested at  $\alpha = .0019$ . At this cutoff, none of self-report vs. NSC group differences would have passed the test of statistical significance.

<sup>11</sup> This indicator variable is not needed for analyses of college persistence, because these analyses only include youth in the NSC dataset, for whom there was semester-by-semester enrollment data needed to create the measure of persistence.

## Measures

### Outcomes variables

***College enrollment.*** As described above, participants were classified as being enrolled in college based on data from the NSC and supplemented by self-report data from the Midwest Study. Only youth who had attained a secondary credential (high school diploma, GED, or certificate of completion) by the time they entered college were counted as having attended college. Of the 402 youth who enrolled in college, 331 were identified by NSC records (82.3%) and another 71 were identified in Midwest Study interviews (17.7%).

***College persistence.*** Persistence is indicated by a college student completing their first three consecutive non-summer semesters, either on a full-time or part-time basis.<sup>12</sup> Students were counted as not persisting if they either failed to enroll for three consecutive semesters, or if they failed to complete one of the three semesters (i.e., withdrawal). Since this measure requires semester-by-semester data, only youth appearing in NSC records ( $n = 331$ ) were included in analyses of college persistence.

***Completion of a postsecondary credential.*** A binary variable indicated whether a youth earned a postsecondary credential (i.e., vocational certificate/two-year degree/four-year degree vs. no credential) by the time of the NSC data draw in May 2015. Self-report data from the Midwest Study was used for the college students not identified in the NSC record. Of the 80 youth who earned a postsecondary credential, 69 were identified in NSC records (86.3%) and 11 were identified from Midwest Study data (13.7%). As a supplemental analysis, a second binary

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<sup>12</sup> A small proportion of students enrolled in colleges that operated on the quarter system or some other system. For youth who attended college operating on the quarter system, persistence consisted of enrolling in four consecutive non-summer quarters. For youth who attended schools operating on a different system (some vocational schools and some for-profit schools), persistence consisted of enrolling in the equivalent amount of time as three semesters.

outcome was created to indicate whether youth had earned a college degree (two-year degree/four-year degree vs. no degree) by the NSC data draw. Additionally, a three-category credential attainment variable was created, which recorded the highest credential attained by the youth: no credential, a vocational certificate, and a two- or four-year degree. Given the sparseness of the outcomes, this variable is used in supplemental regression analyses with a reduced number of predictors.

### **Baseline Youth Characteristics Measured Only at Wave 1**

#### **Demographic characteristics.**

***Demographic characteristics.*** Demographic measures included youths' gender, race/ethnicity (white, African American, Hispanic, and other race), and age at wave 1. A variable also indicated the state in which youth resided at baseline (Illinois, Iowa, or Wisconsin).

#### **Academic history.**

***High school math and English grades.*** Youth were asked to report their grades in four subjects for the most recent high school marking period. Given that large proportions of respondents had not taken courses in two of the subjects (i.e., history/social studies and science), a single measure was created for their grades in math and English. Respondents' self-reported grades in each subject (A, B, C, or D or lower) was averaged, and youth were classified into one of three tertiles: bottom, middle, or top tertile for grades in these two subjects.

***Reading proficiency.*** The Wide-Range Achievement Test: Third Edition (WRAT3) was used to provide a brief assessment of reading proficiency (Wilkinson, 1993). In this standardized assessment, youth were asked to read aloud a list of words that increased in difficulty until they mispronounced ten consecutive words. Raw scores are converted to an age-based standardized scale similar to the IQ scale ( $mean = 100$ ,  $SD = 15$ ). For this analysis, youths' reading scores

were converted to standard deviations, such that a one-unit change represents a one-standard deviation change in reading proficiency.

***Highest completed grade.*** Youth reported the highest grade they completed, and a three-category variable was created for this analysis: 10<sup>th</sup> grade or below, 11<sup>th</sup> grade, 12<sup>th</sup> grade or higher.

***Grade repetition.*** A binary variable captured whether the youth reported ever repeating a grade.

***Special education.*** A binary variable indicated if the respondent was ever placed in a special education classroom.

***School expulsion.*** A binary variable captured whether the youth had ever been expelled from school.

***College preparatory activities.*** Youth were asked if they had participated in several activities and trainings intended to prepare youth for going to college, including: SAT preparation, assistance with college applications, assistance with financial aid/loan applications, and participation in college fairs. A count variable the number of types of activities and trainings they participated in was created, ranging from 0 to 4. Chronbach's alpha for these four items was .73.

### **Foster care history characteristics and maltreatment history.**

***Ever placed in congregate care.*** A binary variable indicated whether youth had ever been placed in a congregate care setting (i.e., group care, residential treatment center, or child caring institution). These are the most restrictive foster care placement types that are typically reserved for youth with emotional and/or behavioral problems.

**Number of foster care placements.** Youth were asked two questions, one about the number of foster care homes they had been placed in and the number of group homes/residential treatment centers they had been placed in. Both variables were top coded at 20, and a measure for the number of foster care placements was created by adding the two variables (range 1 to 40).

**Number of school changes.** Youth were also asked about the number of times they had to change schools because of a foster care placement change or a family move. The original response options included 0 to 4 changes, with an additional option for 5 or more changes.

**Maltreatment.** The Lifetime Experiences Questionnaire (Rose, Abramson, & Kaupie, 2000) was used to assess the youths' histories of neglect (9 items), physical abuse (7 items), and sexual abuse (2 items). To create a maltreatment measure, a sum of affirmative responses to the 18 different instances of maltreatment was calculated, and youth were then classified into three groups: low maltreatment tertile, middle maltreatment tertile, and high maltreatment tertile. The Chronbach's alpha for these items was .86, indicating high internal reliability. As presented in subsequent chapters, maltreatment was not associated with college outcomes. Although not reported, this was also the case when the three types of maltreatment (i.e., neglect, physical abuse, and sexual abuse) were analyzed separately.

### **Important Date Variables**

**Date of secondary credential completion.** The date when participants earned their secondary credential (i.e., high school diploma, GED, or alternative credential) was calculated from self-report data from Midwest Study interviews. After examining youths' secondary completion status at each of the five interview waves, 589 of the 732 participants had earned a secondary credential (80.5%). Respondents who completed the wave 2 interview and had earned a high school diploma by that time provided the month and year in which their diploma was

earned ( $n = 375$ , 63.7% of the secondary credential holders).<sup>13</sup> For the other 214 youth, the date of their secondary credential attainment had to be estimated from information gathered during the five Midwest Study interviews. The interview at which a youth's secondary completion status changed from no credential to credential was identified. Next, the median date between the current interview and the previously completed interview was identified. For youth who reported earning a high school diploma, June 15<sup>th</sup> of the year closest to the median date was selected, since high school graduations typically occur in May or June. For youth who reported earning a GED, the median date between the two interview waves was used. I also completed additional checks to ensure that the estimated dates were reasonable given additional information. For example, if a youth was interviewed at wave 1 (age 17) and next at wave 4 (age 23), and she reported earning a high school diploma, June 15<sup>th</sup> of the year in which she was 19 years old was designated as her high school graduation date, since the average age of high school completion was about 19.2.

***Date of college enrollment.*** The exact date when youth first entered college was available for all 331 participants in the NSC data (82% of youth who attended college), but specific dates were not available for the 71 youth who reported going to college in their Midwest Study interviews. For these 71 youth, a college entry date was created by examining their self-reported enrollment status (i.e., "I am currently enrolled in college", and "I was enrolled in college since my last interview wave") at each wave, identifying the two waves in which their status changed from not enrolled to enrolled, and taking the median date between the two interview waves. Since the overwhelming majority of students in the NSC records first enrolled

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<sup>13</sup> Since the day of the month on which youth completed high school was not asked, the 15<sup>th</sup> of the month was used.

in either the fall or spring semesters, I designated their college start date as the fall or spring semester start date that was closest to the median date.

***Date of college completion.*** Specific graduation dates were available from NSC records for most of the 80 youth who had earned a postsecondary credential ( $n = 69$ , 86.3%). For the 11 youth who reported earning a college degree based on self-report information from their Midwest Study interview, the median date between the two Midwest Study interview dates in which their college degree status change was identified. The May 15<sup>th</sup> that was most proximal to the median date was designated as their college completion date since most graduations in the NSC data occurred in May. Checks were also made to ensure the completion dates for these 11 youth were reasonable (e.g., completion of a four-year degree occurred at least four-years after their college entry date).

### **Pre-Entry and Post-Entry Covariates**

In addition to predictors that were measured at baseline, several predictors were created that spanned the time before youth enrolled in college (pre-entry) and after youth enrolled in college but before they graduated (post-entry). These variables were used in the analyses of college persistence and completion.

***Marital status.*** Binary variables indicated if participants were married at any point before enrolling in college and at any point after enrolling in college.

***Parental status.*** Binary variables indicated if youth had a living child in their pre-entry and post-entry periods.

***Mental health problem.*** Binary variables were created to mark the presence of a mental health problem before and after entering college. A mental health problem was indicated if any of the following criteria were met: (1) positive screen for depression symptoms, (2) positive

screen for PTSD symptoms, (3) youth received psychological or emotional counseling in the past year, (4) youth received medication for emotions in the past year, (5) youth spent one or more nights in a psychiatric hospital since their last interview. Depression and PTSD were included both because they are two of the most prevalent mental health disorders among foster care youth (Havlicek, Garcia, & Smith, 2013) and because symptoms of these disorders were assessed at all five interview waves. Depression and PTSD were screened using a lifetime version of the Composite International Diagnostic Interview (CIDI), a brief structured interview designed for non-clinicians to assess behavioral health problems (World Health Organization, 1998). The other three criteria came from three survey items that asked if the youth had received counseling, received psychotropic medications, and had spent time in a psychiatric hospital.

***Substance use and alcohol use problems.*** Binary variables were created to indicate the presence of a substance or alcohol use problem before and after entering college. Youth were classified as having a substance/alcohol use problem if any of the following three criteria were met: (1) positive screen for alcohol abuse or dependence symptoms, (2) positive screen for substance abuse or dependence symptoms, (3) attended an alcohol/substance use treatment program in the past year. Similar to depression and PTSD, the presence of symptoms of alcohol use and substance use problems were screened using the CIDI, and were assessed at all five interview waves. A separate survey item asked youth about their participation in treatment program for alcohol or substance use problems.

***Economic hardships.*** Six items were used to create a measure of economic hardship that youth had encountered in the past 12 months: not having enough money to buy clothing, not having enough money to pay rent, being evicted because of an inability to pay rent, not having enough money to pay utility bills, having their telephone services cut off because of an inability

to pay the bill, and not having enough money to pay for gas or electricity. The original response options included “often true,” “sometimes true,” and “never true.” Each of the six variables were dichotomized, with zero indicating no hardship and one indicating the hardship was “sometimes” or “often” experienced in the past year. These six binary items were then summed to create a count of the number of economic hardships that youth encountered in the past year. Economic hardship measures were available for waves 2 through 5. The Chronbach’s alphas ranged from .73 to .79 at each wave.

***Food insecurity.*** Pre- and post-entry composite scores were created from five items taken from the USDA’s measure of food insecurity (Bickel, Nord, Price, Hamilton, & Cook, 2000). The original items asked youth if they had experienced each of the following during the past 12 months: had to cut the size of meals because they were not able to afford more, did not eat for a whole day because they did not have enough money for food, had to eat less than they should because they did not have enough money, often worried about running out of food, and sometimes or often were not able to afford to eat balanced meals. Following the USDA’s coding strategy, participants were classified as being food insecure if they answered affirmatively to at least 2 of the 5 items. The food insecurity items were available for waves 2 through 5.

***Delinquency score.*** Respondents were asked over a dozen questions taken from the National Longitudinal Study of Adolescent Health (Resnick et al., 1997) that asked them about the frequency in which they engaged in delinquent behaviors in the past 12 months. Ten of these items were asked during all of the Midwest Study interviews. These ten items, along with an additional binary survey item that asked if participants if they had been incarcerated since the previous interview wave, were used to create pre- and post-entry delinquency scores. These questions asked about behaviors involving vandalism, stealing, fighting, threatening to use a

weapon, and selling drugs. For each of the ten items, the response set included 0=never, 1=one or two times, 2=three or four times, and 3=five or more times. The binary item of past incarceration was coded as 0 if the participant had never spent time in jail and 3 if they had spent time in jail. Pre-entry and post-entry delinquency scores were calculating by taking the average of the ten delinquency items and one incarceration item for the relevant time period and ranged from 0 to 3. The Chronbach's alphas at each of the interview waves indicated good internal consistency among the 11 items used to create the scale (W1=.80; W2=.71; W3=.81; W4=.76; W5=.85).

***Employment status.*** Categorical measures of the average number of hours of employment were created for the pre- and post-entry periods, which included the following categories: not employed, 1-19 hours/week, 20-34 hours/week, and 35 or more hours/week. Since specific data was available for youths' current employment for all five waves, and since the time frame and level of detail about past employment varied from wave to wave, this variable captures the number of hours youth were working at the time of each interview wave.<sup>14</sup> The pre- and post-entry measures reported the maximum number of hours youth had worked during each time period.

***Social support.*** The Medical Outcomes Study's Social Support Survey (Sherbourne & Stewart, 1991) was used to measure participants' perception of the adequacy of social support

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<sup>14</sup> Wave 1 asked about dates of most recent employment and number of average hours worked. Wave 2 asked about whether youth worked at all in the past 12 months, and if they were working mostly full-time or mostly part-time. Waves 3 to 5 asked about the date youth ended their most recent employment (but no start date). Since it was not possible to construct youths' entire employment history, and since the time frame and level of detail about employment varied between waves, I opted to use hours of current employment. This was consistently measured across waves. Additionally, research findings summarized in the previous chapter suggest that the number of hours work (rather than just if a student is employed or not) is important for accurately assessing the impact of employment on persistence and degree completion.

available to them. The 18-item survey is designed to assess four domains of social support, asking how often youth feel there was someone to provide the specific type of support. The response options included: 0=none of the time, 1=a little of the time, 2=some of the time, 3=most of the time, and 4=all of the time. The four types of support assessed were: emotional/informational support (8 items, e.g., someone to confide in and listen to their problems, to provide advice and information), tangible support (4 items, e.g., someone to take to the doctor if sick, help prepare meals if were unable to cook, help with daily chores if sick), positive social interaction (3 items, e.g., someone to relax with, have a good time with, distract from problems), and affectionate support (3 items, e.g., someone to hug you, shows love and affection, make you feel wanted). Average social support scores were calculated before and after youth entered college, ranging from 0 to 4. The internal consistency as measured by Chronbach's alphas was high across the five interview waves (above .90 at all waves).

***Educational aspirations.*** Respondents were asked about the highest level of educational attainment they aspired to complete. The original response set included 0=below high school, 1=graduate from high school, 2=some college, 3=graduate from college, 4=more than college, and "other." The "other" write-in responses were recoded into existing categories when possible. For the regression analysis of predictors of college entry, a three-category pre-entry variable was constructed: high school degree or less, some college, graduate from college or more. For the analyses of college persistence and completion, which only included only college entrants, a different set of categories was used: some college, graduate from college, more than a college degree. Youths' highest stated educational aspirations during the pre-entry and post-entry periods were used, respectively.

## **Measures of Institutional Characteristics**

Several institutional-level variables were created to capture aspects of the colleges that Midwest Study participants had attended.<sup>15</sup> Two versions of each variable were created. The first measure pertained to the first institution that participants attended. However, since it was not uncommon for participants to attend more than one college, a second variable was created for the institution at which the youth spent the most time (as measured by the number of semesters at each institution). In cases where there was a tie for the modal institution, the more selective college was chosen. The first institution measures are used in the main analyses, and the modal institution measures are used in supplemental analyses. As described earlier, institutional variables were created for three years during the study period (2004, 2007, and 2011) and information from the most proximal year was used to input data about the institution the youth was enrolled in.

**College type>Selectivity.** A measure of institution type and selectivity was created using a ranking scale of four-year colleges published annually in *Barron's Profiles of American Colleges*. The original six categories included: noncompetitive, less competitive, competitive, very competitive, highly competitive, and most competitive. Most youth attended two-year colleges, which are not included in the *Barron's* rankings. Thus, a variable for college type/selectivity was created with the following three categories: two-year college, minimally competitive four-year college (noncompetitive and less competitive), and competitive four-year college (competitive, very competitive, highly competitive, and most competitive).

**Sector and control.** Institutions were classified as public, private non-profit, or private for-profit based on data contained in the NSC file. Few youth attended private colleges,

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<sup>15</sup> The 331 youth in the NSC sample attended nearly 182 different colleges. Since many institutions had only one youth enrolled in the college, it was not feasible use a multilevel model. Additionally, there was no information about the specific institutions that youth had attended for college students who were identified through Midwest Study self-report ( $n = 71$ ).

especially private non-profit colleges. Thus, this variable was not included in regression analyses because problems with parameter estimation arose.

**Size.** A measure of institutional size was obtained from *IPEDS*. Size is the count of the institution's total undergraduate enrollment in the fall term. Institutions were classified into the following categories: less than 2500, 2500 to 5000, 5001 to 10,000, and more than 10,000.

**Tuition.** A continuous *IPEDS* measure was used for the average in-state tuition and required fees for undergraduate students.

**Percent of students receiving Pell grants.** An *IPEDS* measure reported the proportion of first-time undergraduate students in the fall who were receiving a Pell grant, a federal need-based grant for low-income students.

**Percent of part-time students.** An *IPEDS* measure captured the proportion of first-time undergraduate students in the fall who were attending college on a part-time basis (typically less than 12 credits per semester).

**Retention rate.** Institutional retention rate was an *IPEDS* measure of the percentage of full-time students who first enrolled in the previous fall who were again enrolled in the current fall. For four-year institutions, this measure pertains to first-time students seeking to complete a bachelor's degree. For two-year institutions, this measure pertains to all degree- or certificate-seeking students who returned in the fall or who had successfully completed their certificate program by the fall.

**Expenditures.** Three separate *IPEDS* variables reported the average expenditures spent per full-time enrolled student on: (a) instruction, (b) academic support services, and (c) student services. Instructional expenditures include expenses for general academic instruction, vocational and remedial education, and services related to instruction (e.g., information

technology). Academic support services includes expenses for academic administration (e.g., deans), libraries and museums, course and curriculum development, and audio/visual and information technology support for instruction. Student services includes expenses for admissions, registrar activities, activities intended to develop students' emotional and physical well-being (e.g., guidance, counseling), and activities intended to promote their social and cultural development outside of the classroom (e.g., student activities, intramural athletics, student organizations, cultural events, and school newspapers).

### **Avoidant Attachment and Anxious Attachment**

Scales for avoidant attachment and anxious attachment were created using items from the Experiences in Close Relationships-Revised (ECR-R) instrument (Fraley, Waller, & Brennan, 2000). The ECR-R is one of the most widely used self-report tools to assess adult attachment orientations (Ravitz et al., 2010). The original ECR-R had 36 items, with 18 items for each dimensions of attachment (avoidance and anxiety). However, due to time constraints, only 22 of the 36 items (11 items for each dimension) were administered. The ECR-R was designed to ask about respondents' perceptions of their relationship with a romantic partner, and in the Midwest Study the instrument was used to ask about the respondents' relationships generally.<sup>16</sup> The ECR-R was only administered at baseline, when participants were 17 or 18 years old. All items have a seven-point response set, ranging from "strongly disagree" to "strongly agree." Following the ECR-R scoring instructions, an avoidant attachment score and an anxious attachment score were calculated by taking the average of the 11 items in each scale. The psychometric properties of the

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<sup>16</sup> The creators of the ECR-R note that researchers have modified the instrument for different research purposes, such as assessing non-romantic relationships (e.g., familial relationships, platonic relationships). The ECR-R developers encourage modifications to the items so long as the modifications are appropriate for the research purposes at hand (Fraley, 2017).

avoidant attachment scale will be reviewed in detail in Chapter 9. Since anxious attachment is of secondary interest, its psychometric properties will be briefly summarized in Chapter 9.

### **Years in Care Past Age 18.**

A measure of the number of years each youth spent in care past age 18 was centered at 18. A value of 0 indicated that youth exited on their 18<sup>th</sup> birthday. If a youth exited care before age 18, they were coded as 0 since they spent no day in care past age 18. Thus, the values ranged from 0 to 3 years.

### **Data Analyses**

This section presents information on the analytic approaches used in this dissertation in the order they appear in the subsequent chapters.

### **Chapter 4: Descriptive Statistics of the Sample and Outcomes**

Descriptive statistics are presented for the covariates assessed in this dissertation, as well as rates of college entry, persistence, and completion. Chapter 4 also examined differences in college persistence and degree completion between first-time college students in the Midwest Study and students from a nationally sample of beginning first-generation low-income college students (*BPS 04*). Survey weights provided by *BPS 04* were used. Additionally, given gender differences and race/ethnicity differences between the Midwest Study sample and the *BPS* sample, Midwest Study estimates were weighted to reflect the gender and race/ethnicity composition of the *BPS*. This standardization ensures that differences in college outcomes were not due to differences in these demographic characteristics of the two samples. Although the Midwest Study included students from just three Midwestern states and the *BPS 04* included a nationally representative sample, college outcomes for these three states were not dissimilar from national outcomes. For example, the 2009 six-year completion rate for bachelor's students was

slightly lower across the U.S. (56%) than it was in the three states included in the Midwest Study (IL=58%, WI=58%, IA=63%) (National Information Center for Higher Education Policymaking and Analysis, 2017).

## **Chapter 5: College Enrollment Groups**

Only youth in NSC records, for whom there is semester-by-semester enrollment information, were included in the classification of enrollment groups. The original analytic approach entailed using an advanced statistical method (e.g., repeated measures latent class analysis, latent transition analysis, mover-stayer models) to identify the latent enrollment trajectories of college entrants. However, these methods require very large sample sizes, particularly when there are many time periods (semesters in this analysis) and many possible combinations of enrollment statuses at each time period (Lanza & Collins, 2006; Nagin, 2010; Vermunt, Tran, & Magidson, 2008). Additionally, models that identify latent enrollment trajectories based on statistical data alone can yield findings that lack theoretical plausibility and practical utility (Collins & Lanza, 2013).

Given these limitations, youth were classified into enrollment groups based on careful visual inspection of each student's enrollment pattern over the semesters from 2002 to 2015. Based on previous research that identified trends and patterns in student enrollment (e.g., Adelman, 2005; Goldrick-Rab, 2006; McCormick, 2003), the following characteristics were used to identify enrollment groups: sustained persistence (i.e., number of consecutive semesters of enrollment), stopouts (i.e., dropping out of college and then returning at a later date), and multi-institution attendance (i.e., enrolling in multiple institutions over time). The decision rules used to create the enrollment groups are described in detail in Chapter 4.

After the enrollment groups were identified, differences between the groups were assessed along all of the covariates in this dissertation. To identify statistically significant group differences, Chi-square tests (for categorical characteristics) and ANOVA tests (for continuous characteristics) were used. When statistically significant ( $p < .05$ ) overall group differences were found, regression analyses were used to identify specific group differences.

## **Chapter 6: Predictors of College Entry**

Two analyses examined factors that influenced college entry. First, logistic regression was used to assess relationships between youth characteristics measured at age 17 and the likelihood of entering college. Covariates were entered into the regression model in blocks, beginning with demographic characteristics and followed by academic history characteristics, foster care history characteristics, and risk and promotive factors. For continuous predictors, the linearity assumption between the log odds of enrollment and the predictor is assessed using the Box-Tidwell Transformation test, which adds interaction terms of the covariate and its natural logarithm (Box & Tidwell, 1962). Significant interaction terms indicate the presence of nonlinearity.

The large number of predictors considered in this dissertation could present problems of overfitting (i.e., the regression model is too complicated for the data set and quirks of the dataset are reflected in findings rather than population characteristics), reduced power to detect significant differences, and multicollinearity (i.e., high collinearity between two or more predictors that can obscure relationships between the predictors and the outcome). To address the goal of model parsimony, initial bivariate logistic regression analyses were conducted for each covariate, and predictors that were not significantly related to the outcome were omitted from its respective covariate block in the multivariable models, unless there was a substantive reason for

retaining the predictor (e.g., youth demographic characteristics). When signs of multicollinearity were present among two or more predictors, only one variable was included in the regression model displayed in the tables, but results of supplemental regression models in which the collinear variables were examined are reported in text. The variable entry and variable reduction approach were also used in regression analyses of persistence and degree completion.

The first analysis of college entry (predictors measured at age 17) is important because it identifies factors measured when foster youth are still connected to institutions that could potentially intervene (e.g., the child welfare system, the secondary school system). However, this model evaluates static characteristics measured at a single point in time, and does not assess the timing of when youth entered college. Given findings reviewed in the previous chapter that suggest a negative association between age of entry and college persistence/completion, and given the possible benefits afforded to foster youth through extended foster care, understanding factors that influence the timing of when youth enter college is important.

A Cox proportional hazard model was used to assess the role that baseline and time-varying covariates had on the rate of college entry (Rothman, Greenland, Lash, 2008). The Cox model is used to model the hazard rate, which is the instantaneous likelihood of entering college among youth still in the risk set at a given time. To ease the interpretation of model coefficients, the exponent of the log hazard is taken to yield the hazard ratio, which is the ratio hazards of two groups (e.g., males vs. females) or of a one-unit change in a predictor (e.g., receipt of one college preparatory activity versus no activities). A hazard ratio above 1.0 indicates that the predictor is associated with an increase in the rate of college entry, while a hazard ratio below 1.0 and approaching zero indicates that the predictor is associated with a decrease in the rate of college entry. Midwest Study participants entered the risk set at age 17.5 and exited the risk set when the

earliest of the following occurred: (a) they enrolled in college, (b) were censored due to reaching age 22 without having entered college, or (c) became deceased before entering college or reaching age 22. Time is modeled continuously as the number of days from age 17.5 to the date of college enrollment. Ties (i.e., college entries occurring on the same day) are handled using the Efron method, which provides accurate beta estimates in the presence of ties (Hertz-Pannier & Rockhill, 1997).

The proportional hazards assumption (PHA) is a main assumption of Cox regression models, which states that hazard functions (determined by the values of model predictors) are proportional over time (Kleinbaum & Klein, 2012). Taking gender as an example, if we find a hazard ratio of .75, indicating that the rate of entry is 25 percent lower for males than females at a given time, the assumption is that this proportional difference is the same across the observation period. The hazard rates for males and females can increase or decrease over the observation period, but it is assumed that they move together so that the 25 percent difference in rates is present at any given time. This constancy is what makes the estimated hazard ratios valid, since they provide a single summary estimate of the influence of covariates over the whole observation period. When the PHA is not met, a model assuming proportionality is not appropriate and alternative models should be considered (Kleinbaum & Klein, 2012).

In this dissertation, violations of the PHA were assessed by visual inspection of graphs (e.g., Kaplan-Meier Curves for time-invariant covariates with few categories); inclusion of interaction terms between time-varying covariates and a function of time; and by using Stata's *phtest* command, which tests the PHA using Schoenfeld residuals (Kleinbaum & Klein, 2012). Both individual predictors and the overall regression model (in models with multiple predictors) were tested for violations of the PHA. In the multiple imputation context, which is the approach

used to address missing data, the PHA must be tested on individual imputed datasets (White & Royston, 2010). A random sample of 10 imputed datasets were used to inspect violations of the PHA.

The original analysis plan for the survival analysis entailed investigating rates of college entry up to the last wave of the Midwest Study interviews (age 25/26) or later. However, the cutoff age of 22 years was selected due to violations of the PHA when a longer observation period was used. When college entry was examined up to the final wave of the Midwest Study, the PHA was consistently violated in the overall model ( $p < .0001$ ). Several variables were found to violate the PHA in most of the 10 imputed datasets, including: state, math/English high school grades, grade retention, parental status, and food insecurity.<sup>17</sup> While it is possible to use alternative models that do not assume proportionality (e.g., an Extended Cox model), these models are sensitive to correctly specifying the functional form of observation time, and interpretation of the coefficients are more complicated (Kleinbaum & Klein, 2012).<sup>18</sup>

Instead of using an alternative modeling strategy, I decided to use a Cox model but investigate college entry up to 22 years of age. Age 22 was selected for both statistical and substantive reasons. Statistically, age 22 was the latest age for which violations of the PHA did not occur. Substantively, understanding factors that promote or interfere with *early* college entry is important because findings of previous studies suggest that early college entrants generally

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<sup>17</sup> Another issue is that the rate of first-time college entry drops appreciably after age 22, making the event exceeding rare at older ages. For example, an average of 71 youth first enter college each year before between ages 17.5 and 22, but just 13 youth enter college each year between ages 22 and 26.

<sup>18</sup> The Extended Cox model introduces interaction terms into the model, in which covariates in violation of the PHA are interacted with a functional form of observation time (e.g., identity, a log transformation, a more complicated spline function). Since the coefficients in the interaction terms are dependent on time, their interpretation is always in relation to a specific value for time. Thus, in the Extended Cox model, the violation of the PHA is still present, but the interaction term models the time-varying effects of the offending coefficients.

fare better in college than do students who delay entry. Moreover, foster care benefits that could promote college outcomes (e.g., extended foster care, education and training vouchers, etc.) phase out in the early 20s. Thus, the main Cox regression model examines rate of college entry by age 22. However, as a sensitivity analysis, a Cox model that examined college entry up to the last Midwest Study interview wave, when participants were 25/26, was also estimated. Even though these latter models were in violation of the PHA, the purpose was to examine the extent to which point estimates and substantive conclusions (i.e., which covariates were significantly associated with entry rate) were in agreement when different end points of the observation period were used. As summarized later in Chapter 6, there was a high degree of consistency between results of the main analyses and sensitivity analyses in both the point estimates and substantive conclusions.

## **Chapter 7: Predictors of College Persistence**

Analyses of college persistence were assessed using logistic regression, in which the likelihood of completing three consecutive non-summer semesters are regressed on covariates measured at baseline, pre-entry characteristics, and institutional characteristics. This analysis included the 331 youth with NSC data.

One potential problem with the regression analysis just described is that the sample is limited to foster youth who entered college. There may be a selection process at play, in that college entrants are a nonrandom subset of the general population of foster youth. Thus, the discrete outcomes of enrolling in college and persisting in college may be correlated because they are influenced by many of the same observed and unobserved characteristics of the youth. Failing to account for unmeasured factors influencing both events could yield biased estimates of predictors of persistence (Angrist & Pischke, 2008). For example, some unmeasured student

characteristics (e.g., motivation to study long hours) may have helped youth to gain admission to highly competitive colleges, and inadequately controlling for student characteristics could have led to an overstatement of the positive effects of college selectivity on persistence.

Probit models with sample selection address endogeneity due to unmeasured confounding by simultaneously modeling the selection equation and the regression equation (Angrist & Pischke, 2008; Bhattacharya, Goldman, & McCaffrey, 2006; Heckman, 1977). The selection equation in this dissertation models the likelihood of entering college, while the regression equation models the likelihood of persisting in college (among entrants). Importantly, the selection equation must contain one or more exogenous covariates—factors that predict the likelihood of entering college but are otherwise independent of the likelihood of persisting in college. The inclusion of exogenous predictors in the selection equation breaks the correlation between the error terms in the selection and regression equations. The expected probabilities for college entry are modeled as predictors in the regression equation. Modeling enrollment and persistence jointly accounts for potential sample bias into college that could arise if enrollment and persistence are modeled separately. Stata's *heckprobit* command is used to model a binary outcome with binary endogenous regressors. Since biprobit selection models are taxing on statistical power and generally require large sample sizes, a carefully selected subset of predictors from the logistic regression analysis were used in this model.

## **Chapter 8: Predictors of College Completion**

### **Two analytic approaches considered but ruled out: Multistate hazard model and generalized mixed model for longitudinal ordinal outcomes**

I initially considered using a longitudinal data analysis model for the analysis of college completion, but after careful consideration, this approach was ruled out. Two of the most

promising types of longitudinal models that were explored included a multistate hazard model (Putter, Fiocco, & Geskus, 2007) and a generalized mixed model for longitudinal ordinal outcomes (Hedeker & Gibbons, 2006).<sup>19</sup> Here I briefly discuss each model and the reasons they were not selected. Multistate hazard models simultaneously run separate hazard models for different outcomes that are related to one another. Like other survival models, the outcome of interest is the timing of the event and how covariates influence the rate at which the event occurs. One of the useful features of multistate hazard models is that covariates can be compared across outcomes. For example, the influence of gender on the rate of completion of postsecondary certificates can be compared with the influence of gender on the rate of completion for two-year degrees. In multistate hazard models, youth could be simultaneously in the risk sets for two or more outcomes, and separate datasets for each outcome must be created. A youth could be in a risk set for one or multiple outcomes, and it is of critical importance to correctly specify which youth are at risk for which outcome or else parameter estimates can be incorrect. Some strengths of the multistate model, in theory, are that it would allow for the inclusion of time-varying covariates into the model; the influence of covariates would be modeled for each outcome separately; the model allows for the possibility of the completion of multiple credentials.

While multistate hazard models have many appealing features, there are critical drawbacks and data limitations that led to the decision to not use this model. The first has to do with correctly specifying the risk sets for the three outcomes. A key problem is that sufficient information was not available to make precise classifications of youth (and more specifically, semesters) into each risk set. For example, some uncertainty arises around not knowing the intentions of students enrolled in two-year colleges. Most of these colleges offer certificate

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<sup>19</sup> Some other models that were explored and ruled out, but not discussed here, include mover-stayer models, competing risk hazard models, and generalized estimating equation models.

programs and associate degree programs, but with the available data it is not possible to tell whether youth are pursuing a certificate, an associate's degree, credit accumulation to transfer to a four-year college, or more than one of these. Since nearly 80 percent of the college entrants in my sample first enrolled in two-year colleges, this is a pervasive issue. Suffice to say, classifying youth into risk sets would involve a good deal of guesswork given the information available, and the results would be dubious at best and misleading at worst. There were other issues with multistate hazard models that are not discussed in detail. For example, since the *time to completing* a credential is the unit of analysis for hazard model outcomes, and since time to completion are by definition very different for the three credentials, it would not have been possible to take advantage of one of the main utilities of multistate models (i.e., comparing covariates' influence on completion rates across different outcomes). The sample size was also prohibitively small for these types of models, and the infrequent occurrences of the outcomes would have likely have led to problems with model convergence.

The second longitudinal model considered to assess degree completion was a mixed model for longitudinal ordinal outcomes. This is an extension of ordinal logistic regression for longitudinal data, which explicitly models the correlation arising from multiple measurements of the same individuals. In this case, the outcome would have been measured as ordered categories, such as no postsecondary credential, certificate, two-year degree, and four-year degree. A main advantage of this approach is the increase in statistical power arising from modeling the credential types as a single outcome. In this model, the outcome would have been measured at multiple time points and lagged time-varying covariates collected during the Midwest Study interviews would have been used to predict the outcomes. The proportional odds assumption (POA) is a key assumption of these models, which states that effects of covariates on moving

from one outcome category to the next highest category is the same for each of the moves (e.g., the effect of gender on going from no credential to certificate/two-year degree/four-year degree is the same as going from no credential/certificate to two-year degree/four-year degree).

Moreover, in the longitudinal context the proportional odds assumption would need to hold for the multiple measurement waves.

There are several major drawbacks to using a mixed model for longitudinal ordinal outcomes as my analytic approach. First, it was highly likely that the proportional odds assumption for the longitudinal model would have been violated. Ordinal regression models were estimated separately for each wave, and the POA was violated in later waves when youth started earning two- and four-year degrees ( $p < .001$ ). Moreover, specialized statistical software (e.g., SuperMix) is needed to test the POA for longitudinal data, since this test is not currently available in most commercial statistical packages. Second, endogeneity would likely have been an issue. For example, consider a participant who entered college soon after wave 1 of the Midwest Study and earned a two-year degree soon after the wave 2 interview. For this participant, his goal was to attain an associate's degree and he did not intend on earning a higher degree (this information is not known to us). However, since he had not yet attained the highest level of educational attainment (i.e., a four-year degree), he would still have been included in the model for wave 4 and wave 5 outcomes. In this case, the associate's degree he earned by wave 3 could have influenced covariates measured at wave 4 (e.g., he started working full-time, he got married and became a parent, and he had avoided economic hardships). In essence, the outcome would have influenced covariates that are used to later predict the outcome. This problem could have distorted parameter estimates. A third issue arising in this model was deciding how to classify youth who attained the highest attainment level (i.e., four-year degree). If they were left in the

model in subsequent waves, the issue of endogeneity just described could have occurred. However, if they were removed then they would have been treated as missing since mixed models do not account for censoring. Fourth, youth entered college at different ages and thus had uneven numbers of pre-college and post-college measurements. For example, a youth who first entered college after wave 4 would have only had information on what happened to them after they entered college from one interview wave. A final notable issue is that, for most youth, covariates were last measured in 2010/2011 and the outcome was measured about four years later in 2015. There was no covariate information for this lengthy time period, and a less-than-ideal strategy would have to have been used to fill in covariates for this wave (e.g., interpolation). Given the serious issues with POA violation and endogeneity, and the additional practical issues, this model was ruled out.

### **Selected analytic approach: Logistic regression using pre-entry and post-entry predictors**

Given these limitations, a simpler but more methodologically defensible approach was adopted to evaluate predictors of college completion. The analytic approach is similar to that used for evaluating college persistence. First, logistic regression will be used to evaluate the expected likelihood of completing a postsecondary degree among youth who enrolled in college and who could be observed for at least six years ( $n = 329$ ). The six year observation period ensures that all youth in the sample had a minimally adequate amount of time to complete a postsecondary credential. Importantly, the age at which youth first enrolled in college was controlled in this analysis, as well as their age at the time of the NSC data draw. The combination of these variables controlled for differences between participants in the amount of time they had to complete a degree.

Predictors in this analysis included baseline characteristics, pre-entry and post-entry factors, and institutional characteristics. Pre-entry and post-entry factors were examined separately and in combination, because each answers slightly different questions. Including only pre-entry factors examines how characteristics and experiences of the youth before entering college (e.g., having a child) affect their eventual likelihood of completing college. Including post-entry factors alone examines how characteristics and experiences of youth after entering college affect college completion, not accounting for their characteristics before entering college. When both pre- and post-entry factors are included, these factors serve as statistical controls for one another and estimate their unique contributions.

As a supplemental analysis to control for selection into college, a probit model with sample selection was used to model the likelihood of entering college among all youth in the first stage ( $n = 732$ ), and the likelihood of completing college among college entrants in the second stage ( $n = 329$ ).

### **Chapter 9: Avoidant Attachment and College Outcomes**

Prior to evaluating the role of avoidant attachment on college outcomes, the psychometric properties of the 11 items used to create the avoidant attachment scale were assessed, including response option distributions and pairwise correlations. Chronbach's alpha was used to assess the degree of internal consistency among the eleven items. Chronbach's alphas of 0.7 or higher indicate acceptable internal reliability, and alphas of 0.8 or higher suggest good internal reliability (Tavakol & Dennick, 2011).

Following the calculation of Chronbach's alpha, results of exploratory factor analysis (EFA) were presented. These analyses were supplemental and proceeded with caution because not all of the original 18 avoidant attachment items were administered. EFA was used to

investigate the latent factor structure of the items. The model proposes that one or more latent factors help to explain some of the shared variance among observed items. In this case, youths' level of avoidant attachment (unobserved) was expected to affect their response choices on the 11 survey items. The variance of each survey item can be explained by a combination of the youths' level of avoidant attachment, and by unexplained variation associated with that particular item (unique factor), and by measurement error (Fabrigar et al., 1999). Desirable factor solutions have characteristics of simple structure—a solution that is conceptually meaningful, is most likely to replicate, explains the data substantially better than simpler alternative models, and performs nearly as well as more complex models (i.e., alternative models with more factors) (Fabrigar & Wegener, 2012; Finch, 2013; Goldberg & Velicer, 2006).

Two important decisions in EFA involved selecting the appropriate number of factors and the selecting an appropriate rotation strategy to fit the data (Fabrigar & Wegener, 2012). I relied on three pieces of information to inform my decision about the number of factors. First, results of the scree test were visually inspected (Cattell, 1966). The scree test plots eigenvalues associated with each factor, and the factor preceding the last sharp decline in eigenvalues indicates the number of factors to retain. Second, I considered Horn's (1965) parallel analysis, which compares eigenvalues generated from random samples of simulated data with the eigenvalues from the observed data. The simulated data parallel the observed data in terms of sample size and number of variables, but the variables are otherwise uncorrelated. Each additional factor from the observed data is retained if the eigenvalue for that factors falls outside of a specified percentile range (e.g., 95th percentile) of the eigenvalue from the randomly drawn data. Third, Velicer's (1976) Minimum Average Partial test (MAP test) is a variation of principal component analysis. After the first principal component and its associated items are partialed out, the average squared

off-diagonal correlation is computed for the subsequent correlation matrix. This process is repeated and an average squared correlation is computed for  $k - 1$  components, where  $k$  is the number of variables. After this process is completed, the component solution with the lowest average squared correlation value indicates the number of factors to retain. Simulation studies have shown that the parallel analysis and MAP test perform better in accurately identifying the correct number of factors than tests that have been historically used to inform factor selection (e.g., Kaiser criterion, scree plots) (Eaton, Velicer, & Fava, 2000; Peres-Neto, Jackson, & Somers, 2005; Zwick & Velicer, 1986).

After the number of factors is selected, a decision was made about the choice of factor rotation. Orthogonal rotation does not allow common factors to correlate when estimating parameters in EFA analyses, while oblique rotation does permit common factors to be correlated (Fabrigar & Wegener, 2012). I ran an EFA model with oblique rotation to examine the correlation coefficients of the common factors. If it was found that a nontrivial correlation is present, oblique rotation would be used.

As explained in the previous chapter, avoidant attachment was not expected to predict college entry, but it was expected to be negatively associated with college persistence and completion. Logistic regression was used to assess avoidant attachment's relationship to persistence, credential completion, and degree completion. The covariates for these analyses included baseline factors suspected of confounding the relationships between avoidant attachment and the college outcome. With the exception of age of college entry and college selectivity, only baseline covariates were included in the models as controls so that temporal ordering was maintained. For example, avoidant attachment may have influenced pre-entry and

post-entry factors, which in turn influenced youths' college outcomes. In this case, the pre-entry and post-entry factors would have been a mediator rather than a potential confounder.

Once a full model was constructed for avoidant attachment, measures of pre-entry social support and post-entry social support were added to the model to assess the extent to which social support mediated the relationship between avoidant attachment and the college outcome.

An important decision involved the manner in which the two measures of insecure attachment (avoidance and anxiety) were investigated. The central research question concerning attachment was whether youth higher in avoidant attachment would be less likely than youth lower in avoidant attachment to persist in and finish college. When anxious attachment is also included in the model, there is a substantive shift in the meaning of the results. The results no longer assess whether higher levels of avoidant attachment predicts the outcome, but rather whether avoidant attachment predicts the outcome given that youth are the same in terms of their level of anxious attachment. While the latter analysis parses out the unique contribution of each dimension of attachment, it could also mask meaningful relationships with the outcome. This is particularly true if avoidance and anxiety are moderately or highly correlated with one another and with the outcome. The following modeling approach was used. First, results from the stepwise regression models were presented for avoidant attachment. Next, results from same models investigating anxious attachment were briefly summarized. Finally, results of models that included both measures were summarized. The interaction of avoidant attachment and anxious attachment was also considered, which tested whether being high in both types of attachment had a particularly deleterious effect on college persistence and completion.

## **Chapter 10: Extended Foster Care and College Outcomes**

The final analytic chapter evaluated the extended foster care policy. Logistic regression analyses from previous chapters were repeated [i.e., baseline predictors of college entry ( $n = 732$ ); baseline and pre-entry predictors of college persistence ( $n = 331$ ); and baseline, pre-entry, and post-entry predictors of college completion ( $n = 329$ )]. In these models, the variable for year in care beyond youths' 18<sup>th</sup> birthdays were included in the models. One problem with these regression analyses is that they may inadequately address possible selection effects. Since participation in extended foster care is not the result of a random process, there may be characteristics of the youth that make them more likely to remain in care and to succeed in college that were not measured or that were inadequately controlled for in the regression models. Failure to account for these factors can yield biased, and possibly overstated, estimates of the effect of EFC on college outcomes.

Similar to a previous analysis that evaluated extended care and educational outcomes using Midwest Study data, state was used as an instrument (Courtney & Hook, 2017). The use of instrumental variables (IV) is an econometric approach to estimate causal effects in the presence of endogeneity (Greene, 2011). An IV is a variable that is associated with the outcome (e.g., enrollment) *only* through its relationship with the treatment (i.e., months in care past the 18<sup>th</sup> birthday). That is, the state in which foster youth live is presumed to have a strong influence on youths' expected likelihood of spending more time in care past age 18 (which influences college outcomes), but is otherwise unrelated to college outcomes. The classic instrumental variable model is a two-stage least square (2SLS) procedure, using ordinary least squares (OLS) estimation in both models. The first stage models the treatment mechanism, which involves regressing treatment on the IV and other exogenous predictors. In the second stage, the continuous outcome of interest is regressed on the fitted values obtained from the first stage, as

well as the exogenous predictors. The coefficient in the second stage model attached to the fitted values represents the estimated treatment effect. While some scholars argue that using 2SLS estimation is still viable and substantively meaningful for non-continuous outcomes (e.g., Amemiya, 1990; Angrist, 2001), alternative models have been developed to handle analyses with limited dependent variables (Bhattacharya, Goldman, & McCaffrey, 2006). In this dissertation, the endogenous treatment variable is continuous (number of days in care past the 18<sup>th</sup> birthday) while the outcome of interest is binary (e.g., enrolled in college vs. did not enroll).

There are five main assumptions of instrumental variable models (Angrist, Imbens, & Rubin, 1996; Bielby, House, Flaster, & DesJardins, 2013). The first is the exclusion restriction, which states that the instrument is related to the outcome only through its relationship to the treatment. It may be the case that state is related to foster youths' college outcomes in a way other than its effect on EFC. The second assumption is that the instrument has a strong, measurable effect on the treatment. In the Midwest Study, the average number of years in care past age 18 is more than two years for Illinois youth than for youth in the other two states ( $p <.001$ ). The third is the stable unit treatment value assumption (SUTVA), which states that the influence of the treatment is consistent for all individuals (e.g., it is not administered differently) and that treated individuals do not influence one another (i.e., no spillover effects). Foster care is a state-administered (rather than a county-administered) in Illinois, which likely helps to systematize the administration of extended care. But as past research by Peters (2012) has shown, much of the variability in EFC participation stems from activities at the local level (e.g., courts and advocates). Thus, for this analysis I run sensitivity analyses of the IV model, with county groups as the instrument. The five county groups included: Cook County, IL; rural counties in IL; urban counties in IL; WI; IA). The fourth assumption is random assignment of the

instrument. This appears to be upheld since youth likely had little influence on the state in which they lived. The final assumption is monotonicity, which states that the instrument has a unidirectional effect on receipt of treatment. In this analysis, a violation of this assumption would be youth who somehow spend *less time* in care past age 18 when residing in a state that has an EFC law than in states with no law.

To the extent to which these assumptions are met, IV models yield local average treatment effects (LATE). As Angrist and colleagues (1996) distinguished, individuals can be classified into four groups based on how their participation in treatment is related to the instrument: always-takers (i.e., youth who always stay in care past 18 regardless of the state they reside in), never-takers (i.e., youth who never stay in care past age 18 regardless of the state they reside in), compliers (i.e., youth who would spend more time in EFC in states that had an EFC law than in states that did not have a law), and defiers (i.e., the group described above who counterintuitively spend less time in EFC when residing in a state with an EFC law). Since always-takers and never-takers are unaffected by the instrument, the LATE estimated in an IV model does not apply to them. LATE estimates apply to compliers—youth who spend more time in care when it's available through state law than they would if EFC was not available, and vice versa. The extent to which there are defiers present in the sample diminishes the estimated LATE, because they act in a way that is opposite of the expected treatment effect.

Since IV models require large sample sizes and since they reduce statistical power, the IV models included a small set of highly relevant controls). After excluding deceased youth and youth who could not be observed for an adequate amount of time, the sample sizes for the analyses of college persistence ( $n = 331$ ) and college completion ( $n = 329$ ) were prohibitively small.

## **Variable Construction Issues and Decisions: Pre-Entry and Post-Entry Factors Measured at Multiple Waves**

Several pre-entry and post-entry predictors were presented earlier in the chapter. In order to create the pre-entry and post-entry covariates, data were used from the five waves of the Midwest Study, and decisions had to be made to address some of the limitations of the timing and measurement of the covariates. This section describes the issues and the decision rules.

The pre-entry measures capture the occurrence of an event (e.g., the participant had a child) or features of youth characteristics (e.g., delinquency score) prior to enrollment in college. Post-entry measures captured events and characteristics after they entered in college but before they graduated (or were no longer observed).

There were two issues that had to be considered and addressed when constructing pre- and post-entry measures. The first issue pertained to the dealing with *uncertainty around the timing* of covariate and outcome measurements. In an ideal situation, exact dates would have been available for all youth and for all college events (i.e., the date they first entered college and the date they completed college), and exact dates or date ranges would be available for the covariates (e.g., date youth had a child, period of time youth experienced a mental health problem). This would have yielded a high degree of precision around the timing of the covariates in relation to the dates youth entered college and completed college. As stated earlier, exact dates of college events are available for more than four-fifths of college attendees, but dates had to be estimated for the remaining youth.

The second issue pertained to differences in the *measurement and nature of the constructs captured in the pre- and post-entry covariates*. Some of these covariates were events with a specific start date (e.g., getting married, becoming a parent), and months and years of

these events were obtained during Midwest Study interviews. Other covariates captured constructs that occur over a period of time, and that were captured by items that asked about occurrences over a specified time period (e.g., experience of food insecurity over the past 12 months, mental health problems since the last interview). Still other covariates captured constructs that endure over time and that were measured at a point in time (e.g., amount of social support at the time of the interview). As discussed below, different strategies were used to estimate the timing of these covariates in relation to college entry and graduation.

The following strategy was used to create pre- and post-entry variables. The time span from the date of the first Midwest Study interview just before summer 2002 to the date of the NSC data draw in May 2015 were divided into college semesters (fall, spring, and summer), beginning with fall 2002 and ending with spring 2015. There were 41 semesters in total. For college entrants, the semester was identified when they first entered college, as was the semester they graduated (if applicable). The semesters before they enrolled in college were pre-entry semesters, and the semesters from the time they entered to the time they graduated from college were post-entry semesters. Data from the five waves of the Midwest Study were then mapped on to these semesters and used to create covariates for each semester.

As summarized in Table 2, three different approaches were used to fill in data for each semester. The three techniques corresponded to the three types of constructs described above (i.e., events with specific dates, phenomena that occur over time whose occurrence was measured in a specific time frame, and phenomena that occur over time that was measured at a point in time). The first were events with specific start and/or end dates. Dates for the beginning and end of youths' marriages were used to specify the semesters in which they were married.

Since specific dates of births for youths' children were also available, the semester in which youth were parents could be identified with high precision.

For the second type of variables, which included phenomena measured for a time period before the interview wave (e.g., since last interview), all of the semesters between the previous interview and the current interview were inputted with the value collected during the current interview. For example, if at wave 3 a youth indicated that they had experienced a mental health problem since the last interview wave, all of the semesters between wave 2 and wave 3 were marked with a positive screen for mental health.

The third type of variables included constructs that were likely durable over a period of time (e.g., social support, educational aspirations) and that were measured at the time of the interview. For these covariates, a "bubble" approach was used for filling in semesters surrounding the current interview. First, the median semester between a youth's current interview and previous interview was identified. Next, the median semester between the youth's current interview and subsequent interview was identified. This identified semesters halfway to the previous interview and halfway to the next interview, essentially creating a "bubble" around the current interview. Finally, the data collected during the current interview (e.g., educational aspirations) was inputted into the semesters in the bubble around the current interview.

In summary, the three strategies just described (specific dates, backlogging, and bubble) filled in data for each of the semesters between fall 2002 and spring 2015. This 41-semester dataset was used for the survival analysis of pre-entry predictors on the timing of college entry. To create pre-entry variables, all of the semesters before youth entered college were identified. For specific events/occurrences that were binary (e.g., becoming a parent, experiencing a mental health problem), indicator variables were created if youth ever experienced the

event/phenomenon prior to entering college. For the continuous measures (e.g., delinquency score, social support score), the average score was calculated. For the ordered categorical variables (e.g., educational aspirations), the youths' highest aspirations during the pre-entry semesters were identified. Similar procedures were used to create post-entry variables, which covered the time period between the semester of first enrollment to the semester of graduation. This procedure resulted in a single pre-entry and single post-entry variable for each covariate for each youth.

*Table 2. Variable Creation Strategies for Pre-Entry and Post-Entry Covariates*

<b>Nature of construct</b>	<b>Measurement of the variable</b>	<b>Variable creation approach</b>	<b>Variables</b>
Specific event with start and/or end date	Specific dates (month and year) were collected during the interview	Can identify the start/end date for the event	Parental status Marital status
Status, experience, or characteristic that endures over time	Constructs measured at the time of the interview for a specified time period prior to the interview (i.e., past 12 months, since last interview).	Backlogging. Data collected during the current interview was backlogged into semester since the previous interview	Mental health problem Alcohol/Substance use problem Delinquency score Economic hardship Food insecurity
Status, experience, or characteristic that endures over time	Measured at a point in time (i.e., at the time of the interview).	“Bubble” approach. Data collected during the current interview was inputted in time period halfway to the previous interview and halfway to the next interview.	Social support Educational aspirations Employment status

### **Approach to Address Missing Data**

Given missing values due to missed interview waves, missing response to survey items, and missing institutional-level data for the 71 college not reported in the NSC records, a principled approach to address missing data was necessary. Data missing on individual items was small, typically below 5 percent. Missingness due to skipped survey waves and to no institutional

data was larger. A first step utilized to address missingness was to exploit data collected across survey waves. For example, if a youth did not participate in interview waves 3 and 4, but indicated at wave 5 that they were not a parent, then information on parental status was filled in for waves 3 and 4. After data recovery steps were taken, multiple imputation by chained equations was used to address the remaining missing data (Azur, Stuart, Frangakis, & Leaf, 2011; White, Royston & Wood, 2010). Multiple imputation draws on the distribution of observed data to fill in missing data by estimating a set of plausible values. These values are estimated by a series of iterative regression analyses, in which each covariate with missing values is regressed on all of the variables in the analytic model along with auxiliary covariates used to augment the prediction of plausible values. This process results in the creation of a single dataset, which contains both the observed values and imputed values. However, a single imputed dataset is inadequate. The imputed values would be treated with more precision than is truly the case (i.e., as if they had been observed), rather than being treated as estimates drawn from a distribution of the variables. Analysis of a single imputed dataset fails to account for the uncertainty of the estimation of the plausible values, and standard errors are often too small, which can lead to incorrect conclusions from hypothesis tests (Donders et al., 2006). Thus, the imputation process is repeated, generating multiple imputed datasets with different sets of estimated plausible values. For the main analysis, the multiple datasets are analyzed separately and results combined into a single set of parameter estimates using rules specified by Rubin (1986). The data combination process is automated in Stata.

Multiple imputation is based on the assumption that data are missing at random (MAR), which means that the probability that a value is missing depends on information that is observed, and not on information that is absent from the available data. To the extent that missing data are

MAR, multiple imputation far surpasses other whole case analysis and other imputation methods in yielding results that are unbiased (Donders et al., 2006).<sup>20</sup> Multiple imputation also preserves statistical power, since cases with missing data are not dropped from the analyses. In the analysis of college entry with the full sample ( $n = 732$ ), about 33 percent of the sample was missing data on one or more variables. Following White and colleagues (2011), who suggest that the number of imputations should be at least equal to the percentage of cases that are incomplete, 40 imputed datasets were created for the dissertation analyses. Checks were performed to ensure both that the imputed values were reasonable (e.g., no extreme outliers) and that the distributions of the imputed values were similar to the distributions of the observed values for each variable (Eddings & Marchenko, 2012; White, Royston, & Wood, 2011).

### **Summary of Limitations**

This chapter closes with a brief summary of major limitations of this dissertation. The limitations are as follows:

- Since few youth had earned college certificates, two-year degrees, and four-year degrees, the ability to examine these measures of attainment as separate outcomes was limited. There may be substantive differences in the predictors of each outcome.
- NSC data provided information on students' enrollment status, but it did not provide more detailed information on their progress through college. For example, it was not known how many youth had to take remedial coursework upon entering college or the how many youth actually made it to college-level courses that count toward graduation. It

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<sup>20</sup> The MAR assumption cannot be directly tested since unobserved information related to the missing values has by definition not been observed.

was also not possible to assess the number of courses students attempted, the number of credits they completed, and their college GPA.

- Information on the kinds and amounts of financial aid students received was not available. Given the economic hardships these youth were vulnerable to experiencing in combination with the rising cost of college over the study period, financial aid is important to investigate in its own right but also as a potential confounder for other variables in the model.
- It was not possible to test the specific mechanisms of the relationship between avoidant attachment and college outcomes.
- Measures were also not available to examine aspects of students' connectedness to the academic and social arenas of their college. These are important to understand in their own right as predictors of college outcomes, but they are also important to evaluate alongside other factors that are hypothesized to exert strong influence on foster youths' college success (e.g., needing to work, economic hardship).
- Although a systematic approach was adopted to create pre-and post-entry covariates that appropriately measured around college entry and completion, there was still some uncertainty around the timing of events.
- Youth were not randomly assigned to extended foster care, and the analyses of its impact could have been influenced by unmeasured confounding, particularly in the analyses of persistence and completion when rigorous econometric analyses are not feasible.

## DESCRIPTIVE STATISTICS OF THE SAMPLE AND OUTCOMES

This chapter presents descriptive statistics of the sample, as well as summary statistics on the three college outcomes investigated in this dissertation. The chapter closes with a comparison of Midwest Study participants and low-income first-generation students on rates of college persistence and completion.

Some variables investigated in this chapter are missing data for a nontrivial proportion of respondents. The descriptive statistics for complete cases are presented in the tables, and point estimates from the multiple imputation (MI) model are presented in table notes for variables with more than 10 percent missing data.

### Baseline Characteristics of the Sample

Table 3 provides descriptive statistics on characteristics of the entire Midwest Study sample ( $n = 732$ ) measured during the wave 1 interview. Additionally, the right panel compares youth who did not enroll in college ( $n = 330$ ) with youth who attended college ( $n = 402$ ). The sample was about evenly split between males and females, and the majority of the youth were African American or White. The average age of study participants was just under 18 years old (*median* = 17.9), and about two-third were in foster care in Illinois. Several measures give us a sense of the academic standing and history of the participants. The highest completed grade for over a third of the sample was 10<sup>th</sup> grade or less. On average, participants were over three-quarters of a standard deviation below same-aged peers on their reading level measured by the WRAT. Although not shown in the table, on a five-point GPA scale, the average GPA in math and English for youths' most recent marking period was 2.47 ( $SD = .88$ ), or about a C+.<sup>21</sup> GPA

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<sup>21</sup> The average GPA after MI was the same as the GPA of complete cases (2.47).

tertiles are presented in the table. About three-quarters of the youth aspired to earn a college degree or more, while the other quarter indicated that they aspired to not finish high school, earn a high school credential, or complete just some college. Nontrivial proportions of youth encountered difficulties in school. Over one-third reported being held back a grade, about one-sixth had been expelled from school, and nearly half said that they had ever been in a special education classroom. In terms of the four college preparatory activities, youth reported partaking in an average of less than one activity (*median* = 0).

Several additional measures described participants' foster care histories and experiences with maltreatment. On average, youth had been in just under six foster care placements (*median* = 4). About two-in-five youth had ever been placed in a group home or residential treatment center. Participants experienced a little under three school changes due to a foster care-related reason or a family move (*median* = 3). Of the 18 specific instances of neglect, physical abuse, and sexual abuse, youth reported experiencing an average of 3.2 different instances (*SD* = 3.7, *median* = 2). Youth were classified into tertiles based on the number of types of maltreatment incidents they reported.

The bottom part of Table 3 presents characteristics of the youth that could promote or hinder college outcomes. About one-in-seven youth had a living child at the time of their interview. On a scale from 0 to 4, the average social support score was 2.9 (*median* = 3.1), corresponding with the response option of feeling supported "most of the time" across different types of support. Nearly three-quarters of youth had ever worked for pay. Delinquency scores could range from 0 to 2, with 0 indicating that youth did not engage in any of the 10 delinquent behaviors in the past 12 months and 2 indicating that they engaged in all 12 behaviors five or more times in the past year. The average delinquency score was about .5 (*median* = .30),

indicating that on average youth engaged in the 10 delinquent behaviors between “never” and “1 or 2 times” in the past 12 months. Over two-thirds of participants had a mental health problem, as indicated by symptoms of depression or PTSD, or having received pharmacological, therapeutic, or in-patient care for psychological problems in the past year. About one-quarter of youth had an alcohol or substance use problem as indicated by symptoms of an alcohol/substance use disorder or receipt of treatment for these problems in the past year.

The right panel of Table 3 reports baseline characteristics for youth who did and did not attend college. P-values are reported when statistically significant differences were present. Compared to participants who did not go college, college entrants were more likely to be female, to have completed more schooling by the baseline interview, to score higher on the reading assessment, to have higher aspirations for college, to have participated in educational preparatory activities, and to have ever worked for pay. Conversely, college entrants were less likely than their counterparts to have repeated a grade, to have been expelled, to have been placed in a special education classroom, to have ever been placed in a congregate care placement, to have engaged in delinquent behaviors, and to have an alcohol/substance use problem. College enrolled youth also spent more time in extended care than did youth who did not enter college. These associations are the bases of predictors of college entry, which will be explored in the next chapter.

*Table 3. Baseline Characteristics of Sample (n = 732)*

	All Youth (n = 732)	College Enrollment Status		p
		Not Enrolled (n = 330)	Enrolled (n = 402)	
<b>Demographic Characteristics</b>				
Male (%)	48.5	56.4	42.0	<.001
Race/ethnicity (%)				n.s.

*Table 3, continued*

White	28.8	29.1	28.6	
African American	55.3	55.8	55.0	
Hispanic	8.6	8.2	9.0	
Other race	7.2	7.0	7.5	
Age at baseline interview (Mean/SD)	17.9 (.4)	17.9 (.4)	17.9 (.4)	n.s.
State (%)				
Illinois	64.8	63.0	66.2	n.s.
Wisconsin	26.6	28.8	24.9	
Iowa	8.6	8.2	9.0	
<b>Academic History</b>				
Highest completed grade (%)				<.001
10 <sup>th</sup> grade or lower	35.6	46.8	26.4	
11 <sup>th</sup> grade	52.6	45.6	58.4	
12 <sup>th</sup> grade	11.8	7.7	15.2	
Reading level, standardized (Mean/SD)	-.83 (1.18)	-1.17 (1.21)	-.56 (1.08)	<.001
High school math and English grades (%) <sup>a</sup>				n.s.
Bottom tertile	32.8	36.9	32.7	
Middle tertile	34.0	33.1	34.0	
Top tertile	33.2	30.0	33.2	
Education aspirations (%)				<.001
High school credential or less	12.1	18.9	6.6	
Some college	14.2	18.3	10.8	
College degree or more	73.8	62.9	82.6	
Ever repeated a grade (%)	37.4	46.8	29.7	<.001
Ever expelled (%)	16.6	22.0	12.3	<.001
Ever in special education (%)	47.5	55.9	40.6	<.001
Number of college prep. activities (Mean/SD)	.88 (1.23)	.71 (1.09)	1.02 (1.23)	<.001
<b>Foster Care Characteristics</b>				
Number of foster care placements (Mean/SD)	5.8 (5.8)	6.0 (5.8)	5.6 (5.8)	n.s.
Ever in congregate care (%)	59.9	66.0	55.0	.003
Number of school changes (Mean/SD)	2.8 (2.0)	2.81 (1.94)	2.70 (1.99)	n.s.
Maltreatment instances (%)				n.s.
Bottom tertile	26.6	28.0	25.5	
Middle tertile	39.9	42.4	37.9	
Top tertile	33.5	29.6	36.6	
Years in care past age 18 (Mean/SD)	1.5 (1.4)	1.32 (1.37)	1.67 (1.37)	<.001
<b>Risk and Promotive Factors</b>				
Parental status (%)	14.1	14.9	13.3	n.s.

*Table 3, continued*

Social support (Mean/SD)	2.93 (.91)	2.90 (.91)	2.95 (.91)	n.s.
Ever worked for pay (%)	73.6	65.4	80.4	<.001
Delinquency score (Mean/SD)	.46 (.46)	.55 (.49)	.39 (.43)	<.001
Mental health problem (%)	68.7	68.6	68.8	n.s.
Alcohol/substance use problem (%)	25.0	32.0	19.3	<.001

<sup>a</sup> Missing more than 10%. MI estimates are: bottom tertile (34.0%), middle tertile (33.4%), and top tertile (32.6%).

### **Reading Proficiency and Types of Colleges Attended**

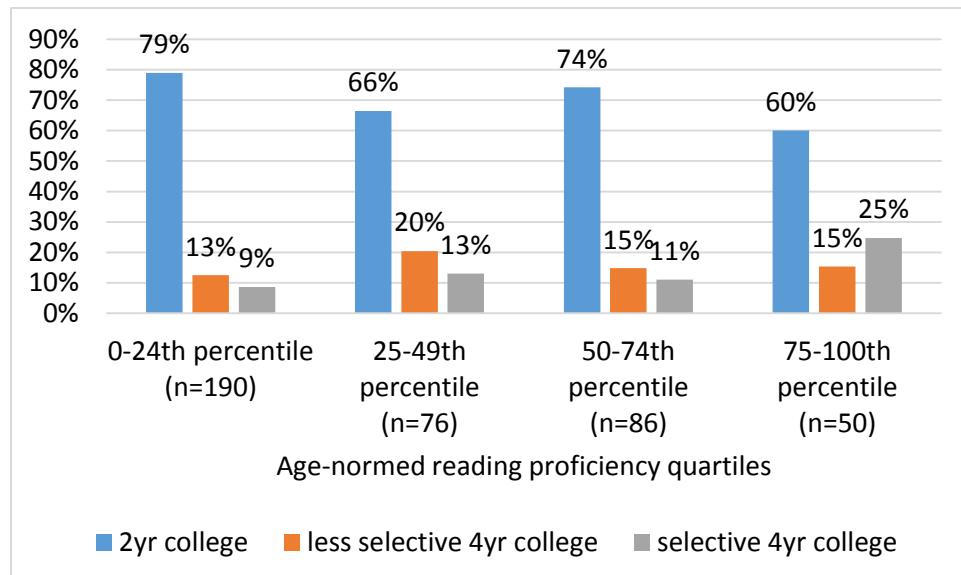
College match, which is a measure of whether students enroll in colleges that align with their academic qualifications, is an important predictor of later college outcomes. College match is typically calculated from a formula using students' cumulative high school GPA, ACT/SAT test scores, and enrollment in advanced coursework in high school. These data were not available in the current study. However, to gauge the extent to which foster youth in this study enrolled in colleges that aligned with their academic proficiency, age-normed test scores on the reading proficiency test are used as a proxy.

Figure 1 displays the types of colleges youth at different reading levels first attended. About 47 percent of youth were well below the average reading level for their age (bottom quartile), 19 percent were below the average reading level (bottom middle quartile), 21 percent were at or above the average reading level (top middle quartile), and 12 percent were well above the average reading level. Among youth in the bottom quartile, about 90 percent attended a two-year college or less selective four-year college, which was comparable to the proportion of youth in the bottom middle quartile who attended these institutions. Two-year and less selective four-year colleges may be an appropriate match for these students, given that these institutions generally have open enrollment policies or admit 85 percent or more of applicants. What is

interesting is that about 7 percent of college entrants who were in the bottom two reading quartiles gained admission to colleges in the selective category.

Among youth reading at or above the average reading level for their age (top middle and top quartiles), most attended two-year colleges. Only one-quarter of youth in the top reading quartile attended selective four-year colleges. As a rough estimation of undermatching, we assume that youth in the third and fourth quartiles could have gained admission selective four-year colleges, and youth in these quartiles who entered colleges below these levels were undermatched. This is reasonable since the lowest level of colleges included in the “selective/highly selective” category were four-year colleges that admitted freshman in the top 50 to 65 percent of their class that earned mostly B- grades (with some Cs). Using these criteria, about 32 percent of all college entrants were undermatched. When interpreting this finding, it is important to be mindful of the limited information available on youths’ academic performance. Thus, these estimates of college match are best interpreted as rough estimates.

*Figure 1. College type/selectivity of first college, by age-normed reading proficiency quartile (n=402)*



## Pre-Entry and Post-Entry Characteristics of College Entrants

Next we shift from the entire sample to just youth who had enrolled in college. Table 4 presents characteristics and circumstances of youth during the time prior to enrolling in college (middle column) and the time after enrolling in college (right column). As displayed in the top of the table, most youth completed their high school credential when they were about 19 years old (*median* = 18.8). The average when participants first entered college was about 20 ½ years of age (*median* = 19.8). In terms of educational aspirations prior to entering college, the majority of youth planned on earning a college degree or continuing in college after completing a degree. Aspirations were slightly higher in the post-entry period. About one-fifth of youth were parents upon entering college, and nearly two-thirds were parents sometime after enrolling in school and before earning a credential. Few youth were married prior to entering college but about one-in-five were married after enrolling. Pre- and post-entry measures of social support were similar. In terms of employment experience, less than half of youth had worked at a job for 20 or more hours per week before enrolling, but much larger proportions of youth worked in jobs with long hours at some point after entering college. Consistent with normative trends in delinquent behaviors, youths' delinquency scores dropped appreciably in the post-entry period.

Pre- and post-entry prevalence rates of mental health problems were high, reaching over three-quarters for each period. The prevalence rates of alcohol and substance use problems was about 30 percent prior to entering college and about 50 percent in the time after entering college. Past research indicates that the prevalence rates of behavioral health disorders such as depression substance use disorders among foster youth generally decline from adolescence to young adulthood (Brown, Courtney, & McMillen, 2015). One explanation we may see the opposite

trend in these data has to do with the fact that the post-entry time frame for when youth could have experienced a behavioral health problem is larger than the pre-entry time frame.

The final two pre- and post-entry measures are intended to gauge financial hardships. Economic hardships and food insecurity were relatively uncommon for youth prior to entering college, but were each experienced by the majority of youth sometime after enrolling in college and before completing a credential.

*Table 4. Pre-Entry and Post-Entry Characteristics of College Entrants*

<b>Age variables</b>	Pre-Entry	Post-Entry
Age completed secondary credential (n = 602)	19.1 (1.6)	N/A
Age first entered college (n = 402)	20.7 (2.9)	N/A
<b>Characteristics (n = 373)<sup>a</sup></b>		
Education aspirations (%)		
Some college	7.5	3.9
College degree	50.0	38.8
More than college degree	42.5	57.3
Parental status (%)	26.1	65.0 <sup>e</sup>
Married (%)	4.0	21.0 <sup>f</sup>
Social support (Mean/SD)	2.9 (.9)	2.8 (.9)
Employment (%)		
Not employed	44.7	23.7
Employed 1-19 hrs/week	8.7	3.1
Employed 20-34 hrs/week	23.7	14.3
Employed 35+ hrs/week	22.9	58.9
Delinquency score (Mean/SD)	.42 (.34)	.16 (.26)
Mental health problem (%)	76.2	79.7 <sup>g</sup>
Alcohol/substance use problem (%)	29.0 <sup>b</sup>	50.8 <sup>h</sup>
Economic hardship (Mean)	.93 (1.27) <sup>c</sup>	2.46 (1.79) <sup>i</sup>
Food insecurity (%)	19.6 <sup>d</sup>	56.7 <sup>j</sup>

<sup>a</sup> Includes youth who first enrolled in college before Wave 5 of the Midwest Study. The other 29 youth who enrolled in college do not have post-entry measurements and are excluded from the table.

<sup>b</sup> Missing more than 10%. MI estimate is 30.0%.

<sup>c</sup> Missing more than 10%. MI estimate is 1.11.

<sup>d</sup> Missing more than 10%. MI estimate is 24.4%.

<sup>e</sup> Missing more than 10%. MI estimate is 60.2%

<sup>f</sup> Missing more than 10%. MI estimate is 24.1%.

<sup>g</sup> Missing more than 10%. MI estimates is 73.5%.

<sup>h</sup> Missing more than 10%. MI estimate is 46.4%.

<sup>i</sup> Missing more than 10%. MI estimate is 3.11.

<sup>j</sup> Missing more than 10%. MI estimate is 56.6%.

## **Institutional Characteristics**

Table 5 presents characteristics of the higher education institutions attended by Midwest Study participants. The middle column pertains to the first college that youth attended, and the right column pertains to the college in which youth spent the most amount of time. Since the statistics are similar, only characteristics of the first college will be reviewed. It is important to note that, beginning with institutional size, data presented in the tables are only available for youth in the NSC records ( $n = 331$ ).<sup>22</sup> Information about the specific college(s) that youth attended were not available for the 71 youth who were identified via self-report in Midwest Study interviews, and thus are missing on these items. However, MI estimates reported in notes below Table 5 were consistently within a few percentage points of the observed proportions. MI estimates of college expenditures were generally higher by a few hundred dollars relative to the observed expenditures.

From the NSC records, Midwest Study participants attended 182 different colleges over the course of their college careers.<sup>23</sup> In terms of the first institution, participants attended 113 different colleges. As displayed in Table 5, the majority of youth in the sample first attended a two-year college. Fewer than one in ten youth entered a four-year college that was selective or highly selective. Most youth attended institutions with a large undergraduate student body. The average proportion of part-time students across institutions attended by foster youth was just

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<sup>22</sup> College students identified by self-report in Midwest Study interviews did report whether they attended a two-year college or four-year college. For youth who only attended two-year colleges, this information was included in the Selectivity data reported in the table. For youth who attended a four-year college, their data is missing in the table because it is not possible to tell whether the institution was nonselective/minimally selective or selective/highly selective. Information that they attended a four-year college was, however, used as auxiliary information during MI to improve the accuracy of the imputed values for institutional characteristics.

<sup>23</sup> For colleges with multiple campuses (e.g., UW-Madison, UW-Milwaukee), each campus is counted separately.

over 50 percent, and the average proportion of low-income students was about 33 percent. The average cost of attendance for in-state students was about \$4700. Schools spent most on instruction, followed by student support services and academic support services. Slightly more than half of first-time students attending on a full-time basis re-enrolled at the same institution in the following fall.

Although not displayed in the table below, most youth in the NSC sample first attended a public college (81.0%) followed by a private for-profit college (13.9%) and private non-profit college (5.1%). Proportions were similar for the most-attended college (82.8% vs. 12.4% vs. 4.8%).<sup>24</sup>

*Table 5. Institutional Characteristics of Colleges Attended (n = 402)<sup>25</sup>*

	First college	Most Attended College
College type/selectivity (%)		
Two-year college	75.9	73.1
Nonselective/minimally selective four-year college	14.8	15.4
Selective/highly selective four-year college	9.8	11.5
Size (%)		
Less than 2500	12.4 <sup>a</sup>	11.6 <sup>i</sup>
2501 to 5000	12.4 <sup>a</sup>	11.3 <sup>i</sup>
5001 to 10,000	31.8 <sup>a</sup>	33.5 <sup>i</sup>
More than 10,000	43.5 <sup>a</sup>	43.6 <sup>i</sup>

<sup>24</sup> Multiple imputation estimates are not provided for college sector because the MI model would not converge when including this variable due to sparse data. Additionally, college sector did not significantly predict the odds of persistence or credential completion. This was true for both the first-attended and most-attended versions.

<sup>25</sup> Note that statistics in the table pertain to the number of youth ( $n = 402$ ), not the number of institutions. For example, if three students attended the same college around the same time, information on this institution was counted three times in calculating the averages reported in the table. Thus, statistics in the table can be thought of as weighted averages, which gives more weight to colleges that foster youth commonly attend. This approach was used rather than simply calculating statistics for the institutions (e.g., each of the 113 first attended colleges would be counted once) because the latter approach could provide a distorted representation of the colleges foster youth attend. For example, selective/highly selective institutions attended by one/few youth would be given the same weight as other institutions attended by several youth. Using the weighted average is consistent with the student view (rather than institutional view) approach described in the Background chapter.

Table 5, continued

Percent part-time students (Mean/SD)	52.8 (20.9) <sup>b</sup>	53.1 (20.3) <sup>j</sup>
Percent low-income students (Mean/SD)	33.2 (21.2) <sup>c</sup>	34.7 (21.0) <sup>k</sup>
In-state tuition cost (Mean/SD)	\$4740 <sup>d</sup> (\$4827)	\$4817 <sup>l</sup> (\$4807)
Expenditures on instruction per FTE (Mean/SD)	\$5147 <sup>e</sup> (\$3177)	\$5526 <sup>m</sup> (\$3434)
Expenditures on academic services per FTE (Mean/SD)	\$725 <sup>f</sup> (\$784)	\$821 <sup>n</sup> (\$1085)
Expenditures on student support services per FTE (Mean/SD)	\$1124 <sup>g</sup> (\$767)	\$1221 <sup>o</sup> (\$833)
Retention rate (Mean/SD)	55.7 (16.2) <sup>h</sup>	56.2 (15.5) <sup>p</sup>

<sup>a</sup> Missing more than 10%. MI estimates are: less than 2500 (15.2%), 2501 to 5000 (10.6%), 5001 to 10,000 (28.0%), and more than 10,000 (46.2%).

<sup>b</sup> Missing more than 10%. MI estimate is 52.8%.

<sup>c</sup> Missing more than 10%. MI estimate is 32.8%.

<sup>d</sup> Missing more than 10%. MI estimate is \$4975.

<sup>e</sup> Missing more than 10%. MI estimate is \$5429.

<sup>f</sup> Missing more than 10%. MI estimate is \$972.

<sup>g</sup> Missing more than 10%. MI estimate is \$1441.

<sup>h</sup> Missing more than 10%. MI estimate is 54.8%.

<sup>i</sup> Missing more than 10%. MI estimates are: less than 2500 (14.1%), 2501 to 5000 (10.0%), 5001 to 10,000 (28.9%), and more than 10,000 (47.0%)

<sup>j</sup> Missing more than 10%. MI estimate is 53.2%.

<sup>k</sup> Missing more than 10%. MI estimate is 35.1%.

<sup>l</sup> Missing more than 10%. MI estimate is \$5052.

<sup>m</sup> Missing more than 10%. MI estimate is \$6083.

<sup>n</sup> Missing more than 10%. MI estimate is \$979.

<sup>o</sup> Missing more than 10%. MI estimate is \$1507.

<sup>p</sup> Missing more than 10%. MI estimate is 55.4%.

## College Enrollment Trends

Having reviewed characteristics of the institutions that participants attended, we now examine aspects of their enrollment in college. This section of the chapter exploits semester-by-semester information provided by NSC records to dig into college enrollment trends of foster youth. Table 6 presents aggregate enrollment trends of participants appearing in NSC records. Over the course of their college careers, about half of the youth attended just one college. More than one-quarter of youth attended two different colleges, and one-fifth attended three or more colleges. On average, youth attempted about six semesters of college and completed about five

semesters.<sup>26</sup> Of all of the semesters attempted, youth completed 86 percent of the semesters. However, students who enrolled for many semesters are overrepresented in this statistic. For example, when looking at just the first semester, the completion rate is lower (80.5%). Among students who dropped out during the first semester, 25 percent never returned to college, while 75 percent returned at a later time.

Although there were no significant differences by race/ethnicity in the statistics reported in Table 6, there were significant gender differences. Females attended more colleges than males, attempted a greater number of semesters, and completed a greater number of semesters. However, gender differences in the average number of completed semesters is driven by number of semesters attempted. When the proportion of semesters completed among attempted semesters is examined, rates of completion are similar for males and females (1.6 percentage point difference).

*Table 6. College Enrollment Characteristics and Trends of Youth in the NSC Data, Overall and by Gender (n = 331)*

	All	Gender		p
		Male	Female	
Number of colleges attended (%)				.013
One college	52.9	62.9	45.2	
Two colleges	27.5	21.7	31.9	
Three colleges	14.5	10.5	17.6	
Four or more colleges	5.1	4.9	5.3	
Number of semesters attempted (Mean/SD)	5.9 (5.4)	4.8 (4.8)	6.7 (5.7)	.001
Number of semesters completed (Mean/SD)	4.9 (4.9)	4.0 (4.5)	5.7 (5.2)	.002
Completion of semesters (%)				.389
Semesters completed	86.7	85.7	87.3	
Semesters not completed	13.3	14.3	12.7	

<sup>26</sup> Semester “completion” means that youth did not withdraw from college during that semester.

## **Rates of College Persistence and Completion**

The last section of the chapter presents descriptive statistics on the main outcomes of this dissertation. The first panel in Table 7 displays degree completion rates for all Midwest Study participants ( $n = 732$ ). The second panel presents rates of college persistence and completion among youth who ever attended college before the NSC data draw (if identified by NSC records) or the last completed wave of the Midwest Study (if identified by self-report). Since youth who entered college shortly before they were last observed may not have had sufficient time to complete a degree, the third panel presents completion rates for just the youth who could be observed for at least six years after they first enrolled in college ( $n = 329$ ). No significant differences were found by race/ethnicity, but some gender differences were found.

As displayed in the first panel, about 11 percent of participants completed a college credential, and the rate was significantly higher for females than males overall and for specific types of credentials. In terms of the highest credential attained, about 4 percent of young people earned a four-year degree, about 4 percent earned a two-year degree, and a little over 3 percent earned a vocational certificate. Moving to the middle panel comprised of college entrants, we see that just under one-third of students in the NSC records ( $n = 331$ ) persisted through their first three semesters of college. The 7.5 percentage point difference between males and females was not statistically significant. Overall, about one-fifth of college entrants identified by NSC records or self-report ( $n = 402$ ) attained a college credential. Females were more likely than males to have earned a credential, but the differences in types of credentials earned were not significantly different. Among youth who can be observed for at least six years (third panel), rates of persistence and degree attainment are slightly higher, and gender differences follow similar patterns as the differences for all college enrolled youth.

Table 7. Rates of College Persistence and Completion

Outcome	Midwest Study Youth (n = 732)				Youth Enrolled in College (n = 402)				Youth Enrolled in College Observed for 6+ Years (n = 329)			
	All	Gender			All	Gender			All	Gender		
		Male	Female	p		Male	Female	p		Male	Female	p
Persisted first three semesters (%) <sup>a</sup>	N/A	N/A	N/A		30.2	25.9	33.5	.134	33.2	29.9	35.6	.319
Completed any credential (%)	10.9	7.0	14.6	.001	19.9	14.8	23.6	.029	24.2	18.1	28.7	.028
Highest credential completed <sup>27</sup> (%) <sup>b</sup>				.010				.148				.143
None	89.1	93.0	85.4		80.1	85.2	76.4		77.8	81.9	71.4	
Certificate	3.3	2.0	4.5		6.0	4.1	7.3		7.3	5.1	8.9	
Two-year degree	3.7	2.8	4.5		6.7	5.9	7.3		8.2	7.3	8.9	
Four-year degree	4.0	2.3	5.6		7.2	4.3	9.0		8.8	5.8	10.9	

<sup>a</sup> Includes NSC sample (n = 331)

<sup>27</sup> By date of NSC data draw for youth in NSC report (n = 331). By last Midwest Study interview for youth not in NSC report (n = 71).

Table 8 displays the highest credential completed, broken down by the type and selectivity of the first college that students enrolled in. Only about 19 percent of students who first enrolled in two-year colleges completed any credential. Few students used two-year colleges as an onramp to completing a four-year degree; just three percent of students who entered two-year colleges later completed a bachelor's degree. Conversely, we see that some students who initially entered four-year institutions wound up completing a certificate or two-year college degree. This was more common among students who first enrolled in minimally selective four-year colleges than in selective four-year colleges. Indeed, a greater proportion of youth who entered these institutions wound up completing a certificate or two-year degree than a four-year degree. In contrast, students who entered selective and highly selective four-year colleges overwhelming completed four-year degrees. While about 10 percent completed an associate's degree, none completed just a certificate.

*Table 8. Credential Completion by First College Type>Selectivity among Youth Enrolled in College Observed for 6+ Years (n =329)*

	None	Certificate	Associate's degree	Bachelor's degree
	%	%	%	%
Two-year college (n=259)	81.2	8.5	7.3	2.9
Nonselective/less selective four-year (n=32)	66.0	7.3	12.1	14.6
Selective/highly selective four-year (n=38)	53.9	0.0	9.4	36.7

We now compare persistence and completion rates of foster youth to those of low-income first generation college students in the BPS (03/04). For these analyses, BPS students were limited to college students within the same age ranges as Midwest Study participants. The analysis of persistence included youth who first entered college between ages 17 and 29, and the analysis of degree completion included youth who first enrolled in college between ages 17 and

25. Although youth from both samples mostly entered two-year colleges, a greater proportion of BPS students than Midwest Study students attended selective four-year colleges than less selective four-year colleges. BPS students were about 66 percent more likely than Midwest Study students to persist through the first two semesters of college. The difference in college completion rates were even more pronounced. BPS students were about 2.7 times as likely as Midwest Study participants to earn any college credential by six years after first enrolling in college. BPS students were more than twice as likely as foster youth to complete a two-year degree and they were nearly three times as likely to have completed vocational certificates and four-year degrees.

The persistence and graduation rates presented in Table 9 are the unadjusted rates, using just BPS survey weights to account for aspects of the survey design. As a sensitivity analysis, I standardized BPS persistence and degree completion rates so that the gender and race/ethnicity distribution of the BPS sample matched the gender and race/ethnicity distribution of the Midwest Study sample. This standardization changed the college outcomes only slightly for the BPS sample. The two-semester persistence rate dropped less than half of a percentage point to 76.9 percent, and the six-year credential status rates were as follows: no credential (59.3%), certificate (14.6%), two-year degree (10.1%), and four-year degree (16.0%). As an additional check, the BPS estimates were standardized to match the gender and age of first enrollment distributions of the Midwest Study sample.<sup>28</sup> The estimates changed only slightly with this alternate standardization. The persistence rate was 77.1 percent, and the completion rates were as follows:

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<sup>28</sup> For the persistence analysis, the age of first enrollment categories used for standardization included: 19 years old or younger, 20 years old, 21 to 24 years old, and 25 to 29 years old. The degree completion age categories were: 19 years old or younger, 20 years old, and 21 to 24 years old. Age categories were used rather than individual ages due to sparse data. Additionally, it was not possible to standardize on all three demographic characteristics at once (i.e., gender, race/ethnicity, and age of first enrollment) due to sparse data.

no credential (57.2%), certificate (15.8%), two-year degree (10.4%), and four-year degree (16.7%). All differences between Midwest Study and BPS students were significant after standardization ( $p < .001$ ).

*Table 9. College Type>Selectivity, Two-Semester Persistence, and Credential Completion: Foster Youth vs. Low-Income First-Generation Students [BPS (03/04) sample weighted to estimated population of about 660,430 students].*

	Foster care students in Midwest Study	First-generation low-income students in BPS	p
College type/selectivity <sup>a</sup>			<.001
Two-year college	71.3	75.4	
Nonselective/minimally selective four-year college	17.2	7.0	
Selective/highly selective four-year college	11.5	17.6	
Persisted through first two semesters <sup>a</sup> (%)	46.5	77.2	<.001
Completed any postsecondary credential by six years <sup>b</sup> (%)	17.1	43.5	<.001
Highest credential completed by six years <sup>b</sup> (%)			<.001
None	82.9	56.5	
Certificate	5.5	15.8	
Two-year degree	4.6	10.3	
Four-year degree	7.0	17.4	

<sup>a</sup> Midwest Study sample includes youth in NSC records ( $n = 331$ )

<sup>b</sup> Midwest Study sample includes youth from both self-report and NSC records who could be observed for at least six years ( $n = 329$ )

## Chapter Summary

This chapter examined characteristics of the Midwest Study sample, college enrollment trends, and rates of college persistence and completion. While almost 90 percent of youth at age 17 aspired to complete at least some college, only 55 percent enrolled in college. Bivariate analyses showed that youth who made it to college had greater college aspirations, were more prepared academically and had fewer educational setbacks, presented with fewer behavioral problems, and remained in foster care for a longer period of time after age 18. Females fared

better than males in both entering college and completing college. The overwhelming majority of foster youth attended two-year and minimally selective four-year colleges. Overall, less than one-third of college students in the sample persisted through their first three semesters, and just one-fifth earned a postsecondary certificate or degree. Persistence rates, and especially degree completion rates, were markedly lower for foster youth than for the comparison group of low-income first generation college students.

## **COLLEGE ENROLLMENT GROUPS**

This chapter presents findings on the classification of the 331 participants with NSC data into distinct groups based on their college attendance pattern. The time frame that was examined spanned over a dozen years, from 2002 to 2015. Creating the enrollment groups was an iterative process that involved visually inspecting the data over the course several weeks, creating decision rules, applying decision rules, and then checking my classification. In the first section, I describe the selections made about the criteria, criteria cut points, and decision rules. The four enrollment groups are presented and described. In the second section, we examine differences in the enrollment groups in the types and number of colleges youth attended and their credential completion status. The final section compares the groups in terms of their demographic composition, academic and foster care history, risk and protective factors, and pre-entry and post-entry characteristics.

### **Creation of Enrollment Groups**

The first step in creating the enrollment groups involved selecting which aspects of students' college attendance would be the basis of the classifications. Three pieces of information were selected: sustained persistence, stopouts, and multi-institution attendance. Sustained persistence captures whether students had ever remained enrolled in college for a sustained period of time, stopout captures whether youth had ever left college and then later returned, and multi-institution attendance captures whether youth attended multiple colleges during their college career. These three measures are commonly used descriptors of college students' enrollment patterns (Seidman, 2012).

A second decision point involved selecting cut points for each of the three attendance characteristics. Many youth in this sample had attendance patterns that differed from the “traditional” route—entering college immediately following high school, remaining at one institution, and continuously attending college to graduation (Peter & Cataldi, 2005). Participants displayed discontinuous and interrupted patterns of attendance that were more comparable to “non-traditional” students. For sustained persistence, I classified each youth into two groups: they had either enrolled continuously for at least two full years of college (i.e., four consecutive non-summer semesters without withdrawing) or they had not. I selected the second year as a cut point because by this point in college students have typically moved past remedial and introductory courses, they must have declared a major (in most four-year colleges), and they are taking more intermediate/advanced courses in their selected area of study. If the data were available, I would have followed Adelman (2005) and used the number of completed credits as a criterion to classify students’ progress through and sustained engagement with college,<sup>29</sup> but these data were not available. Thus, the two-year cutoff represents a sustained engagement and deeper immersion in college by students.

Youth were classified as having stopped out if they had enrolled in college, dropped out for at least one year, and then reenrolled. Some scholars designate a stopout as a lapse of just one

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<sup>29</sup> Adelman’s (2005) study included traditional-age first-time community college students. One of the cutoffs he used to distinguish groups was whether they had earned 30 or more community college credits. If students had attended community college full-time (i.e., 15 credits per semester), had to take no non-credit remedial courses, and passed all of their courses, this would be equivalent to one year in college. However, because most community college students enroll part-time (about 40%) (National Student Clearinghouse, 2016), most are required to take at least one remedial course (about 60%) (Bailey, Jeong, & Cho, 2010), and few advance through all of their courses with passing grades (Bahr, 2009), completion of 30 credits is more likely equivalent of about two years of steady progress in community college. This also informed my decision to use two years of consistent enrollment as a cutoff.

semester (e.g., Schulte, 2015). I decided to use one year because one-semester lapses in enrollment were common in this sample and was not a meaningful distinction.

For multi-institution attendance, students who had attended three or more institutions before earning a credential were distinguished from students who had attended two or fewer institutions. The distinction was not made between students who had attended one versus two colleges because attendance in two or more schools was fairly common in the sample (48%). Additionally, this strategy reduced the chances of capturing multi-institution attendance that was strategic (e.g., students enrolled in four-year college who enroll in a two-year college in the summer to complete extra credits). Taken together, these three indicators capture whether or not youth had a sustained period of enrollment in college, had a break(s) in their college career of a year or more, and had attended several different institutions. Four groups were identified based on the decision rules presented in Table 10 and described below.

*Table 10. Decision Rules Used to Create the Four Enrollment Groups*

<b>Attendance Characteristic</b>	<b>Enrollment Group</b>			
	<b>Toe-in-the-water</b>	<b>Consistently enrolled</b>	<b>Boomerang</b>	<b>Buffet</b>
Completed 2 consecutive years of college?	No	Yes	No	No
Stopped out of college for a year or more?	No	Yes or No	Yes	Yes or No
Enrolled in 3 or more different colleges?	No	Yes or No	No	Yes

The first and largest group included youth who were classified as the “toe-in-the-water” group. These students enrolled for three or fewer semesters, dropped out, and never returned to college. One or two semester enrollment was the norm; only 7 of the 163 youth in this group had enrolled for three semesters. About half of the sample fell in to the to-in-the-water group ( $n =$

163, 49.2%). The hallmark of this group is that students had barely put their toe in the water before leaving college and not returning.

The second group is called the “consistently enrolled” group. Youth were assigned to this group if they had enrolled in four consecutive non-summer semesters with no withdrawals for any of these semesters. These students displayed a pattern of sustained engagement in college over the course of two full years. The four semesters could have been completed at the same institution or at different institutions. It could have occurred at the very beginning of their college career or later on after a period of interrupted enrollment. The one exception to the four-semester rule is youth who enrolled in consecutive semesters in a two-year college leading up to the completion of a certificate in less than four semesters ( $n = 3$ ). Since these youth enrolled consistently until they finished their credential, they were assigned to the consistently enrolled group. Only about one-quarter ( $n = 89$ , 26.9%) of students in the sample met the criteria for this group.

The last two enrollment groups displayed intermittent patterns of college attendance. The hallmark of the “boomerang” group is that students boomeranged in-and-out of the same institution for short enrollment spells. That is, youth attended an institution for three or fewer semesters, stopped out of college for at least a year, and reenrolled in the same institution at a later time. None of the enrollment spells lasted more than three consecutive semesters (most spells were just one or two semesters). Some students had multiple enrollment spells, in which they were in and out of the same college over the course of several years. Some boomerang youth attended a second institution (but no more than two). Less than one-fifth of the sample was classified in the boomerang group ( $n = 57$ , 17.2%).

The last group displayed a different pattern of intermittent enrollment. Students in the “buffet” group attended three or more different institutions, never for more than three consecutive semesters in any given enrollment spell (one or two semesters was the norm). Thus, rather than going in and out of the same college, students in the buffet group sampled several different colleges for short spurts of time. This was the smallest group, with fewer than one in ten youth classified in this group ( $n = 22, 6.7\%$ ).

A subsample of youth ( $n = 35$ ) displayed characteristics of more than one group. Two additional decision rules were created to determine class assignment for these 35 cases. First, consistent enrollment trumped boomerang and buffet patterns. If a youth had enrolled for at least four consecutive non-summer semesters but also boomeranged back and forth to the same institution ( $n = 10$ ) or attended three or more schools ( $n = 15$ ), they were classified as consistently enrolled. Second, a buffet pattern trumped a boomerang pattern. That is, if a youth displayed characteristics of the boomerang group and the buffet group ( $n = 15$ ), they were assigned to the buffet group. These include youth who attended three or more institutions for short periods of time, and at some point in their college career they returned to an institution they had previously attended after a year or more gap. There was no overlap with the toe-in-the water group and the other enrollment groups.

### **Enrollment Group Differences in Colleges Attended and Credential Completion**

To summarize, consistently enrolled students completed at least two consecutive years of college, toe-in-the-water students had a brief trial run with college, boomerang youth went in-and-out of the same college, and buffet youth sampled several different colleges. Table 11 compares the four enrollment groups in terms of the types of colleges they attended and their rates of college completion. In terms of the average number of colleges students attended, youth

in the buffet group attended the most—about 3 ½ colleges (*median* = 3). Youth in the consistently enrolled group attended an average of just over two colleges (*median* = 2), and students in the boomerang group and toe-in-the-water group attended about 1 ½ colleges apiece (*median* = 1 for both).

Nearly 40 percent of consistently enrolled youth and over 35 percent of buffet youth started in four-year colleges. Only about 25 percent of boomerang youth and toe-in-the-water youth first entered four-year colleges. Students in the consistently enrolled group were at least twice as likely as students in each of the other groups to have enrolled in a selective/highly selective four-year college. A relatively large proportion of buffet youth got their start in nonselective or less selective four-year institutions. In terms of statistically significant differences, consistently enrolled youth were more likely than toe-in-the-water youth to have attended selective/highly selective four-year colleges versus two-year colleges ( $p = .001$ ). Additionally, consistently enrolled youth were more likely than buffet youth to have first attended a selective/highly selective college than a nonselective/minimally selective four-year college ( $p = .023$ ).

Although not presented in the table, group differences were also assessed for the other institutional characteristics (e.g., size, percent of Pell grant recipients, expenditures). Only one statistically significant group difference was found. Toe-in-the-water youth attended colleges with a higher average percentage of part-time students than did consistently enrolled youth (55.9% vs. 49.7%,  $p = .029$ ).

We see stark differences in the credential completion rates between the groups. By definition, none of the youth in the toe-in-the-water group completed college. However, the majority of youth in the consistently enrolled group had earned a credential, which was

substantially higher than two groups that displayed intermittent enrollment patterns. Although boomerang youth were nearly twice as likely as buffet youth to have earned a credential, the difference was not statistically significant ( $p = .259$ ). However, this may be due to insufficient statistical power, as the buffet group had a particularly small number of students. In terms of the types of the credentials that were earned, roughly similar proportions of consistently enrolled youth earned certificates, two-year degrees, and four-year degrees. Although not shown in the table, the bulk of four-year degrees earned by consistently enrolled students came from those who first entered selective/highly selective four-year colleges. Nearly two-thirds of consistently enrolled student who first attended these institutions earned a bachelor's degree (63.2%), compared to just one-fifth of consistently enrolled students who first entered a nonselective/less selective four-year college (20.0%) and less than one-tenth of consistently enrolled students who first entered a two-year college (7.3%). Overall, within the consistently enrolled group, rates of credential completion were relatively high regardless of the type of institution that youth started out in. Credential completion rates did not significantly differ by youth who first entered two-year colleges (60%), nonselective/less selective four year colleges (67%), and selective/highly selective four-year colleges (74%) ( $p = .548$ ).

For the students in the buffet group, the same proportion of youth earned certificates and two-year degrees, and no students in the buffet group earned a four-year degree. Among students in the boomerang group, two-year degrees were the most common credential earned.

From the examination of group differences thus far, we may suspect that youth in the consistently enrolled group differed from youth in the other three groups in ways that poised them to succeed in college. We might also suspect that the background characteristics of youth in

the toe-in-the-water would telegraph later academic difficulties. These group differences are examined next.

*Table 11. College Type/Selectivity and Credential Completion, by College Enrollment Group (n = 331)*

	Enrollment Group				Sig.
	Consistently enrolled	Toe-in-the-water	Buffet	Boomerang	
Percent of enrollees (%)	26.9	49.2	6.7	17.2	
Number of different colleges attended (Mean/SD)	2.2 (1.0)	1.3 (.5)	3.5 (1.0)	1.5 (.8)	***
First college type/selectivity (%)					*
Two-year	61.8	76.4	63.6	73.7	
Non-/minimally selective four-year	16.9	16.8	27.3	15.8	
Selective/highly selective four-year	21.4	6.8	9.1	10.5	
Earned a credential (%)	64.0	0.0	9.1	17.5	***
Type of credential (%)					***
None	36.0	100.0	90.9	82.5	
Certificate	23.6	0.0	4.6	3.5	
Two-year degree	19.1	0.0	4.6	8.8	
Four-year degree	21.4	0.0	0.0	5.3	

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

### Differences in the Characteristics of the Enrollment Groups

The four enrollment groups reveal distinct patterns of college attendance, which were associated with different rates of college completion. To better understand the students in each of these groups, we now examine background characteristics measured at baseline and pre-entry and post-entry characteristics. Table 12 presents comparisons of the groups on covariates measured at baseline. Since some of the covariates had nontrivial proportions of missing data, group differences were tested using multiple imputation. For each comparison, the outcome variable was the background characteristic under consideration, and the predictor variable was the enrollment groups. The appropriate regression was used depending on the measurement scale

of the outcome. The enrollment group designated as the reference group was rotated to identify statistically significant differences between specific groups, and results of these analyses are reported in text. As we will see, most differences existed between the toe-in-the-water group and one or more of the other enrollment groups.

In terms of demographic characteristics, the consistently enrolled group had a significantly greater proportion of females than did the toe-in-the-water group ( $p = .001$ ) and the boomerang group ( $p = .032$ ). No group differences were found for race/ethnicity or state. The groups were also virtually the same in terms of age at which they completed their baseline interview (not shown). However, there were several poignant differences in aspects of the youths' academic histories. The toe-in-the-water group had significantly lower reading scores than the consistently enrolled group ( $p = .031$ ) and the buffet group ( $p = .036$ ). This group were less likely than the buffet group to have completed just 10<sup>th</sup> grade instead of 11<sup>th</sup> grade ( $p = .030$ ) or 12<sup>th</sup> grade ( $p = .011$ ). Additionally, toe-in-the-water students were more likely to have repeated a grade than students in all three groups (all  $p < .05$ ), more likely to have been expelled than consistently enrolled students ( $p = .007$ ) and boomerang students ( $p = .029$ ), and more likely to have been in special education than consistently enrolled students ( $p = .001$ ). Additionally, the toe-in-the-water students were more likely than consistently enrolled students ( $p = .014$ ) and boomerang students ( $p = .004$ ) to have ever been in congregate care. There were also differences in terms of the ages that youth completed educational achievements. Toe-in-the-water students finished their secondary credential at least a half of a year later than did students in the other three groups (all  $p < .05$ ). A particularly pronounced group difference was in the age at which youth first entered college. Toe-in-the-water youth were about 2 to 3 years older than youth in the other three groups when they first entered college (all  $p < .001$ ). This difference will

be revisited later. Finally, the toe-in-the-water group spent about half a year less in extended care than did the buffet group and boomerang group (both  $p < .05$ ).

Nearly all of the group differences in baseline characteristics were found between the toe-in-the-water group and the other three groups. In addition to the gender differences reported above, a few group differences were found among these other three groups. Buffet students were more likely to have finished 12<sup>th</sup> grade than 10<sup>th</sup> grade than consistently enrolled youth ( $p = .046$ ) and boomerang youth ( $p = .054$ ). Consistently enrolled youth were less likely than boomerang youth to have been in special education ( $p = .008$ ). Overall, there were no significant group differences in educational aspirations, high school grade tertiles, maltreatment history, number of foster care moves, or school changes. Although not displayed in the table, the groups also did not differ in their avoidant attachment scores.

*Table 12. Baseline Characteristics, by College Enrollment Groups (n = 331)*

<b>Characteristic</b>	<b>Enrollment Group</b>				<b>Sig.</b>
	Consistently enrolled	Toe-in-the-water	Buffet	Boomerang	
<b>Demographic Characteristics</b>					
Gender (%)					***
Male	28.1	49.7	45.5	45.6	
Female	71.9	50.3	54.5	54.4	
Race/ethnicity (%)					n.s.
White	33.7	30.7	18.2	28.1	
African American	58.4	51.5	68.8	42.1	
Hispanic	2.3	9.2	13.6	17.5	
Other race	5.6	8.6	0.0	12.3	
State (%)					n.s.
Illinois	67.4	63.8	77.3	71.9	
Wisconsin	25.8	25.8	18.2	17.5	
Iowa	6.7	10.4	4.5	10.5	
<b>Academic History</b>					
Highest completed grade (%)					*
10 <sup>th</sup> grade or lower	23.6	34.6	4.5	24.6	
11 <sup>th</sup> grade	61.8	53.1	68.2	59.6	
12 <sup>th</sup> grade	14.6	12.3	27.3	15.8	

Table 12, continued

Reading level, standardized (Mean)	-.38	-.67	-.18	-.45	*
High school grades (%)					n.s.
Bottom tertile	33.1	39.0	27.3	24.6	
Middle tertile	24.8	27.5	27.3	36.8	
Top tertile	42.2	33.4	45.5	38.6	
Ever repeated a grade (%)	25.8	40.5	13.6	19.3	**
Ever expelled (%)	6.7	20.2	9.1	7.0	**
Ever in special education (%)	25.8	47.2	27.3	47.4	***
Education aspirations (%)					n.s.
Some college	15.8	20.9	18.5	12.9	
College degree	49.9	55.8	43.4	49.3	
More than college degree	34.4	23.3	38.1	37.8	
<b>Foster Care History</b>					
Number of foster care placements (Mean)	5.2	6.4	5.6	4.9	n.s.
Number of school changes (Mean)	2.7	2.8	2.8	2.8	n.s.
Ever in congregate care (%)	48.3	64.4	59.1	42.1	*
Years in care past age 18 (Mean)	1.8	1.5	2.2	2.0	*
<b>Ages</b>					
Age completed high school (Mean)	18.7	19.2	18.4	18.6	*
Age first enrolled in college (Mean)	20.0	21.8	19.0	19.6	*

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

Comparisons of baseline characteristics suggest that the toe-in-the water group displayed more academic difficulties (i.e., reading scores, special education) and behavioral problems (i.e., school expulsions, placement in congregate care) than did the other groups. Might there also be differences in the characteristics and life circumstances of the groups prior to entering college? Similar to the findings reported above most group differences were present between toe-in-the-water students and students in the other groups. Although parenthood rates were higher for the toe-in-the-water group than the other groups, the only significant difference was in comparison to the boomerang group ( $p = .020$ ). Two employment status categories (1-19 hours/week and 20-

34 hours/week) were combined into a single category due to sparse data. Casual examination of distributions reveals that the toe-in-the-water group had a more bimodal distribution than the other groups—about 40 percent of these youth had not worked and another 40 percent worked full-time, while just 20 percent worked part-time. Most of the significant group differences were present between the toe-in-the-water youth and youth in the other groups, and were related to this bimodal distribution. Compared to consistently enrolled youth, toe-in-the-water youth were more likely to be unemployed ( $p = .029$ ) or employed full-time ( $p = .001$ ) than to be employed just part-time. Similarly, compared to boomerang youth, toe-in-the-water youth were more likely to be unemployed ( $p = .033$ ) or employed full-time ( $p = .021$ ) than to be employed just part-time. Additionally, compared to buffet youth, toe-in-the-water youth were less likely to be unemployed than employed part-time ( $p = .033$ ). Toe-in-the-water youth also had more problems with alcohol/substance use issues, economic hardships, and food insecurity. These youth were more likely to have had alcohol/substance use problems than consistently enrolled youth and boomerang youth (both  $p < .001$ ), they experienced more economic hardships than all three groups (all  $p < .01$ ), and were more likely to be food insecure than the other three groups (all  $p < .05$ ).

Recall that toe-in-the-water group were older than youth in the other three groups when they first entered college. It may be that some of the group differences in pre-entry characteristics are due to the age differences or differences in the amount of time in which these problems could have occurred. Youth in the toe-in-the-water group had an extra two to three years before enrolling in college in which they could have gotten pregnant, experienced financial hardships, and so on. Thus, the regression analyses examining pre-entry characteristics were run again, controlling for age of high school completion and age of college entry. After this step,

group differences in parental status, economic hardships, and food insecurity disappeared (all  $p > .20$ ). However, the employment status differences remained, as did the differences in alcohol/substance use problems. Thus, some but not all of the differences in pre-entry characteristics are explained by the fact that toe-in-the-water group entered college at a significantly later age than the other groups.

Similar to the baseline characteristics, the consistently enrolled, boomerang, and buffet groups did not significantly differ on most pre-entry characteristics. The only difference present was the buffet group experiencing fewer economic hardships than youth in the consistently enrolled group ( $p = .033$ ), and this difference became nonsignificant after controlling for high school completion age and college entry age ( $p = .120$ ).<sup>30</sup>

*Table 13. Pre-Entry Characteristics, by College Enrollment Groups (n = 331)*

<b>Characteristic</b>	<b>Enrollment Group</b>				<b>Sig.</b>
	Consistently enrolled	Toe-in-the-water	Buffet	Boomerang	
<b>Pre-Entry Risk and Promotive Factors</b>					
Parental status (%)	24.7	32.3	22.7	15.8	*
Marital status (%)	3.4	5.0	4.5	1.8	n.s.
Employment (%)					*
Not employed	36.0	39.1	54.5	31.6	
Employed < 35 hrs/week	39.3	21.1	27.3	38.6	
Employed 35+ hrs/week	24.7	39.8	18.2	29.8	
Social support (Mean)	3.98	3.89	3.78	3.97	n.s.
Delinquency score (Mean)	0.31	0.37	0.36	0.27	n.s.
Mental health problem (%)	75.2	82.0	72.3	75.4	n.s.
Alcohol/substance use problem (%)	22.4	46.6	27.3	12.3	***
Economic hardship (Mean)	1.03	1.73	0.09	0.60	***
Food insecurity (%)	19.1	37.9	0.0	19.3	***

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

<sup>30</sup> Since none of the 22 youth in the buffet group were food insecure, statistical tests between groups could not be conducted.

Table 14 examines enrollment group differences in post-entry characteristics. There were not significant group differences in most of the characteristics assessed, but consistently enrolled youth tended to fare better than the other groups in the two measures of financial difficulties. Students in the consistently enrolled group experienced fewer economic hardships than did students in the toe-in-the-water group ( $p = .002$ ) and students in the buffet group ( $p = .027$ ). A marginally significant difference was found for consistently enrolled and boomerang students ( $p = .076$ ). Consistently enrolled youth were significantly less likely to have been food insecure than toe-in-the-water youth ( $p = .046$ ) and marginally significantly less likely to have been food insecure than boomerang youth ( $p = .089$ ). The other post-entry differences pertained to post-entry employment status between boomerang youth and other youth. Boomerang youth had the highest rate of full-time employment. More specifically, these young people were significantly more likely than consistently enrolled youth to be employed full time than to be unemployed or employed part-time (both  $p < .05$ ). Boomerang youth were more likely than toe-in-the-water youth to have been employed full-time than unemployed ( $p = .016$ ).

*Table 14. Post-Entry Characteristics, by College Enrollment Groups (n = 331)*

<b>Characteristic</b>	<b>Enrollment Group</b>				<b>Sig.</b>
	Consistently enrolled	Toe-in-the-water	Buffet	Boomerang	
<b>Post-Entry Risk and Promotive Factor</b>					
Parental status (%)	58.2	62.9	61.4	52.9	n.s.
Marital status (%)	16.4	24.2	23.4	18.6	n.s.
Employment (%)					*
Not employed	15.3	17.1	4.5	3.6	
Employed less than 35 hrs/week	23.5	16.4	22.7	9.0	
Employed 35+ hrs/week	61.2	66.4	72.7	87.3	
Social support (Mean)	3.72	3.82	3.88	3.85	n.s.
Delinquency score (Mean)	0.14	0.17	0.15	0.12	n.s.

Table 14, *continued*

Mental health problem (%)	67.1	76.4	77.3	74.5	n.s.
Alcohol/substance use problem (%)	41.2	52.9	63.6	49.1	n.s.
Economic hardship (Mean)	2.48	3.38	3.59	3.13	**
Food insecurity (%)	47.1	60.7	63.6	61.8	*

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

## Chapter Summary

This chapter identified four groups based on youths' college attendance characteristics. Most of the college completions came from youth who had enrolled in college for four or more consecutive semesters, and these youth had relatively high rates of attendance in four-year colleges (especially selective/highly selective four-year institutions). The largest group, including almost half of all entrants, enrolled in college for just a few semesters and did not return thereafter. The other two groups intermittently attended college, either cycling in and out of the same college or hoping between different colleges. College completion rates were not high for these students, especially the students who sampled several colleges.

Between-group comparisons pointed to several stark differences in youth characteristics and life circumstances, particularly between the toe-in-the-water group and the other groups. Toe-in-the-water students displayed relatively high rates of academic difficulties and behavioral problems in their adolescence. These characteristics may carry over later in life and interfere with their ability to engage with, and remain engaged in, college. The toe-in-the-water youth also entered college at a later age than the other two groups, which meant that their life circumstances were very different from the life circumstances of youth in the other groups who started college a couple of years earlier. Few post-entry group differences were found. The main differences existed between consistently enrolled youth and some of the other groups. Compared to boomerang and buffet youth, consistently enrolled youth had a greater proportion of females, and

were less likely to experience economic hardships and food insecurity after entering college. Consistently enrolled youth also attended the selective/highly selective colleges at the highest rates. But even after controlling for age differences in high school completion and college entry, gender, economic hardships, food insecurity, and selectivity of the first college, consistently enrolled youth were still more likely to have completed a credential than the other two groups (both  $p < .001$ ). This suggests that other factors may be driving the group differences.

The toe-in-the-water group was the largest of the enrollment groups, comprising nearly half of foster youth who entered college. Given the many areas of need for these youth, they will likely require the most support and broadest ranges of intervention of all of the groups. In the next three chapters we take a closer look at understanding the factors that influence college entry, persistence, and completion.

## PREDICTORS OF COLLEGE ENTRY

This chapter presents findings on predictors of college entry. First, bivariate logistic regression analyses investigate associations between predictors measured at baseline and the odds of entering college. Results from these analyses inform the selection of the variables that were included in the multivariable regression model in the second section. Supplemental multinomial logistic regression analyses explore how associations differ for entry into two-year and four-year colleges. The third part of the chapter employs survival analysis to consider both time-invariant and time-varying predictors on the rate of college entry.

### Recap of College Entry Statistics

Table 15 recaps statistics on college entry presented in Chapter 4. About 55 percent of Midwest Study participants had ever enrolled in college by age 29/30. Among the 402 youth who attended college, about three-quarters first enrolled in two-year colleges, and the other quarter enrolled in four-year colleges.

*Table 15. College Entry and First College Type>Selectivity*

Ever enrolled in college (n = 732)	54.9
First college type/selectivity (%) (n = 402)	
Two-year college	75.9
Nonselective/minimally selective four-year college	14.8
Selective/highly selective four-year college	9.8

### Baseline Youth Characteristics Predicting College Entry

As a first step, we examine individual predictors of college entry. Table 16 displays results from separate logistic regression analyses, in which college entry was regressed on each of the baseline covariates. Odds ratios were calculated by taking the exponent of the log odds of college entry. The results restate findings presented in the previous chapter when differences in

group means and proportions between college entrants ( $n = 402$ ) and non-entrants ( $n = 330$ ) were investigated. Briefly summarizing the findings, the results indicate that the following factors decreased the expected odds of college entry: being male, grade repetition, school expulsion, special education, ever being placed in congregate care, increased engagement in delinquent behavior, and alcohol/substance use problems. The following factors increased the expected odds of college entry: higher completed grade at baseline, reading proficiency, educational aspirations (i.e., college degree or more vs. no college), participation in more types of college prep activities, and having ever worked for pay. Statistically significant ( $p < .05$ ) differences were not found in the estimated likelihood of entering college by race/ethnicity, state, high school math and English grades, number of foster care placements, number of school changes, amount of maltreatment instances, parental status, social support, and mental health problems.

*Table 16. Bivariate Logistic Regression Results: Baseline Predictors of College Entry (n = 732)*

	Odds Ratio	95% CI	p
<b>Demographic Characteristics</b>			
Male (ref: female)	.56	0.42 – 0.75	<.001
Race/ethnicity (ref: White)			
African American	1.00	0.72 – 1.40	.988
Hispanic	1.11	0.63 – 1.96	.712
Other race	1.09	0.59 – 2.00	.783
Age at baseline interview	1.01	0.68 – 1.52	.946
State (ref: Illinois)			
Wisconsin	.82	0.59 – 1.15	.254
Iowa	1.04	0.61 – 1.77	.878
<b>Academic History</b>			
Highest completed grade (ref: 10 <sup>th</sup> grade or lower)			
11 <sup>th</sup> grade	2.31	1.68 – 3.18	<.001
12 <sup>th</sup> grade	3.59	2.12 – 6.08	<.001
Reading level, standardized	1.67	1.44 – 1.93	<.001

Table 16, continued

High school math and English grades (ref: Bottom tertile)			
Middle tertile	.76	0.53 – 1.09	.138
Top tertile	1.40	0.97 – 2.03	.073
Education aspirations (ref: High school credential or less)			
Some college	1.73	0.95 – 3.17	.075
College degree or more	3.71	2.27 – 6.07	<.001
Ever repeated a grade	.48	0.35 – 0.65	<.001
Ever expelled	.51	.035 – 0.76	.001
Ever in special education	.54	0.40 – 0.73	.001
Number of college prep. activities (0-4)	1.24	1.09 – 1.40	.001
<b>Foster Care Characteristics</b>			
Number of foster care placements (1-40)	.99	0.96 – 1.01	.331
Ever in congregate care	.64	0.47 – 0.86	.003
Number of school changes (0-5+)	.97	0.90 – 1.05	.427
Maltreatment instances (ref: Bottom tertile)			
Middle tertile	.80	.55 – 1.16	.239
Top tertile	1.38	.94 – 2.04	.104
<b>Risk and Promotive Factors</b>			
Parental status	.87	0.53 – 1.32	.518
Social support	1.08	0.92 – 1.25	.342
Ever worked for pay	2.19	1.57 – 3.06	<.001
Delinquency score (0-3)	.57	0.44 – 0.74	<.001
Mental health problem	1.01	0.73 – 1.38	.960
Alcohol/substance use problem	.51	0.36 – 0.71	<.001

The next analytic step involved building a multivariable logistic regression model (Table 17). Except for demographic characteristics of the youth, variables that did not marginally predict ( $p < .10$ ) college entry in bivariate analyses were omitted for parsimony. Checks were performed to ensure that the omitted variables did not become statistically significant when other covariates were entered into the model (i.e., suppression effects). No suppression effects were found for the variables omitted from the multivariable model presented in Table 17. A few additional covariates that significantly predicted college entry in bivariate models were omitted from the final model due to collinearity. First, highest grade completed at the time of the baseline interview was collinear with a history of grade repetition (corr = -.41). Grade repetition was

retained in the final model, however, results from a supplemental regression analysis are summarized in the text below that investigated highest completed grade. Second, a few variables tapped underlying behavioral problems: school expulsion, placement in group care at baseline, delinquency score, and alcohol/substance use problems.<sup>31</sup> In the final model, school expulsion and congregate care were omitted because they are more indirect measures of underlying constructs. For example, school expulsion is an event that typically results from behavioral disruption, and placement in group care or a residential treatment center follows the presentation of behavioral, emotional, and/or substance use problems. Delinquency and alcohol/substance use are more direct measures of underlying behavioral problems and substance use issues. Results of supplemental regression analyses of the variables omitted due to collinearity are reported below in text.

Model 1 in Table 17 displays regression results when only youths' demographic characteristics are included in the regression model. After controlling for the other covariates, the expected odds of entering college is about 46 percent lower for males than for females. Race/ethnicity, age at baseline, and the state in which the youth resided were not related to the likelihood of entering college. Model 2 introduces a block of predictors related to youths' academic standing and background. Controlling for these covariates only slightly changes the gender difference observed in the previous model. Reading score is a strong predictor of college entry, with a one standard deviation in test score increasing the expected odds of college enrollment by about 58 percent. Youth who aspired to complete college were also significantly

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<sup>31</sup> It was considered to combine these measures into a single factor but the internal reliability was not strong (Chronbach's alpha = .53). Also, substance/use may have an independent effect on college entry, separate from underlying tendency for youth displaying behavioral problems to also engage in alcohol/substance use. Thus, there was a substantive reason to analyze alcohol/substance use problems separately.

more likely to enroll in college than were students who did not aspire to go to college. Grade repetition was negatively associated with entering college. Finally, there was a marginally significant association between participation in college preparatory activities and the likelihood of going to college ( $p = .066$ ), with students who took part in more types of activities predicting increased odds of entering college. Note that although special education was strongly and negatively associated with college entry in the bivariate model ( $OR = .54, p = .001$ ), it was not significant after controlling for demographic characteristics and other academic history characteristics ( $p = .617$ ). This is due largely to the fact that youth in special education had markedly lower reading scores than did youth who had never been in special education (-1.16 vs. -.48).

Model 3 introduces a set of factors that could potentially reduce or bolster the likelihood that foster youth go to college. After entering these covariates, a gender difference in the expected odds of college entry was reduced but still present. The diminution is explained by gender differences in delinquency scores and alcohol/substance use problems. Males had higher delinquency scores (.59 vs. .31) and a higher rate of alcohol/substance use problems (31% vs. 19%) than did females, both of which were negatively associated with college enrollment. Reading score, college aspirations, and grade repetition continue to significantly predict the odds of college entry, and the number of college preparatory activities remained marginally significant. Youth paid employment experience were more likely to enter college than were youth with no early work experience. Participants with an alcohol/substance use problem were significantly less likely than youth without a problem to go to college, and greater engagement in delinquent behaviors was a marginally significant predictor of college entry net of the other covariates.

We now return to the three covariates omitted from Model 3 due to collinearity. Each omitted variable was investigated separately by rerunning Model 3. After removing grade repetition, the highest grade youth completed by wave 1 was significantly associated with college entry. Relative to youth who had completed 10<sup>th</sup> grade or lower at baseline, youth who had completed 11<sup>th</sup> grade ( $OR = 2.02, p < .001$ ) and youth who had completed 12<sup>th</sup> grade ( $OR = 2.38, p = .005$ ) were significantly more likely to enter college. Taken together with the results of grade repetition, foster youth who were academically behind in late adolescence were less likely to go to college than were youth who were not behind. After removing delinquency and alcohol/substance use problems, youth who had ever been placed in congregate care had marginally significantly lower expected odds of entering college ( $OR = .71, p = .053$ ). History of school expulsion was also marginally significant after omitting delinquency and alcohol/substance use problems ( $OR = .68, p = .086$ ). Taken together, these variables suggest that foster youth with behavioral issues and substance use problems were less likely than their peers to go to college.

Table 17. Multivariable Logistic Regression Results: Baseline Predictors of College Entry (n = 732)

	Model 1	Model 2	Model 3	p	95% CI
	OR	OR	OR		
<b>Demographic Characteristics</b>					
Male (ref: female)	0.56***	.57**	0.64*	.012	0.46 – 0.91
Race/ethnicity (ref: White)					
African American	0.97	1.08	1.02	.921	0.67 – 1.57
Hispanic	1.19	1.13	1.09	.798	0.58 – 2.05
Other race	1.08	1.21	1.38	.360	0.70 – 2.72
Age at baseline interview	0.88	0.75	0.75	.286	0.44 – 1.27
State (ref: Illinois)					
Wisconsin	0.81	0.89	0.79	.294	0.50 – 1.23
Iowa	0.97	0.80	0.78	.453	0.41 – 1.50
<b>Academic History</b>					
Reading level, standardized		1.58***	1.60***	<.001	1.34 – 1.90
Education aspirations					
(ref: High school credential or less)					
Some college	1.54	1.46	.251	0.77 – 2.78	
College degree or more	2.79***	2.68***	<.001	1.58 – 4.54	
Ever repeated a grade	0.56**	0.63**	.007	0.45 – 0.88	
Ever in special education	0.91	1.04	.830	0.72 – 1.51	
Number of college prep. activities (0-4)	1.13^	1.15^	.052	0.99 – 1.32	
<b>Risk and Promotive Factors</b>					
Ever worked for pay		1.68**	.007	1.15 – 2.43	
Delinquency score (0-3)		0.77^	.086	0.57 – 1.04	
Alcohol/substance use problem		0.55**	.044	0.37 – 0.83	

<sup>^</sup> p<.10 \*p<.05 \*\*p<.01 \*\*\*p<.001

As a supplemental analysis, the covariates in Model 3 were entered into a multinomial logistic regression analysis that had three outcomes: no college entry, entry into a two-year college, and entry into a four-year college. This analysis allows us to compare the relationship of the covariates on the likelihood of entering a two-year college (vs. no college) and the likelihood of entering a four-year college (vs. no college). A few notable results in Table 18 deserve mention. First, there are several variables that significantly predict both outcomes: reading level, college aspirations, grade repetition, and alcohol and substance use problems. The covariates generally exert stronger influences on entering four-year colleges than on entering two-year colleges, as indicated by the magnitudes of the relative risk ratios. Second, the gender difference observed in the prior logistic regression model appears to be entirely attributed to differences in entry into two-year colleges. Indeed, the unadjusted rates of entry into four-year colleges are similar for males (15.2%) and females (14.3%). Third, while special education and delinquency were not significant predictors of college entry in the earlier model, there were marginally significant associations in the expected odds of entering a four-year college versus no college. When the three omitted collinear factors were investigated in separate multinomial regression models, highest completed grade had a significantly positive association with entry into both college types relative to no college, school expulsion negatively predicted entry into four-year colleges ( $OR = 0.36, p = .020$ ) but not two-year colleges ( $OR = .80, p = .324$ ), and history of placement in congregate care negatively predicted entry into two-year colleges ( $OR = 0.69, p = .045$ ) but not four-year colleges ( $OR = 0.78, p = .359$ ).

Table 18. Multinomial Logistic Regression Results: Baseline Predictors of Entry into Different Types of College (n = 732)

	Two-Year College Entry (ref: No college)			Four-Year College Entry (ref: No college)		
	RRR	p	95% CI	RRR	p	95% CI
<b>Demographic Characteristics</b>						
Male (ref: female)	0.58**	.003	0.41 – 0.83	0.96	.862	0.57 – 1.60
Race/ethnicity (ref: White)						
African American	0.98	.924	0.63 – 1.53	1.21	.581	0.62 – 2.36
Hispanic	0.90	.755	0.45 – 1.78	2.02	.137	0.80 – 5.11
Other race	1.19	.639	0.58 – 2.45	2.27	.115	0.82 – 6.29
Age at baseline interview	0.62^	.096	0.35 – 1.09	1.44	.375	0.64 – 3.28
State (ref: Illinois)						
Wisconsin	0.65^	.082	0.40 – 1.06	1.47	.260	0.75 – 2.88
Iowa	0.82	.563	0.42 – 1.60	0.46	.233	0.13 – 1.60
<b>Academic History</b>						
Reading level, standardized	1.50***	<.001	1.25 – 1.80	1.98***	<.001	1.50 – 2.60
Education aspirations (ref: High school credential or less)						
Some college	1.51	.227	0.77 – 2.97	1.11	.879	0.28 – 4.38
College degree or more	2.42**	.002	1.39 – 4.21	3.82*	.016	1.28 – 11.4
Ever repeated a grade	0.69*	.043	0.49 – 0.99	0.43**	.004	0.24 – 0.77
Ever in special education	1.23	.287	0.84 – 1.83	0.55^	.052	0.30 – 1.01
Number of college prep. activities (0-4)	1.14^	.085	0.98 – 1.32	1.19^	.079	0.98 – 1.45
<b>Risk and Promotive Factors</b>						
Ever worked for pay	1.70**	.008	1.15 – 2.53	1.63	.123	0.88 – 3.05
Delinquency score (0-3)	0.82	.206	0.59 – 1.12	0.65^	.086	0.40 – 1.06
Alcohol/substance use problem	0.61*	.021	0.40 – 0.92	0.37**	.007	0.18 – 0.77

<sup>^</sup> p<.10 \*p<.05 \*\*p<.01 \*\*\*p<.001

Although not displayed, a supplemental multinomial regression model was run in which the outcome reference group was changed to entry into two-year colleges. This provided a formal assessment of which covariates were associated with entering four-year colleges versus two-year colleges. The estimated odds of entering four-year versus two-year colleges was marginally greater for males than females ( $OR = 1.64, p = .052$ ), for youth living in Wisconsin than youth in Illinois ( $OR = 2.25, p = .017$ ), and for youth with higher reading scores ( $OR = 1.32, p = .039$ ). Conversely, youth who had ever been in special education were less likely than those who had not been in special education to have entered a four-year college than a two-year college ( $OR = .44, p = .007$ ). Supplemental analyses of collinear variables indicated that highest completed grade at baseline and ever being placed in congregate care were not significantly associated with entry into four-year than two-year colleges, and history of school expulsion was marginally significant ( $OR = .45, p = .072$ ).

### **Time-Varying Predictors of the Rate of College Entry**

The analyses above examine the relationship between predictors measured at a single time point and the likelihood of entering college. A distinct but related inquiry involves examining how different factors influence the rate at which youth enter college. In addition to time-invariant baseline predictors, this analysis can include factors that change over time such as parental status, social support, and employment status. To investigate the association between baseline and time-varying covariates on the rate of college entry, we turn to results from survival analyses. Table 19 displays results of bivariate Cox proportional hazards models, in which each predictor was separately investigated. In these analyses, youth enter the risk set at age 17.5 and exit the risk set on the day they entered college or were censored due to death or reaching age 22.

Results from supplemental analyses, in which the college entry up the time of the fifth Midwest Study interview (ages 25/26), are reported after the results from the main analyses.

The regression coefficients in Table 19 are presented as hazard ratios. In the bivariate models, many of the covariates significantly predicted rate of college entry. The rate of college entry at a given time was about 37 percent lower for males and females. Although no race/ethnicity differences were found, youth in Wisconsin had a lower rate of college entry than did youth in Illinois. In terms of academic factors, highest completed grade at baseline, reading scores, high school grades in math and English in the top tertile, and receiving multiple types of college preparatory activities predicted increased rate of college entry, while grade repetition, expulsion, and special education were associated with decreased rates of college entry. The number of foster care placements youth resided in, as well as having ever been placed in congregate care, both decreased rates of entry. Only one time-varying covariate was associated with an increased rate of entry. Youth who aspired to earn a college degree or more had a greater rate of entry than did youth who aspired to attend college or less.<sup>32</sup> Conversely, being a parent, having alcohol/substance use problems, experiencing food insecurity, and engaging in delinquent behaviors were associated with decreases in the rate of college entry.

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<sup>32</sup> The time-varying measure of educational aspirations had to be simplified to a binary variable in the survival analysis due to convergence issues during multiple imputation. These problems were a result of sparse data in the “less than college” response option. Particularly at interview waves 2 and 3, few youth aspired to earn just a high school credential or less. At wave 2, only 9.2 percent of respondents aspired to earn a high school credential or less. At wave 3, the percentage was 6.7 percent of respondents. For the survival analysis, the reference group includes youth who aspired to attain “some college” or less, and the comparison group includes youth who aspired to earn a college degree or more. Combining these two groups likely leads to an understatement of the hazard ratio reported in this analysis. If youth who aspired to attain a college degree or more were able to be compared to only youth who did not aspire to go to college, the differences are likely to be more pronounced than the estimates provided here. In spite of this, educational aspirations of completing a college degree or more is a strong and robust predictor of college entry.

Table 19. Bivariate Cox Proportional Hazard Model Results: Baseline and Time-Varying Predictors of Rate of College Entry (n = 732)

	HR	95% CI	p
<b>Demographic Factors Measured at Baseline</b>			
Male (ref: female)	0.63	0.51 – 0.79	<.001
Race/ethnicity (ref: White)			
African American	0.98	0.76 – 1.27	.889
Hispanic	1.09	0.72 – 1.65	.668
Other race	1.07	0.68 – 1.69	.756
Age at baseline interview	1.04	0.77 – 1.40	.796
State (ref: Illinois)			
Wisconsin	0.65	0.49 – 0.85	.002
Iowa	0.86	0.60 – 1.27	.447
<b>Academic Factors Measured at Baseline</b>			
Highest completed grade (ref: 10 <sup>th</sup> grade or lower)			
11 <sup>th</sup> grade	2.04	1.57 – 2.65	<.001
12 <sup>th</sup> grade	2.57	1.79 – 3.69	<.001
Reading level, standardized	1.42	1.28 – 1.57	<.001
High school math and English grades (ref: Bottom tertile)			
Middle tertile	1.28	0.96 – 1.71	.090
Top tertile	1.52	1.15 – 2.00	.003
Ever repeated a grade	0.46	0.36 – 0.59	<.001
Ever in special education	0.60	0.48 – 0.75	<.001
Ever expelled	0.54	0.39 – 0.77	.001
Number of college prep. activities (0-4)	1.14	1.05 – 1.24	.003
<b>Foster Care Factors Measured at Baseline</b>			
Number of foster care placements (1-40)	0.97	0.95 – 0.99	.017
Ever in congregate care	0.60	0.49 – 0.75	.001
Number of school changes (0-5+)	0.98	0.93 – 1.04	.540
Maltreatment instances (ref: Bottom tertile)			
Middle tertile	1.01	0.76 – 1.35	.936
Top tertile	1.21	0.91 – 1.62	.187
<b>Time-Varying Predictors</b>			
Aspire to earn college degree or more	2.31	1.65 – 3.24	<.001
Parental status	0.58	0.44 – 0.77	<.001
Marital status	.63	0.30 – 1.29	.202
Social support	1.04	0.92 – 1.17	.515
Hours worked (ref: none)			
1 – 19 hours/week	1.03	0.70 – 1.50	.894
20 – 34 hours/week	1.31	0.98 – 1.76	.072
35+ hours/week	1.11	0.80 – 1.55	.537
Delinquency score (0-3)	0.59	0.42 – 0.85	.004
Mental health problem	0.87	0.65 – 1.15	.330
Alcohol/substance use problem	0.70	0.50 – 0.97	.034

*Table 19, continued*

Food insecure	0.72	0.52 – 0.99	.043
Economic hardships (0-6)	0.91	0.82 – 1.02	.109

Table 20 presents results from survival analyses in which blocks of predictors are entered into the model. The same approach used earlier to deal with collinear predictors (i.e., high grades and grade repetition; delinquency, congregate care, and school expulsion) is used here. Model 1 contains just demographic characteristics of the youth and their state of residence. The rate of college entry for males was about 32 percent lower than the rate for females after adjusting for the other covariates. No significant differences were found by race/ethnicity, and the rate of college entry was lower for youth in Wisconsin than for youth in Illinois. Model 2 introduces baseline education factors as well as youths' number of foster care placements. Gender differences remained, and state differences became more pronounced. Participants in Wisconsin and Iowa had significantly lower rates of entry than did youth in Illinois. The noticeable change in the coefficient for Iowa came mostly from adjusting for reading scores, since the mean WRAT scores for youth in Iowa were about one-quarter of a standard deviation higher than the WRAT scores of Illinois youth (-.28 vs. -.49). Two of the five academic history variables that were significant in bivariate models were no longer significantly related to college entry rate in Model 2. The decline in statistical significance for special education is explained almost entirely by differences in reading scores. Youth who had been in special education had significantly lower reading scores than did youth who had never been in special education (-.90 vs. -.27), and after adjusting for these differences the disparity in rate of entry between youth who were and were not in special education diminishes considerably. Youth who received more education services tended to have higher reading scores and lower rates of grade repetition, and accounting for these covariates were principally responsible for the loss of statistical significance in Model 2. The

association between the number of foster care placements and entry rate after controlling for demographic characteristics and academic history was similar to the association in the bivariate model.

Model 3 introduces time-varying covariates to the model that were associated with college entry in the bivariate models. Gender differences, state differences, and most of the academic background covariates change little and remain significant predictors of college entry. High school grades and number of foster care placements fell below the .05 cutoff. In terms of the time-varying covariates, only two of the six factors that significantly predicted entry rate in bivariate models were statistically significant in the full model. The rate of college entry at a given time for parents is 42 percent lower than the rate of entry for youth who were not parents. Conversely, youth who aspired to earn a college degree or higher have an expected rate of college entry that is about 73 percent higher than is the rate of entry for youth who aspired to complete some college or less. Engaging in delinquent behaviors, number of hours worked, and alcohol/substance use problems were not found to be significantly related to rate of college entry. Food insecurity was on the margin of statistical significance. Employed youth tended to have higher high school grades and reading scores, and were less likely to have been in special education classrooms. Delinquency scores were higher in males, and were positively associated with a greater number of foster care placement, higher rates of alcohol and substance use problems, and negatively associated with aspirations to earn a college degree. Relatedly, alcohol and substance use problems were more common among males, and were negatively associated with college degree aspirations and positively associated with delinquency. Experiencing food insecurity was positively associated with grade repetition and more foster care placements.

Adjusting for these respective sets of factors were the main drivers of the drops in statistical significance for the four nonsignificant time-varying predictors in Model 3.

Table 20. Multivariable Cox Proportional Hazard Model Results: Baseline and Time-Varying Predictors of Rate of College Entry (n = 732)

	Model 1 HR	Model 2 HR	Model 3 HR	95% CI	p
<b>Baseline Demographic Characteristics</b>					
Male (ref: female)	0.65***	0.69**	0.66**	0.51 – 0.84	.001
Race/ethnicity (ref: White)					
African American	0.88	0.86	0.96	0.71 – 1.30	.779
Hispanic	1.14	1.16	1.19	0.77 – 1.84	.428
Other race	1.05	1.16	1.25	0.79 – 1.98	.349
Age at baseline interview	0.73^	0.58**	0.65*	0.44 – 0.94	.024
State (ref: Illinois)					
Wisconsin	0.57***	0.52***	0.52***	0.37 – 0.73	<.001
Iowa	0.71	0.55**	0.54**	0.34 – 0.86	.009
<b>Baseline Education Factors</b>					
Reading level, standardized		1.34***	1.31***	1.16 – 1.47	<.001
High school math and English grades (ref: Bottom tertile)					
Middle tertile	1.19	1.08	0.80 – 1.45	.609	
Top tertile	1.36*	1.32^	0.99 – 1.75	.055	
Ever repeated a grade	0.52***	0.54***	0.42 – 0.70	<.001	
Ever in special education	0.80^	0.79^	0.61 – 1.03	.082	
Number of college prep. activities (0-4)	1.05	1.03	0.94 – 1.12	.513	
<b>Baseline Foster Care Factor</b>					
Number of foster care placements (1-40)	0.97*	0.98^	0.95 – 1.00	.056	
<b>Time-Varying Predictors</b>					
Parental status			0.49***	0.37 – 0.65	<.001
Hours worked (ref: none)					
1 – 19 hours/week		1.04	0.64 – 1.66	.881	
20 – 34 hours/week		1.17	0.87 – 1.58	.295	
35+ hours/week		1.09	0.77 – 1.55	.625	
Delinquency score (0-3)		0.75	0.51 – 1.11	.150	
Alcohol/substance use problem		0.97	0.67 – 1.41	.883	
Food insecure		0.74^	0.54 – 1.02	.064	
Aspire to earn college degree or more		1.79**	1.24 – 2.57	.002	

^ p<.10 \*p<.05 \*\*p<.01 \*\*\*p<.001

Supplemental analyses examined the three baseline covariates that were omitted from Model 3 due to collinearity. After removing grade repetition, highest completed grade significantly predicted rate of college entry ( $OR = 1.79, p < .001$  for 11<sup>th</sup> grade vs. 10<sup>th</sup> grade or lower;  $OR = 2.01, p = .001$  for 12<sup>th</sup> grade vs. 10<sup>th</sup> grade or lower). After removing delinquency score, school expulsion ( $OR = 0.67, p = .028$ ) and history of placement in congregate care ( $OR = .72, p = .012$ ) decrease rates of college entry in the separate regression models.

Although not displayed, the parental status variable was interacted with gender. It was not found that the rate of college entry was significantly different for male parents than for female parents ( $HR = .85, p = .551$  for the interaction term).

Finally, we turn to the results of sensitivity analyses of the Cox regression models, in which the observation time for college entry was extended to the last wave of the Midwest Study. Results of the bivariate and multivariable Cox regression models were very similar to the results presented above, both in terms of the estimated hazard ratios and the conclusions of significance tests. The substantive conclusions regarding the statistically significant predictors in Model 3 were the same in the main analysis and sensitivity analysis, although the magnitudes of some of the coefficients were larger in the main analysis. These included gender ( $HR = .66$  vs.  $HR = .72$ ), Wisconsin vs. Illinois ( $HR = .52$  vs.  $HR = .65$ ), Iowa vs. Illinois ( $HR = .54$  vs.  $HR = .64$ ), grade repetition ( $HR = .54$  vs.  $HR = .61$ ), and parental status ( $HR = .49$  vs.  $HR = .58$ ). Thus, findings reported above about predictors of rate of college entry were generally robust to the age at which entry was measured.

### **Chapter Summary**

This chapter explored factors related to foster youths' likelihood of entering college. Males were less likely than females to go to college. Three sets of baseline factors decreased the

odds of going to college: being academically behind (highest completed grade, grade repetition); being academic underprepared (reading score); presenting with behavioral and alcohol/substance use problems (ever placed in congregate care, school expulsion, alcohol/substance use problem). A fourth category of baseline predictors increased the expected likelihood of entering college, includes college aspirations and early employment history. Results of multinomial logistic regression analyses added some nuance to the initial findings. First, the gender difference in college entry rates is concentrated in two-year colleges, where most foster youth start their college career. Second, several significant predictors identified earlier were found to predict entry into both two-year and four-year colleges (vs. no college), but the associations tended to be stronger for entry into four year colleges.

Similar to the previous findings, results from survival analyses indicated that academic delays (highest completed grade, grade repetition), academic preparation (reading scores), and educational aspirations each exerted influence on the rate at which youth entered college. Females had a higher rate of entry than males net of other factors. Past congregate care placement and a history of school expulsion, but not alcohol and substance use problems, were found to decrease the rate of college entry. Survival analyses also allowed us to identify temporal processes not evident in the findings of earlier analyses pertaining to parental status and state. Although parental status at age 17 was not associated with the estimated odds of ever going to college, it did significantly delay entry. This is because some youth who had a child at a young age eventually enrolled in college later in life. Similarly, state was not associated with the estimated likelihood of ever entering college, but it was associated with the rate at which youth entered college. This is because youth in Illinois entered college at significantly higher rates in their late teens and early 20s than did youth in the other states, but in the long run youth in Iowa

and Wisconsin eventually caught up to Illinois youth.<sup>33</sup> These differences will be revisited when we examine extended foster care in Chapter 9.

This chapter points to a strong influence of gender, academic factors, and other youth characteristics on the likelihood of going to college. Do these predictors continue to exert influence on short-term outcomes after youth enter college? In the next chapter we examine factors associated making it through the first year and into the second year of college.

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<sup>33</sup> The changing association between state and the rate college entry over time is an example of a violation of the PHA. Rates of college entry were consistently higher for IL youth than IA and WI youth early on, but rates of college entry appreciably narrowed in youths' mid- and late-20s.

## PREDICTORS OF COLLEGE PERSISTENCE

The current chapter examines predictors of persistence through the first three college semesters. Since these analyses require data on semester-by-semester enrollment statuses, the sample includes the 331 youth with NSC data. Similar to the previous chapter, the first and second sections explore bivariate and multivariable predictors of persistence, respectively. The third section presents results of a bivariate probit Heckman selection model, which addresses possible biases in regression coefficients arising from selection into college.

### Recap of College Persistence Rates

Table 21 recaps persistence rates presented in Chapter 4. Overall, just under one-third of youth in the NSC sample completed three consecutive non-summer semesters of college upon first enrolling in college. Significant gender differences were not found.

*Table 21. Rates of College Persistence among Youth in NSC Sample*

Outcome	NSC Sample (n =331)			
	All	Male	Female	p
Persisted first three semesters (%)	30.2	25.9	33.5	.134

### Baseline, Pre-Entry, and Institutional Predictors of College Persistence

Results of bivariate analyses of predictors of college persistence are presented in Table 22. No statistically significant differences were found by gender or state, although one race/ethnicity difference was close to the .05 alpha level (i.e., Hispanic youth vs. White youth). The age at which youth first entered college had a strong relationship with the expected odds of

persistence.<sup>34</sup> Compared to youth who first enrolled in college before age 19, the expected odds of persistence was about 54 percent lower for youth who entered at age 19 or 20 and nearly 75 percent lower for youth who entered at age 21 or later. All measures of academic history except the number of college preparatory services youth participated in significantly predicted college persistence in the bivariate models. Completing a higher grade in school, having higher reading scores, and performing better in high school math and English increased the estimated odds of persistence, while repeating a grade, being expelled from school, or being in a special education classroom decreased the expected odds of persistence. In terms of foster care history characteristics, youth who had ever been in congregate care placements were less likely than youth who had never been in congregate care to persist. The bivariate results also suggest that a greater number of foster care placements is negatively associated with persistence, with each additional placement decreasing the estimated odds of persistence by about 7 percent. School mobility also had a negative and marginally significant association with the expected likelihood of persisting in college.

Several youth characteristics measured prior to college entry significantly predicted persistence. Youth who had worked less than 20 hours per week were much more likely to persist than were youth who had not worked before entering college. Youth who engaged in more delinquent behaviors and who had an alcohol or substance use problem before starting college had lower rates of persistence. Finally, youth who had experienced more economic hardships and were designated as being food insecure before college had lower expected odds of

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<sup>34</sup> A four category version of the variable was also inspected, which divided the last age category into two categories (21-24 and 25 or older). The persistence proportions of these two categories were not significantly different (15.4% vs. 19.1%,  $p = .611$ ). Due to the relatively small numbers of youth in each category, the categories were combined to increase statistical power.

persistence than did youth who did not experience these financial difficulties. Educational aspirations, parental status, marital status, social support, and mental health problems prior to entering college were not associated with persistence.

The final set of covariates included several characteristics of the first college youth attended. Only a few institution-level covariates predicted youths' estimated likelihood of persisting. Students who attended selective four-year colleges were more likely than youth who attended two-year colleges to persist. Although not shown in the table, youth in selective four-year institutions were also more likely to persist than were youth in minimally selective or nonselective four-year institutions ( $OR = 3.11, p = .010$ ). The proportion of part-time students in a college's student body decreased the expected likelihood that students persisted. Every 10 percentage point increase in the proportion of part-time students decreased the estimated odds of persistence by about 12 percent. The average amount college spent on academic support services per student was positively associated with persistence, with each \$1000 increase being associated with a 34 percent increase in the expected odds that students persisted. The size of the college, proportion of the student body receiving Pell grants, the cost of tuition, and the expenditures on instruction and on student support services were not associated with persisting through three semesters. The proportion of full-time students retained at an institution from one year to the next also significantly increased youths' likelihood of persisting.

Table 22. Bivariate Logistic Regression Results: Baseline, Pre-Entry, and Institutional Predictors of College Persistence (n = 331)

	Odds Ratio	95% CI	p
<b>Demographic Characteristics</b>			
Male (ref: female)	0.69	0.43 – 1.12	.135
Race/ethnicity (ref: White)			
African American	0.84	0.50 – 1.42	.523
Hispanic	0.37	0.13 – 1.06	0.63
Other race	0.46	0.16 – 1.34	.157
Age at baseline interview	1.50	0.77 – 2.95	.230
State (ref: Illinois)			
Wisconsin	0.72	0.40 – 2.43	.265
Iowa	1.08	0.48 – 2.43	.855
Age first enrolled in college (ref: under age 19)			
19 to 20	0.46	0.27 – 0.81	.007
21 or older	0.26	0.14 – 0.50	<.001
<b>Academic History</b>			
Highest completed grade (ref: 10 <sup>th</sup> grade or lower)			
11 <sup>th</sup> grade	1.99	1.09 – 3.61	.024
12 <sup>th</sup> grade	2.93	1.35 – 6.32	.006
Reading level, standardized	1.52	1.19 – 1.94	.001
High school math and English grades (ref: Bottom tertile)			
Middle tertile	1.87	0.99 – 3.51	.053
Top tertile	1.99	1.10 – 3.61	.023
Ever repeated a grade	0.40	0.23 – 0.71	.002
Ever expelled	0.30	0.12 – 0.74	.009
Ever in special education	0.44	0.26 – 0.73	.001
Number of college prep. activities (0-4)	1.04	0.88 – 1.24	.625
<b>Foster Care Characteristics</b>			
Number of foster care placements (1-40)	0.93	0.88 – 0.98	.010
Ever in congregate care	0.40	0.25 – 0.65	<.001
Number of school changes (0-5+)	0.90	0.80 – 1.02	.087
Maltreatment instances (ref: Bottom tertile)			
Middle tertile	0.80	0.44 – 1.46	.470
Top tertile	0.80	0.44 – 1.45	.464
<b>Pre-Entry Factors</b>			
Highest Education aspirations (ref: High school credential or less)			
Some college	0.57	0.24 – 1.34	.197
College degree or more	0.88	0.38 – 2.07	.776
Parental status	0.68	0.39 – 1.17	.164

Table 22, *continued*

Marital status	0.41	0.09 – 1.88	.250
Social support	1.18	0.90 – 1.56	.237
Hours worked (ref: none)			
1 – 19 hours/week	5.52	2.30 – 13.2	<.001
20 – 34 hours/week	1.56	0.83 – 2.93	.164
35+ hours/week	1.03	0.57 – 1.89	.911
Delinquency score (0-3)	0.53	0.29 – 0.95	.034
Mental health problem	0.75	0.43 – 1.30	.302
Alcohol/substance use problem	0.37	0.21 – 0.66	.001
Economic hardships (0-6)	0.82	0.71 – 0.95	.009
Food insecurity	0.44	0.25 – 0.80	.007
<b>Institutional Characteristics</b>			
Selectivity			
College type/selectivity (ref: Two-year college)			
Non-/minimally selective four-year	0.94	0.49 – 1.81	.852
Selective/highly selective four-year	2.92	1.45 – 5.89	.003
Size (ref: Less than 2500)			
2501 to 5000	1.67	0.67 – 4.19	.274
5001 to 10,000	0.85	0.38 – 1.89	.686
More than 10,000	0.92	0.43 – 1.98	.828
Percent part-time students (10%)	0.88	0.79 – 0.99	.030
Percent Pell grant recipients (10%)	0.91	0.81 – 1.02	.119
In-state tuition cost (\$1,000s)	1.04	0.99 – 1.09	.113
Expenditures on instruction per FTE (\$1,000s)	1.04	0.97 – 1.12	.301
Expenditures on academic services per FTE (\$1,000s)	1.35	0.99 – 1.84	.053
Expenditures on student support services per FTE (\$1,000s)	1.10	0.88 – 1.38	.396
Retention rate	1.30	1.09 – 1.53	.002

Table 23 presents results of four multivariable logistic regression models, which started with a model including just youth demographic characteristics, followed by models that entered academic and foster care history characteristics, pre-entry factors, and institutional characteristics, respectively. Being mindful of the sample size ( $n = 331$ ), only demographic characteristics and predictors that were marginally significant ( $p < .10$ ) were considered for the multivariable regression analyses. Additionally, care was taken to avoid collinearity among

variables. This applied to multiple groups of predictors: reading level and high school grades; grade repetition and highest completed grade at baseline; school expulsion, congregate care, pre-entry delinquency, and pre-entry alcohol/substance use problems; pre-entry economic hardships and pre-entry food insecurity; and college selectivity, percent part-time students, and expenditures on academic support services. The variables underlined in the previous sentence were included in the regression models displayed in Table 23. Similar to the previous chapter, results of supplemental regression analyses of the collinear covariates are summarized in text.

Results from the first regression analysis in Table 23 indicated that Hispanic youth were less likely than White youth to persist (marginally significant), as were students who first entered college after age 18. After controlling for characteristics of youths' academic history and the number of foster care placements (Model 2), the race/ethnicity gap remained marginally significant. In terms of age of entry, only the highest (age 21 or older) and lowest (age 18 or younger) age categories were significantly different in the estimated odds of persistence. Higher reading scores were positively associated with persistence and number of foster care placements was negatively associated with persistence. Since youth who enter college at later ages tended to have lower baseline reading scores and higher prevalence rates of grade repetition and special education, including these academic covariates explained some of the association between entry age and persistence. The correlations between the academic history variables and age of first entry, as well as associations among the academic variables (especially reading scores and special education), diminished the coefficients of the academic predictors.

As presented in the results of Model 3, controlling for pre-entry characteristics strengthened race/ethnicity and age differences, and attenuated the relationships between reading scores and foster care placements and persistence. Pre-entry employment experience

significantly increased the expected odds of persistence, particularly for young people who had worked under 20 hours per week. The estimated odds ratios for some employment categories increased considerably (i.e., employed 1-19 hrs./week vs. not employed) compared to the estimated bivariate odds ratios between pre-entry employment and persistence. Some covariates that are negatively associated with persistence were positively correlated with employment (i.e., youth identified as Hispanic or other race; enrollment age; special education), and these associations amplified the predictive relationship between employment and persistence.<sup>35</sup> Pre-entry delinquency scores, alcohol/substance use problems, and economic hardships were not significantly associated with the expected odds of persistence. For pre-entry delinquency, the decrease in the magnitude of the odds ratio in Model 3 from the odds ratio in the bivariate model ( $OR = .53$ ) was largely a result of controlling for alcohol/substance use problems and the number of foster care placements, which were both positively associated with delinquency negatively associated with persistence. The diminution in the odds ratio for alcohol/substance use problems is attributable largely to enrollment age and economic hardships. Older youth and youth who had experienced more economic hardships were more likely to have had an alcohol or substance use problem before entering college, and since all of these were negatively correlated with persistence, including all three in the model weakened the independent predictive relationship between alcohol/substance use problems and persistence. Relatedly, the diminution in the coefficient for economic hardships is accounted for by age of first enrollment and alcohol/substance use problems, and to a lesser degree engaging in delinquent behaviors. Thus, youth who first enter college at age 21 or older experienced more economic hardships than did

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<sup>35</sup> For example, in a regression model with pre-entry employment, race/ethnicity, enrollment age, and special education, the odds ratios for the employment coefficients were 9.64 for employed 1-19 hrs./week, 2.01 for employed 20-34 hrs./week, and 2.87 for employed 35+ hrs./week.

youth who entered college at younger ages. Older entrants were also more likely than younger entrants to have experienced alcohol/substance use problems before enrolling in college, and they also tended to have worked more hours per week.

The final model in Table 23 introduced the institution type/selectivity of the first college youth enrolled in. Race/ethnicity differences (Hispanic youth vs. White youth), age of entry (21 or older vs. 18 or younger), reading level, and pre-entry employment were the only statistically significant predictors in Model 4. Although not shown, Hispanic youth were significantly less likely than African American youth to persist ( $OR = .22, p = .16$ ) and youth in the other race category marginally significantly less likely than African American youth to persist ( $OR = .30, p = .088$ ). There were a few covariates that marginally significant in their associations with persistence, including other race vs. White youth, number of foster care placements, and college type/selectivity (selective college vs. two-year college). The estimated odds of persistence was marginally significant for youth attending selective vs. two-year colleges, and although not shown in Table 23, the predicted likelihood of persistence was significantly greater for students entering selective versus less selective four-year colleges ( $OR = 2.75, p = .049$ ). Relative to the bivariate coefficient, the odds ratio for college type/selectivity was reduced due to associations with several covariates. Youth who entered selective and highly selective institutions were typically younger, fared better academically (i.e., higher reading scores and lower rates of repetition and special education), engaged in less delinquent behavior before entering college, and were less likely to have had an alcohol or substance use problems before college.

Employment experience prior to college continued to be a strong predictor of college persistence, particularly for youth who worked 1 to 19 hours per week. The odds ratio was particularly large (larger than 9.0). This was due to the fact that a relatively small number of

youth in this sample had worked 1-19 hours per week before entering college ( $n = 28$ ), and the persistence rate for this group was exceptionally high (64%). This may be a consistent estimate, since these youth may have maintained a similar manageable work schedule after entering college, and this helped them to persist. But it could also be that these 28 youth had a particularly high rate of persistence, and the rate in the population of foster youth working 1-19 hours is actually some degree lower. Although not displayed, youth who had worked less than 20 hours per week were more likely to persist than were youth who had worked 20 to 34 hours per week ( $OR = 4.39, p = .008$ ) and youth who had worked 35 or more hours per week ( $OR = 3.29, p = .043$ ).

Supplemental analyses investigated each collinear predictor by rerunning Model 4. In these analyses, the only statistically significant predictor was the number of school changes, with greater school mobility decreasing the expected odds of persistence ( $OR = .086, p = .049$ ). When institutional selectivity was removed from the model, the institutional retention rate significant increased the predicted odds of persistence ( $OR = 1.22, p = .043$ ).

As an additional supplemental analysis, pre-entry parental status and an interaction term of gender and pre-entry parental status was added to Model 4. Recall that pre-entry parental status was not significantly associated with the expected odds of persistence in the bivariate model; this was also the case in Model 3 when pre-entry parental status was included ( $OR = 1.22, p = .598$ ). However, when pre-entry parental status and the interaction term were added to the model, there was a statistically significant interaction between gender and pre-entry parental status ( $OR = 1.21, p = .577$  for male main effect;  $OR = 2.02, p = .100$  for parental status main effect;  $OR = .07, p = .023$  for male x parental status interaction term). These findings suggest that being a parent before entering college had a significantly worse effect on the odds of persistence

for males than for females. In fact, the odds ratio for pre-entry parental status, which reports the estimated odds ratio for just females when the interaction term is present, is positive but nonsignificant.

Table 23. Multivariable Logistic Regression Results: Baseline, Pre-Entry, and Institutional Predictors of College Persistence (n = 331)

	Model 1 OR	Model 2 OR	Model 3 OR	Model 4 OR	p	95% CI
<b>Demographic Characteristics</b>						
Male (ref: female)	0.77	0.73	0.81	0.77	.402	0.42 – 1.41
Race/ethnicity (ref: White)						
African American	1.01	0.90	0.83	0.83	.600	0.41 – 1.68
Hispanic	0.40 <sup>^</sup>	0.38 <sup>^</sup>	0.24*	0.22*	.016	0.06 – 0.75
Other race	0.49	0.47	0.33	0.30 <sup>^</sup>	.088	0.07 – 1.20
Age at baseline interview	1.65	1.50	1.92	2.07	.119	0.83 – 5.19
State (ref: Illinois)						
Wisconsin	1.26	1.12	0.94	1.06	.892	0.46 – 2.44
Iowa	1.58	1.30	1.42	1.41	.546	0.46 – 4.28
Age first enrolled in college (ref: under age 19)						
19 to 20	0.46**	0.66	0.57	0.58	.143	0.28 – 1.20
21 or older	0.26***	0.38**	0.27*	0.34*	.029	0.09 – 0.87
<b>Academic and Foster Care History</b>						
Reading level, standardized		1.35*	1.41*	1.41*	.029	1.04 – 1.91
Ever repeated a grade		0.60	0.71	0.72	.349	0.39 – 1.42
Ever in special education		0.77	0.73	0.78	.474	0.40 – 1.53
Number foster care placements (1-40)		0.94*	0.94 <sup>^</sup>	0.94 <sup>^</sup>	.056	0.88 – 1.00
<b>Pre-Entry Factors</b>						
Employment (ref: did not work)						
1 – 19 hrs./week			9.33***	9.89***	<.001	3.38 – 28.9
20 – 34 hrs./week			2.07 <sup>^</sup>	2.25*	.035	1.06 – 4.79
35+ hrs./week			2.96*	3.00*	.016	1.23 – 7.35
Delinquency score (0-3)			0.79	0.80	.538	0.40 – 1.61
Alcohol/substance use problem			0.62	0.64	.225	0.30 – 1.40
Economic hardships (0-6)			1.01	0.80	.636	0.32 – 2.01
<b>Institutional Characteristics</b>						
Type>Selectivity (ref: two-year college)						
Non-/minimally selective four-year				0.74	.450	0.34 – 1.62
Selective/highly selective four-year				2.03 <sup>^</sup>	.095	0.88 – 4.67

<sup>^</sup> p<.10 \*p<.05 \*\*p<.01 \*\*\*p<.001

## **Accounting for Selection into College**

To examine whether the findings above are robust after accounting for possible selection on unobservable variables, a bivariate probit selection model introduced by Heckman (1977) was implemented. Since two-stage models reduce statistical power, a more parsimonious version of Model 4 was used, omitting five variables that were not associated with persistence: special education, grade repetition, pre-entry delinquency, pre-entry alcohol/substance use problems, and pre-entry economic hardships.

An important decision in running two-stage models is selecting one or more covariates that can serve as exogenous predictors of the main outcome (Holm & Jaeger, 2011). This entails selecting a variable that is substantively and statistically related to the first stage outcome and that meets the exclusion restriction, which states that the error term in the second stage equation is not correlated with the error term in the first stage equation. Said differently, it is assumed that the exogenous covariate is not related to the likelihood that students persist in college, other than the influence it has on affecting the odds that students enter college.

The variable selected as the exogenous covariate is the number of college preparation activities that youth participated in. Substantively, partaking in activities such as SAT preparation, assistance with college applications, assistance with financial aid/loan applications, and college fairs are expected to increase students' odds of entering college. There is empirical support for this proposition. In a bivariate logistic regression model, participating in more activities increased the estimated odds of entering college ( $OR = 1.18, p = .007$ ).

Unlike the first assumption of two-stage models, the exclusion restriction assumption cannot be tested empirically. On the one hand, it is unlikely that partaking the activities included in the college prep measure will directly impact college persistence. For example, attending

college fairs and completing college applications may attract students to particular colleges and help them to gain admission, but it is unlikely that these activities will affect their chances of completing three semesters. It is also doubtful that participation in SAT preparation will have an effect on college persistence. Except for expensive, private SAT preparation, which foster youth in this study most likely did not participate in, most preparatory courses have a modest effect on even their intended target, SAT scores (Buchmann, Condron, & Roscigno, 2010; Montgomery & Lilly, 2012). Help with financial aid applications could arguably promote college persistence if they led to students actually receiving needed financial aid. Empirically, the number of college preparatory services that students received was unrelated to the expected odds of persistence ( $OR = 1.04, p = .625$ ).

On the other hand, it is plausible that there are attributes of students that could be associated with partaking in college preparatory activities and persisting in college. For example, students with higher academic skills may be more likely to participate in activities that help them to gain admission to college and also more likely to remain enrolled in college. This concern appears to be warranted; higher reading proficiency scores were positively associated with partaking in more education activities ( $p < .05$ ). While this particular covariate can be statistically controlled, it raises the question of whether other unmeasured characteristics that influence persistence are also correlated with participation in education services. This is a limitation of the analysis below, and the results should be interpreted with the caveat that the exclusion restriction assumption may not be satisfied. Several other candidates for exogenous predictors were considered, but these alternatives were either unrelated to college entry or statistically related to college persistence.

Table 24 presents the results of a probit regression model predicting the likelihood of persistence among college entrants (left panel), and the two-stage selection model (right panel). The probit model estimates serve as points of comparison for the selection model estimates. Note that the second stage model included some covariates specific to college persistence (i.e., institution type/selectivity pre-entry covariates) that are not included in the first stage model. The coefficients are in the unit of z-scores.

As displayed below in the first stage of the selection model (bottom right panel), the number of educational activities that youth partook in remained a significant predictor of college entry, although the association is not very strong. Rho ( $\rho$ ) is a measure of the correlation between of the error terms of the two stages, and is used to test the presence of unobservable variables (Holm & Jaeger, 2011). Large and statistically significant values of  $\rho$  indicate that the unexplained variance in both models are influenced by the presence of unmeasured variables, whereas small and nonsignificant  $\rho$  values do not support this hypothesis. When  $\rho$  is statistically different from zero, this suggests that not accounting for unobserved characteristics introduces bias in the regression coefficients in the second stage equation.

The value of  $\rho$  in the bivariate probit model in Table 24 is .02 ( $p = .98$ ). As seen below, covariates in the two-stage selection model are virtually the same as coefficients in the probit model. The one exception is the coefficient for reading scores, which decreased from 1.21 to 1.20 and fell below the .05 alpha level. This may be due in part to the bivariate probit model, which increases standard errors and deceases statistical power to detect true differences. Overall, the results do not support the presence of a strong selection process that is introducing bias to the results in the probit model.

Table 24. Comparison of Probit and Bivariate Probit Results: Predictors of Persistence

	Probit Persistence (n = 331)		Bivariate Probit: Persistence (n = 331)		
	B		B	p	95% CI
<b>Demographic Characteristics</b>					
Male (ref: female)	-0.26		-0.26	.249	[-0.69, 0.18]
Race/ethnicity (ref: White)					
African American	-0.04		-0.04	.847	[-0.44, -0.36]
Hispanic	-0.93	*	-0.93	*	[-1.66, -0.20]
Other race	-0.74	^	-0.74	^	[-1.51, 0.03]
Age at baseline interview	0.44		0.44	.133	[-0.13, 1.01]
State (ref: Illinois)					
Wisconsin	0.07		0.07	.780	[-0.45, 0.59]
Iowa	0.20		0.20	.562	[-0.48, 0.89]
Age first enrolled in college (ref: under age 19)					
19 to 20	-0.39	^	-0.39	^	[-0.80, 0.01]
21 or older	-0.88	***	-0.88	***	[-1.41, -0.35]
<b>Academic and Foster Care History</b>					
Reading level, standardized	0.21	*	0.20	.247	[-0.14, 0.54]
Number foster care placements (1-40)	-0.04	*	-0.04	*	[-0.08, -0.01]
<b>Pre-Entry Factors</b>					
Employment (ref: did not work)					
1 – 19 hrs./week	1.43	***	1.43	***	<.001
20 – 34 hrs./week	0.51	*	0.51	*	.023
35+ hrs./week	0.69	**	0.69	**	.007
<b>Institutional Characteristics</b>					
Type>Selectivity (ref: two-year college)					
Non-/minimally selective four-year	-0.14		-0.14	.544	[-0.60, 0.31]
Selective/highly selective four-year	0.54	*	0.54	*	.033

Table 24, continued

	Entry (n = 732)			
	B	p	95% CI	
<b>Demographic Characteristics</b>				
Male (ref: female)	-0.26	**	.007	[-0.45, -0.07]
Race/ethnicity (ref: White)				
African American	-0.04	.690	[-0.29, 0.19]	
Hispanic	0.08	.687	[-0.29, 0.44]	
Other race	0.08	.688	[-0.31, 0.47]	
Age at baseline interview	-0.24	.123	[0.55, 0.06]	
State (ref: Illinois)				
Wisconsin	-0.20	.131	[-0.46, 0.06]	
Iowa	-0.23	.236	[-0.61, 0.15]	
<b>Academic and Foster Care History</b>				
Reading level, standardized	0.28	***	<.001	[0.19, 0.37]
Number foster care placements (1-40)	0.00	.910	[-0.02, 0.02]	
Number of college prep. activities (0-4)	0.08	*	.034	[0.01, 0.16]
	$\rho$		.982	

<sup>^</sup> p<.10 \*p<.05 \*\*p<.01 \*\*\*p<.001

Note that in the models presented in Table 25, only youth in NSC records were counted as enrolled in college ( $n = 331$ ) since NSC data is needed to construct the measure of persistence. This means that the 71 youth who were identified as college entrants by self-report were not designated as college entrants in the results presented in Table 25; they were classified as having not enrolled in college. The misclassification of these youth could attenuate the correlation between the stage 1 and stage 2 error terms, and thus underestimate the value of  $\rho$ . As a sensitivity analysis, separate probit and bivariate probit selection models were run, which excluded these 71 youth.<sup>36</sup> The remaining 661 youth were all properly classified in terms of their college enrollment status. Results of these analyses were very similar to the results reported above. The value of  $\rho$  in this model was larger than in the previous model, but still quite small and nonsignificant ( $-.05, p = .947$ ). Moreover, the substantive conclusions between the main selection model and the sensitivity analysis did not change, and the point estimates were very similar.<sup>37</sup>

### **Chapter Summary**

This chapter investigated predictors of persistence among college entrants with NSC data. There were some demographic differences in the expected odds of persistence. There were some differences by race/ethnicity, with Hispanic youth and youth in the other category having lower odds of persistence than at least one other race/ethnicity group. Higher reading proficiency was positively associated with persistence, while school changes and foster care placement changes were negatively associated with persistence. Although youth who entered college after age 21

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<sup>36</sup> It was not possible to conduct a sensitivity analysis that involved all 732 youth, in which the 71 youth were designated as college entrants, because persistence outcomes are not available for these 71 youth.

<sup>37</sup> Differences in point estimates between the main and sensitivity analyses were either the same (rounding to two-decimal places) or within one one-hundredth of a point. For example, the point estimate for male was  $-.25 (p = .249)$  in the main analysis and  $-.26 (p = .292)$  in the sensitivity analysis.

were more likely than youth who entered college before age 19 to display early educational difficulties (e.g., grade repetition, special education, lower reading scores), after controlling for these and other factors, youth who entered college later still faced a disadvantage in persistence. It is important to keep in mind that while youth who entered college early fared better than their peers who entered later, the persistence rates of even the most favorable age group are still quite low. Among youth who entered college by age 19, less than half made it through their first three semesters in college (43.9%).

Most of the pre-entry characteristics did not predict youths' likelihood of persisting. The exception was pre-college employment, with youth who had work experience being significantly more likely to persist than youth who had never worked. Few of the institutional-level factors were significantly related to persistence. The strongest institutional-level predictor was the type and selectivity of the college that youth attended. However, after controlling for other background and pre-entry characteristics, the benefit associated with attending a selective institution was only marginally significant compared attending two-year or less selective four-year colleges.

The results found in the logistic regression models were robust after accounting for possible selection effects, but the exogenous predictor (college preparatory activities) may not have satisfied the exclusion restriction assumption. In the next chapter we look beyond early markers of college progress to the long-term outcome of whether youth ultimately completed a credential.

## PREDICTORS OF COLLEGE COMPLETION

This chapter explores perhaps the most important outcome in this dissertation—whether or not youth finished college. As adolescents, over seven in ten participants reported that they aspired to complete a college degree, and in a previous chapter we saw that only one in ten attained this goal. This chapter investigates factors that promoted and hindered youths' attainment of a postsecondary credential. The sample for this chapter includes the 329 youth who had first enrolled in college at least six years prior to date of the NSC data draw (if identified by NSC records) or prior to their last Midwest Study interview date (if identified by self-report).<sup>38</sup>

This six-year window ensured that youth were observed for a sufficient amount of time after first enrolling in college in which they could earn a postsecondary certificate or degree.

Among the 329 youth in the sample for this chapter, 24 youth earned a certificate, 27 youth earned a two-year degree, and 29 youth earned a four-year degree. Ideally, these would have been investigated as separated outcomes, but the rarity of the outcomes severely limited statistical power and model building. Two binary outcomes are evaluated in this chapter. The first outcome measures completion a postsecondary credential, including a vocational certificate, two-year degree, or four-year degree. One downside of this measure is that it combines

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<sup>38</sup> Twelve of the youth in the sample were identified by Midwest Study self-report and were not observed for the full six years. These 12 youth were observed for at least five years (range 5.10 years to 5.97 years, *mean* = 5.56 years). At the time of their most recent interview, these youth had either (a) reported that they completed less than one year of college (*n* = 6), or (b) reported that they completed a year of college but were not currently enrolled and had not been enrolled in college since their last interview (*n* = 6). Since it is highly unlikely that these youth would have completed a college credential if they had been observed for an additional six months (on average), they were included in the sample. In addition, 2 youth from NSC data were not observed for a full six-year period (2.7 years and 5.3 years) but had earned a postsecondary certificate in less than six years. These two youth were included in this sample of 329.

substantively different credentials into a single category, notably certificates and degrees. Moreover, most foster youth aspired to earn a college degree or more, so attainment of a degree is an important benchmark. Thus, the second outcome measures is a binary variable indicated whether youth attained a two-year/four-year degree or not. Full results will be presented for the binary outcome of credential completion, and abbreviated results of degree completion will be summarized in text.

Similar to the structure of the previous chapter, the first section examines bivariate relationships between several groups of predictors. Results of this section inform the development of the multivariable models in the second section. The third section tests the sensitivity of the findings from the multivariable models after accounting for possible selection effects. Finally, the fourth section examines assumptions made about the interpretations of three post-entry factors that significantly predicted the odds of college completion.

### **Recap of College Completion Rates**

Table 25 recaps college complete rates presented in Chapter 4. One-quarter of students completed a college credential. About 7 percent of youth completed a postsecondary certificate, 8 percent completed a two-year degree, and 9 percent completed a four-year degree. Females were more likely than males to have completed a credential. A four-year degree was the modal credential for females, while a two-year degree was the modal credential for males.

Table 25. College Credential and Degree Completion Rates

Outcome	Youth Enrolled in College Observed for 6+ Years (n =329)			
	All	Male	Female	p
Completed any credential (%)	24.2	18.1	28.7	.028
Highest credential completed (%)				.143
None	77.8	81.9	71.4	
Certificate	7.3	5.1	8.9	
Two-year degree	8.2	7.3	8.9	
Four-year degree	8.8	5.8	10.9	

### Bivariate Predictors of College Completion

Table 26 presents results of bivariate logistic regression analyses that investigated covariates measured at baseline. There were statistically significant differences by gender and age of entry in the expected odds of earning a credential, favoring females and students who enrolled in college at a young age (under 19 vs. 19-20 years old). There was a marginally significant difference in the expected odds of earning a credential for Hispanic youth versus White youth. None of measures of youths' academic background significantly predicted credential completion, although prior school expulsion and special education were marginally significant. Only foster care characteristic had a marginally significant association with completion; a greater number of foster care placement decreased the estimated odds of earning a credential.

Some notable differences were present in predictors of degree completion. Males were not significantly less likely than females to complete a degree ( $OR = .61, p = .109$ ). Compared to the associations with credential completion, some covariates had stronger associations with degree completion. These included age of entry (19-20 vs. under 19,  $OR = 0.33, p = .001$ ; 21 or

older vs. under 19,  $OR = .44, p = .084$ ), grade repetition ( $OR = .29, p = .006$ ), and school expulsions ( $OR = .13, p = .045$ ).

*Table 26. Bivariate Logistic Regression Results: Baseline Predictors of Credential Completion (n = 329)*

	Odds Ratio	95% CI	p
<b>Demographic Characteristics</b>			
Male (ref: female)	0.55	0.32 – 0.94	.029
Race/ethnicity (ref: White)			
African American	0.83	0.47 – 1.47	.552
Hispanic	0.38	0.12 – 1.18	.095
Other race	1.16	0.42 – 3.14	.778
Age at baseline interview	1.27	0.62 – 2.60	.411
State (ref: Illinois)			
Wisconsin	1.36	0.75 – 2.45	.313
Iowa	1.01	0.38 – 2.64	.988
Age first enrolled in college (ref: under age 19)			
19 to 20	0.51	0.29 – 0.89	.017
21 or older	0.71	0.33 – 1.53	.384
<b>Academic History</b>			
Highest completed grade (ref: 10 <sup>th</sup> grade or lower)			
11 <sup>th</sup> grade	0.98	0.53 – 1.81	.950
12 <sup>th</sup> grade	1.43	0.65 – 3.18	.371
Reading level, standardized	1.15	0.90 – 1.47	.252
High school math and English grades (ref: Bottom tertile)			
Middle tertile	1.04	0.52 – 2.07	.915
Top tertile	1.51	0.81 – 2.79	.193
Ever repeated a grade	0.57	0.31 – 1.07	.078
Ever expelled	0.37	0.13 – 1.09	.071
Ever in special education	0.62	0.36 – 1.05	.077
Number of college prep. activities (0-4)	1.05	0.87 – 1.27	.620
<b>Foster Care Characteristics</b>			
Number of foster care placements (1-40)	0.94	0.89 – 1.00	.064
Ever in congregate care	0.88	0.53 – 1.46	.618
Number of school changes (0-5+)	0.97	0.86 – 1.11	.681
Maltreatment instances (ref: Bottom tertile)			
Middle tertile	0.87	0.46 – 1.65	.667
Top tertile	0.72	0.37 – 1.38	.322

Table 27 presents results from analyses that investigated predictors of pre-entry and post-entry covariates and their associations with earning a college credential. The left panel displays findings from logistic regression analyses when each covariate was entered separately, and the right panel displays results when the pre-entry and post-entry covariate pair were included in the model together (e.g., pre-entry aspirations and post-entry aspirations). The second panel allows us to observe how estimates changed after adjusting for the same covariate measured at a different point in the youths' educational journey. This is an important intermediate step before moving to the more complex multivariable models.

As seen in the left panel in Table 27, post-entry factors generally had a stronger influence on college completion than did pre-entry factors. After entering college, youth who were parents, youth who worked full-time (vs. not employed), youth who had an alcohol or substance use problem, and youth who encountered more economic hardships or were food insecure had decreased expected odds of earning a credential. Post-entry marriage and mental health problems were marginally significant negative predictors of completion. The one pre-entry factor that was associated with graduation, and which was the only pre- or post-entry covariate that had a positive relationship with the estimated odds of graduating, is social support. Youths' highest educational aspirations were not found to be associated with college completion.

In general, with regard to post-entry factors that significantly predicted completion in bivariate models, controlling for the corresponding pre-entry measure either had little effect on or amplified the magnitude of the post-entry measure. For example, point estimates for post-entry employment (full-time vs. not employed), economic hardships, and food insecurity changed little after controlling for their pre-entry counterparts, and the point estimates for post-entry marital status and parenthood were amplified after controlling for their corresponding pre-

entry measure. We also see that pre-entry social support had a stronger association with the expected odds of graduation after adjusting for youths' post-entry social support. In sum, controlling for a measure's pre-/post-entry counterpart did not have a dramatic effect on its bivariate associations, so any notable changes we observe in the multivariable models in the next section were due largely to associations with other covariates.

Table 27. Bivariate Logistic Regression Results: Pre-Entry and Post-Entry Predictors of Credential Completion (n = 329)

	Model 1: Bivariate			Model 2: Pre- and Post-Entry Covariate		
	Odds Ratio	95% CI	p	Odds Ratio	95% CI	p
Pre-entry educational aspirations (ref: Some college or less)						
College degree	1.48	0.52 – 4.14	.455	1.46	0.52 – 4.09	.470
More than college degree	1.85	0.66 – 5.19	.242	1.72	0.61 – 4.86	.309
Post-entry educational aspirations (ref: Some college or less)						
College degree	0.13	0.01 – 1.51	.103	0.15	0.01 – 1.69	.123
More than college degree	0.17	0.01 – 1.88	.148	0.18	0.02 – 1.99	.160
Pre-entry parental status	1.04	0.56 – 1.93	.891	1.87	0.89 – 3.93	.096
Post-entry parental status	0.48	0.29 – 0.81	.007	0.37	0.19 – 0.69	.002
Pre-entry marital status	2.43	0.53 – 11.1	.252	4.26	0.83 – 21.9	.083
Post-entry marital status	0.50	0.24 – 1.04	.065	0.43	0.20 – 0.96	.040
Pre-entry social support	1.37	1.01 – 1.86	.042	1.53	1.07 – 2.18	.021
Post-entry social support	1.01	0.75 – 1.37	.938	0.81	0.57 – 1.15	.244
Pre-entry employment (ref: none)						
1 – 19 hours/week	1.15	0.47 – 2.81	.756	1.30	0.52 – 3.25	.581
20 – 34 hours/week	1.64	0.89 – 3.04	.114	1.70	0.90 – 3.21	.100
35+ hours/week	0.90	0.45 – 1.80	.767	0.99	0.49 – 2.03	.989
Post-entry employment (ref: none)						
1 – 19 hours/week	1.64	0.35 – 7.64	.527	1.62	0.34 – 7.62	.544
20 – 34 hours/week	1.06	0.43 – 2.57	.904	1.01	0.41 – 2.49	.978
35+ hours/week	0.36	0.17 – 0.76	.007	0.35	0.17 – 0.75	.006
Pre-entry delinquency score (0-3)	0.95	0.54 – 1.67	.864	1.03	0.54 – 1.98	.921
Post-entry delinquency score (0-3)	0.78	0.29 – 2.10	.617	0.75	0.24 – 2.37	.629

Table 27, *continued*

Pre-entry mental health problem	0.95	0.54 – 1.69	.862	1.12	0.61 – 2.05	.718
Post-entry mental health problem	0.59	0.34 – 1.03	.064	0.58	0.32 – 1.02	.060
Pre-entry alcohol/substance use problem	0.77	0.43 – 1.40	.398	0.97	0.52 – 1.82	.923
Post-entry alcohol/substance use problem	0.53	0.32 – 0.90	.018	0.54	0.31 – 0.93	.027
Pre-entry economic hardships (0-6)	0.99	0.84 – 1.17	.960	1.06	0.89 – 1.26	.507
Post-entry economic hardships (0-6)	0.73	0.64 – 0.83	<.001	0.73	0.64 – 0.83	<.001
Pre-entry food insecurity	0.77	0.39 – 1.54	.467	0.79	0.39 – 1.58	.502
Post-entry food insecurity	0.51	0.30 – 0.84	.009	0.51	0.30 – 0.84	.009

Several notable differences were found in the parameter estimates for degree completion. All of the differences involved instances in which a covariate significantly predicted credential completion but not degree completion. The pre-entry measure of social support was only marginally significant when predicting degree completion ( $OR = 1.38, p = .071$ ), and neither pre-entry social support ( $OR = 1.39, p = .109$ ) nor post-entry social support ( $OR = .98, p = .937$ ) significantly predicted degree completion when both were included in the model. Full-time post-entry employment (vs. no employment) did not significantly predict the odds of degree completion, either in the bivariate model ( $OR = .54, p = .168$ ) or in the model when pre-entry employment was included in the model ( $OR = .53, p = .150$ ). Similarly, post-entry food insecurity only marginally significantly predicted degree completion when entered by itself ( $OR = .61, p = .093$ ) or in tandem with its pre-entry counterpart ( $OR = .61, p = .098$ ). Post-entry alcohol/substance use problems was not significantly related to degree completion, either in the bivariate model ( $OR = .68, p = .199$ ) or when included in combination with the pre-entry measure ( $OR = .75, p = .352$ ). While the measure of post-entry mental health problems was found to be a marginally significant predictor of reducing the estimated odds of earning a credential, no association was found with degree completion in the bivariate model ( $OR = .78, p = .431$ ) or the model controlling for pre-entry mental health problems ( $OR = .75, p = .386$ ).

Table 28 presents results of bivariate logistic regression analyses involving institutional-level covariates. Estimates based on the first college youth attended are displayed in the left panel, and for comparative purposes, estimates based on the college youth spent the most time in are presented in the right panel. Several characteristics of the first college youth attended were found to be associated with the expected odds of earning a postsecondary credential. Youth who first attended four-year colleges, especially selective institutions, were more likely than youth

who started in two-year colleges to earn a credential. Schools with more of the student body attending part-time negatively affected youths' chances of earning a credential. Conversely colleges with higher tuition, and institutions that spent more per full-time students on instruction, academic support services, and student support services increased the expected odds of credential completion. Overall, the first college and the most attended college had similar associations with the expected odds of completing a credential, although the first college measures tended to be slightly stronger predictors. In the regression analyses throughout the remainder of the chapter, institutional factors of the first college youth attended were used.

Associations between institution-level factors and the estimated odds of completing a degree were similar to associations displayed in Table 28. The directions of the associations were exactly the same, and the magnitudes of the associations were consistently larger for the degree completion outcome than for the credential completion outcome. This was especially the case for expenditures on academic services and student support. For example, every \$1000 increase in expenditures on academic services increases the expected odds of degree completion by about 1.7 times ( $OR = 2.70, p < .001$ ). Similar to the finding reported in Table 28, institutional size was not associated with the expected odds of degree completion, but attending non-selective and minimally selective institutions (vs. two-year institutions) was significantly associated with earning a degree ( $OR = 3.01, p = .009$ ).

Table 28. Bivariate Logistic Regression Results: Institutional Predictors of Credential Completion (n = 329)

<b>Institutional Characteristic</b>	First College Attended			Most Attended College		
	Odds Ratio	95% CI	p	Odds Ratio	95% CI	p
College type/selectivity (ref: Two-year college)						
Non-/minimally selective four-year	2.11	1.01 – 4.41	.047	1.82	0.82 – 4.07	.143
Selective/highly selective four-year	3.92	1.92 – 8.02	<.001	3.94	1.97 – 7.91	<.001
Size (ref: Less than 2500)						
2501 to 5000	0.99	0.31 – 3.21	.983	2.02	0.62 – 6.64	.245
5001 to 10,000	0.74	0.26 – 2.12	.576	0.61	0.21 – 1.81	.373
More than 10,000	0.68	0.20 – 2.23	.519	1.03	0.30 – 3.48	.961
Percent part-time students (10%)	0.78	0.68 – 0.91	.001	0.83	0.70 – 0.98	.026
Percent low-income students (10%)	1.19	0.98 – 1.45	.077	1.20	0.99 – 1.44	.060
In-state tuition cost (\$1,000s)	1.14	1.07 – 1.22	<.001	1.09	1.02 – 1.17	.010
Expenditures on instruction per FTE (\$1,000s)	1.12	1.01 – 1.24	.027	1.12	1.02 – 1.24	.017
Expenditures on academic services per FTE (\$1,000s)	1.91	1.30 – 2.80	.001	1.55	1.10 – 2.17	.011
Expenditures on student support per FTE (\$1,000s)	1.79	1.32 – 2.43	<.001	1.61	1.15 – 2.23	.005
Retention Rate (10%)	1.02	0.72 – 1.43	.922	1.05	0.74 – 1.49	.897

## Exploration of Bivariate Predictors of Certificates vs. Degrees

Before proceeding to the multivariable regression models, some time is spent exploring differences that emerged between predictors of credential attainment and predictors of degree attainment. To better understand differences between predictors of degree completion and predictors of certificate completion, supplemental multinomial logistic regression analyses were conducted. The outcome variable consisted of three categories: no credential, a certificate, and a two-year or four-year college degree. In these analyses, no credential was designated as the base outcome, and the relative risk ratios (interpreted the same as odds ratios) for attaining a credential were compared to the relative risk ratios for attaining a college degree. This permits us to inspect whether predictors have different associations with the likelihood of earning a certificate (vs. no credential) and the likelihood of earning a degree (vs. no credential).<sup>39</sup>

Compared to earning no credential, some covariates had different relationships with the estimated likelihood of earning a certificate than with the estimated likelihood of earning a college degree. First, age of entry was not associated with the estimated odds of earning a certificate (ref: under 19,  $OR = 1.36, p = .537$  for 19-20 years old;  $OR = 1.94, p = .284$  for 21 years or older) but it was significantly associated with the estimated odds of earning a degree ( $OR = .34, p = .001$  for 19-20 years old;  $OR = .47, p = .114$  for 21 years or older). Being in the top GPA tertile versus the bottom tertile was not associated with the estimated odds of earning a certificate ( $OR = .95, p = .919$ ) but was a marginally significant predictor of earning a degree ( $OR = 1.89, p = .088$ ). Neither grade repetition ( $OR = 1.48, p = .375$ ) nor school expulsion ( $OR = 1.01$ ,

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<sup>39</sup> A credential or degree was not designated as the base outcome. First, this comparison was not of primary interest. It would have essentially involved testing whether students who earned a credential differed from students who earned a degree in individual characteristics and the colleges they attended. Second, this comparison would include just youth who attained a postsecondary credential ( $n = 80$ ), and statistical power to detect differences would be limited.

$p = .989$ ) was related to earning a credential, but both repetition ( $OR = .30, p = .007$ ) and expulsion ( $OR = .13, p = .046$ ) decreased the expected odds of earning a college degree. Similarly, the number of foster care placements was not associated with earning a certificate ( $OR = .98, p = .599$ ) but was marginally negatively associated with earning a degree ( $OR = .93, p = .052$ ). Being a parent after enrolling in college was not related to completing a certificate ( $OR = 1.08, p = .876$ ), but it had a large negative impact on the expected likelihood of completing a degree ( $OR = .34, p < .001$ ). There were a few pre- and post-entry factors that influenced the expected odds of earning a certificate but not a degree. Pre-entry parental status ( $OR = 2.45, p = .049$ ) and marital status ( $OR = 5.86, p = .048$ ) were both positively associated with completing a certificate, but pre-entry parental status ( $OR = 0.63, p = .270$ ) and marital status ( $OR = 1.19, p = .921$ ) were not related to degree completion. Post-entry full-time employment (vs. no employment) ( $OR = .24, p = .008$ ), mental health problems ( $OR = .40, p = .041$ ), and alcohol/substance use problems ( $OR = .34, p = .029$ ) decreased the estimated odds of earning a certificate. In contrast, full-time employment (vs. not employed) ( $OR = .46, p = .084$ ), mental health problems ( $OR = .71, p = .292$ ), and alcohol/substance use problems ( $OR = .63, p = .121$ ) had smaller and marginally significant or nonsignificant associations with the estimated odds of earning a degree.

Across the board, institutional-level factors influenced attainment of postsecondary degrees but not certificates. This is due largely to the fact that students who ultimately earned a certificate attended two-year colleges almost exclusively, while more variation existed in both the type (two-year vs. four-year) and selectivity of the colleges that degree earners had enrolled in. The expected odds of attaining a degree versus no credential were negatively impacted by the proportion of part-time students ( $OR = .68, p < .001$ ) and positively associated with the

proportion of students receiving Pell grants ( $OR = 1.30, p = .035$ ), tuition costs ( $OR = 1.19, p < .001$ ), and expenditures on instruction ( $OR = 1.17, p = .014$ ), academic services ( $OR = 2.59, p < .001$ ), and student support ( $OR = 2.30, p < .001$ ). There were no statistically significant associations with attainment of a certificate for the proportion of part-time students ( $OR = 1.19, p = .195$ ), the proportion of students receiving Pell grants ( $OR = .94, p = .643$ ), tuition costs ( $OR = .97, p = .679$ ), and expenditures on instruction ( $OR = 1.00, p = .957$ ), academic services ( $OR = .36, p = .128$ ), and student support ( $OR = .80, p = .456$ ).

In summary, many of the differences noted earlier in predictors of credential completion and degree completion were better understood after considering the results of the supplemental multinomial logistic regression models. Several covariates that significantly predicted degree completion were not associated with certificate completion (e.g., academic background, post-entry parenthood, institutional characteristics). This explains why we saw diminished effects of these covariates in the models of credential completion compared to models of degree completion. Adding certificate completers diluted the associations between these covariates and degree completion. Conversely, some predictors significantly hindered the expected odds of completing a certificate but not completing a degree (e.g., post-entry employment, mental health problems, and substance use problems). In some cases, combining certificate completers with degree earners produces associations that are not present when just degree attainment is evaluated.

## Multivariable Models

### Predictors of Credential Completion

Next, we turn to multivariable logistic regression models. One issue is that youth in this sample varied in the amount of time that their degree status could be observed after first

enrolling in college. These differences were especially large between youth identified by NSC data and youth identified by self-report in the Midwest Study interviews. Logically, youth who could be observed longer had more time to finish college and are thus more likely to have attained a credential. Failing to account for observation time differences could lead to biased results. One option that was explored involved introducing a control variable for the number of years youth could be observed for. A youth's observation time was the number of years between the date when she first enrolled in college and the date of the NSC data draw (if she appeared in NSC records) or the date of her last Midwest Study interview.<sup>40</sup> However, one problem is that this variable was highly correlated with a key predictor in the model: the age at which youth first entered college (corr = -.63). Indeed, as displayed below, age of first entry was significantly associated with the estimated odds of completing college net of other factors, but when observation time was entered into the model the odds ratios were greatly reduced and entry age was not statistically significant. To avoid collinearity, a second alternative was considered: the use of a dummy variable for whether youths' outcomes were observed until the NSC data draw or until their last Midwest Study interview. Of the 53 youth in the current sample who were identified by Midwest Study self-report data, 45 (84.9%) completed the Wave 5 interview, so the indicator variable equaled roughly a four to five year difference in observation time between youth identified by NSC data and youth identified by self-report. Using the dummy variable

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<sup>40</sup> Note that for the youth who attained a postsecondary credential, the time from first entry to completion is shorter than the time from entry to the date their outcome could potentially be observed. For youth who attained a credential, the time in which their outcome could potentially be observed was used, rather than the time between first entry to credential attainment. Using the latter time frame would introduce endogeneity into the measure of observation time. That is, youths' credential status would influence their observation time. Indeed, when a variable coded in this manner was introduced into Model 4 in Table 27, the model produced several implausible and counterintuitive results [e.g., with two-year colleges as the reference group, the odds ratio for youth attending nonselective four-year colleges was about three times as large as the odds ratio of youth attending highly selective four-year colleges (15.1 vs. 5.3)].

turned out to be an effective statistical control that avoided the problematic collinearity of the continuous measure of observation time. That is, aside from age of first entry, the substantive conclusions of the other covariates were the same, and the directions and magnitudes of the regression coefficients were similar between the models that used the continuous observation time and the NSC indicator variable.<sup>41</sup> Problematic collinearity with age of first entry was also mitigated. In the model controlling for observation time, youth who entered at ages 19 and 20 ( $OR = .66, p = .385$ ) and youth who entered at age 21 or older ( $OR = .33, p = .194$ ) were not significantly different from their peers who entered before age 19. As displayed below in Table 29, age of entry is a statistically significant predictor of the expected odds of credential completion in the model using the NSC indicator as a control for observation time.<sup>42</sup>

The first model in Table 29 presents results from the logistic regression model that only included baseline predictors, age of entry into college, and the NSC indicator variable. Similar to the bivariate models, only gender and age of first entry significantly predicted the odds of completing a college degree. Model 2 added academic background measures and the number of foster care placements youth resided in. After controlling for these covariates, there were no statistically significant predictors of completion of a postsecondary credential. Since males and youth who enter college later in life tended to have more academic setbacks and foster care placements, adjusting for these factors reduced the differences in estimated odds of completion attributable to gender and entry age. Model 3 introduces pre- and post-entry covariates that significantly predicted college completion. If either a pre-entry or post-entry covariate predicted

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<sup>41</sup> With the exception of one parameter estimate (pre-enrollment alcohol/substance use problems, 13.7%), all of the parameters estimates between models were within 10 percent of one another, and the substantive conclusions did not change between models.

<sup>42</sup> Note: in a version of Model 4 that controls for neither observation time nor age of entry, the results are as follows (ref: under age 19): age 19 to 20 ( $OR = .46, p = .075$ ), age 21 or older ( $OR = .23, p = .052$ ).

college completion in the right panel of Table 29, both the pre- and post-entry measures were included in Model 3 below. In this model, Wisconsin youth were significantly more likely than Illinois youth to have completed college. Youth in the two older age categories were each less likely to have completed college than were youth who first enrolled in college before age 19. Post-entry parenthood, full-time employment (vs. no employment), and number of economic hardships each decreased youths' expected odds of earning a credential. Conversely youths' amount of social support before entering college increased their expected odds of completing a postsecondary credential. Marital status and alcohol/substance use problems, both prior to and after entering college, were not significantly predictive of completion. Youth who had been married after enrolling in college were more likely than unmarried youth to have been parents and to have encountered more economic hardships. Adjusting for these differences rendered post-entry marital status nonsignificant. Youth who had post-enrollment problems with alcohol or substances were more likely to be males and encountered more economic hardships, and accounting for these covariates diminished the relationship between alcohol/substance use problems and the estimated odds of completion.

Model 4 added the type/selectivity of the first college youth enrolled in. In this model, the expected odds of finishing college for males were less than half of the expected odds of finishing college for females. Youth who had entered college after age 21 were at a disadvantage in their predicted likelihood of completing a credential relative to youth who had entered college early. Post-entry parenthood, full-time employment, economic hardships, and social support continued to be significant predictors of completion after controlling for institution type and selectivity. Working full-time versus working less than 20 hours per week was also associated with a marginally significant reduction in the estimated odds of earning a degree ( $OR = .16, p = .057$ ).

Finally, youth who had attended four-year colleges (particularly selective institutions) had greater estimated odds of finishing college than did youth who had first entered two-year colleges. Although not displayed in the table, youth who had attended selective four-year colleges were not significantly more likely than youth who had attended less selective four-year colleges to have earned a credential ( $OR = 1.91, p = .309$ ).

Two counterintuitive findings in Model 4 involved post-entry social support and pre-entry economic hardships. The results suggested that having more social support after entering college impeded youths' chances of graduating, and experiencing more economic hardships before entering college improved their chances of graduating. These curious findings were driven by the associations that these two variables had with other covariates in the model, most notably their pre-/post-entry counterparts. The first finding came from the relationship that post-entry social support had with two other covariates in the model: pre-entry social support and post-entry economic hardships. Youth high in social support after entering college tended to have a lot of social support before entering college (corr = .51), and these youth encountered fewer economic hardships after enrolling in college (corr = -.31). When all three covariates were included in the model, pre-entry support and post-entry hardships predicted the outcome in the expected directions, but the adjusted statistical relationship between post-entry support and credential completion was in the opposite direction of what is expected. Indeed, the coefficient for post-entry social support was no longer statistically significant when we omitted pre-entry social support ( $OR = .71, p = .093$ ), post-entry hardships ( $OR = .65, p = .058$ ), or both ( $OR = .85, p = .426$ ). The counterintuitive association between post-entry social support and credential completion was a statistical artifact arising from collinearity.

A similar phenomenon occurred in the counterintuitive association between pre-entry economic hardships and credential completion. The relationship between the number of pre-entry hardships and college graduation was only significant when we controlled for post-entry hardships, since youth who experienced more hardships before entering college tended to encounter more hardships after entering college ( $corr = .14$ ). When post-entry hardship was removed from Model 4, pre-entry hardships was no longer a significant predictor of credential completion ( $OR = 1.20, p = .182$ ). Thus, the counterintuitive results around post-entry social support and pre-entry economic hardships arise as a statistical artifact of collinearity, and not necessarily because of their substantive associations with credential completion. These two covariates were retained in the final model to maintain consistency in the inclusion of both the pre-entry and post-entry covariate measures, and because they were important statistical controls for their counterpart measure and for other covariates.

Although not displayed, another set of supplemental analyses examined the interaction between gender and each of the two parental status covariates. In Model 4, the interaction of gender and post-entry parental status was not statistically significant ( $p > .50$ ). It was not possible to test the interaction terms between gender and the pre-entry parental status variable due to issues with model convergence.<sup>43</sup>

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<sup>43</sup> This was due to the fact that attaining a college credential was a rare outcome among the small number of males who were parents at some point before entering college. In some of the multiply imputed datasets, none of these individuals attained the outcome.

Table 29. Multivariable Logistic Regression Results: Baseline, Pre-Entry, Post-Entry, and Institutional Predictors of Credential Completion (n = 329)

	Model 1	Model 2	Model 3	Model 4	p	95% CI
	OR	OR	OR	OR		
<b>Demographic Characteristics</b>						
Male (ref: female)	0.57*	0.57^	0.49^	0.41*	.026	0.19 – 0.90
Race/ethnicity (ref: White)						
African American	0.94	0.90	1.09	1.01	.989	0.41 – 2.47
Hispanic	0.39	0.37	0.42	0.30	.100	0.08 – 1.26
Other race	1.12	1.14	0.77	0.67	.574	0.17 – 2.69
Age at baseline interview	1.94	1.78	3.34*	3.00*	.048	1.01 – 8.94
State (ref: Illinois)						
Wisconsin	1.95^	1.76	2.27*	2.12	.143	0.78 – 5.81
Iowa	1.19	1.08	1.26	1.39	.644	0.34 – 5.66
Age first enrolled in college (ref: under age 19)						
19 to 20	0.52*	0.65	0.41*	0.49	.109	0.21 – 1.17
21 or older	0.71	0.89	0.18*	0.19*	.035	0.04 – 0.89
NSC indicator	1.17	1.28	2.25	2.19	.020	1.20 – 8.61
<b>Academic and Foster Care History</b>						
Reading level, standardized	1.09	1.31	1.22	.289	0.85 – 1.76	
Ever repeated a grade	0.65	0.53	0.59	.228	0.25 – 1.39	
Ever in special education	0.90	0.75	0.90	.804	0.41 – 2.00	
Number foster care placements (1-40)	0.96	0.97	0.96	.340	0.89 – 1.04	
<b>Pre-and Post-Entry Factors</b>						
Pre-entry parent		1.68	1.52	.424	0.55 – 4.23	
Post-entry parent		0.31**	0.37*	.018	0.16 – 0.84	
Pre-entry married		2.72	3.52	.262	0.39 – 31.6	
Post-entry married		0.55	0.55	.272	0.19 – 1.60	

Table 29, continued

Pre-entry employment (ref: did not work)				
1 – 19 hrs./week	1.23	1.16	.796	0.37 – 3.61
20 – 34 hrs./week	1.49	1.36	.470	0.59 – 3.18
35+ hrs./week	1.20	1.06	.915	0.36 – 3.10
Post-entry employment (ref: did not work)				
1 – 19 hrs./week	1.37	1.40	.741	0.19 – 10.4
20 – 34 hrs./week	0.63	0.53	.272	0.17 – 1.65
35+ hrs./week	0.23**	0.22**	.002	0.08 – 0.58
Pre-entry social support	1.76*	1.91**	.006	1.20 – 3.03
Post-entry social support	0.53**	0.51**	.006	0.32 – 0.82
Pre-entry alcohol/substance use problem	1.49	1.63	.289	0.66 – 4.00
Post-entry alcohol/substance use problem	0.78	0.74	.421	0.35 – 1.55
Pre-entry economic hardships (0-6)	1.34*	1.38*	.032	1.03 – 1.85
Post-entry economic hardships (0-6)	0.68***	0.67***	<.001	0.55 – 0.82
<b>Institutional Characteristic</b>				
Type/Selectivity (ref: two-year college)				
Non-/minimally selective four-year		2.54^	.066	0.94 – 6.87
Selective/highly selective four-year		4.85**	.002	1.78 – 13.2

<sup>^</sup> p<.10 \*p<.05 \*\*p<.01 \*\*\*p<.001

Supplemental analyses were conducted on covariates omitted from Model 4 due to collinearity. After omitting pre- and post-entry alcohol/substance use problems, school expulsion was not significant ( $OR = .59, p = .424$ ), nor was pre-entry mental health problems ( $OR = .91, p = .813$ ) and post-entry mental health problems ( $OR = 0.75, p = .473$ ). After omitting pre- and post-entry economic hardships, neither pre-entry food insecurity ( $OR = 1.48, p = .448$ ) nor post-entry food insecurity ( $OR = .62, p = .189$ ) significantly predicted credential completion.

Several institutional factors were associated with the expected odds of completing a credential after college type/selectivity was omitted, including: the percentage of part-time students ( $OR = .73, p = .002$ ), the cost of tuition and expenses ( $OR = 1.17, p = .001$ ), expenditures on academic support ( $OR = 2.65, p = .001$ ), and expenditures on student services ( $OR = 1.99, p = .001$ ). After removing selectivity, expenditures on instruction was a marginally significant predictor of completing a credential ( $OR = 1.13, p = .083$ ). An unexpected finding is that the percentage of students receiving Pell grants was positively associated with the estimated odds of completion, with every 10-percentage point increase in the proportion of students receiving Pell grants increasing the estimated odds of completion by about 32 percent ( $OR = 1.32, p = .026$ ). This finding is curious because the model did not control for institutional type and selectivity, and previous research had found that larger proportions of Pell grant recipients is negatively associated with college completion. However, since foster youth generally have limited resources and will qualify for need-based aid, and since most attend two-year and non-and less-competitive four year colleges, attending institutions where greater proportions of students receive need-based aid may be beneficial.

### **Exploration of institutional predictors of credential completion.**

To get a clearer picture of the independent contributions of institutional factors on students' likelihood of graduating, a few additional analyses were conducted. Two of the statistically significant institutional predictors pertained to characteristics of the student body (percent part-time, percent receiving Pell grant), and three pertained to financial dimensions of the institution (cost of tuition, expenditures on academic support services, and expenditures on student support services). The final significant predictor of credential completion was college type/selectivity, which is an indicator that captures aspects of an institution's student body, finances, and other dimensions. While proceeding with the additional regression analyses, it helps to examine descriptive statistics of the college types in order to understand the interrelationships between the variables.

Table 30 presents differences in the five significant institutional factors by the three categories of college type/selectivity. As displayed in Table 30, there were much higher proportions of part-time students in two-year and less selective four-year colleges than there were in selective four-year colleges (both  $p < .001$ ). Since the percentage of part-time students is negatively associated with completion and positively associated with college types (i.e., two-year and less selective four-year colleges), including both institutional type/selectivity and percent of part-time students in Model 4 would likely diminish the predictive power of each. This is what was found—the percentage of part-time students was no longer significantly related to the expected odds of completion ( $OR = .79, p = .121$ ) and neither was institutional selectivity ( $p > .25$  for both coefficients).

From the table below, we see that receipt of Pell grants at less selective four-year colleges was considerably higher than at two-year colleges and selective four-year colleges (both  $p < .001$ ). Consequently, after controlling for the proportion of students receiving Pell grants in

Model 4, there was not a credential completion advantage for students in less selective four-year colleges versus two-year colleges ( $OR = 1.44, p = .555$ ), however, students in selective four-year colleges continued to have a much higher expected odds of graduating than did students in two-year colleges ( $OR = 4.22, p = .006$ ). In the same model, after controlling for the type and selectivity of the college, the proportion of Pell grant recipients was marginally significantly associated with the expected odds of completing a credential ( $OR = 1.29, p = .067$ ).

We now turn to the three institutional factors associated with cost of attendance and expenditures. In Table 30, it was seen that the cost of tuition and fees for less selective and selective four-year colleges are comparable, but tuition is more than three times higher at four-year colleges than at two-year colleges ( $p < .001$ ). When tuition and selectivity were included in Model 4, tuition was a marginally significant predictor of completion ( $OR = 1.17, p = .032$ ) but selectivity differences disappeared for both students in less selective four-year colleges versus two-year colleges ( $OR = .74, p = .718$ ) and selective four-year colleges versus two-year colleges ( $OR = 1.51, p = .616$ ). We also saw in Table 30 that four-year colleges spend significantly more than two-year colleges on academic support and student services (all  $p < .001$ ). Selective four-year colleges devoted particularly large amounts of resources (relative to the other college types) to academic support. When selectivity was entered into separate models with each of the expenditure types, selectivity was not significantly associated with completion (all  $p > .10$ ) but each of the expenditure types were statistically significant (for academic support  $OR = 2.59, p = .034$ ; for student services  $OR = 1.81, p = .030$ ).

Table 30. Descriptive Statistics of Institutional Factors, by College Type>Selectivity (n = 329)

	Two-year colleges	Non-/Less selective four-year colleges	Selective/Highly selective four-year colleges
Percent part-time students (%)	58.9	49.3	14.2
Percent low-income students (%)	27.8	48.4	33.2
In-state tuition cost (Mean)	\$2,880	\$9,967	\$10,373
Expenditures on academic services per FTE (Mean)	\$613	\$1,149	\$2,468
Expenditures on student support per FTE (Mean)	\$1,052	\$2,405	\$2,140

To summarize the results of supplemental analyses of institutional predictors, we found that students who first entered four-year colleges were more likely than students who entered two-year colleges to ultimately complete a credential. These differences likely arose from a combination of factors, such as the composition of the student body (e.g., percent of part-time students), the investment that different institutions make to support students and academics, as well as other institutional factors not investigated in this analysis. What is clear, however, is that even after accounting for the type and selectivity of the institution, there were some institutional characteristics that were related to foster youths' expected likelihood of completing a credential. First, the investments institutions made in student services and academic support each increased the estimated odds that students would graduate. Second, increases in the percentage of students attending a college on a part-time basis decreased students' chances of completing a credential. Third, greater proportions of Pell grant recipients at a school had a marginally significant positive association with the estimated likelihood of completing a postsecondary credential ( $p = .067$ ). As discussed in detail in the concluding chapter, the three sets of findings are consistent with what we would expect to find from Tinto's theory. Institutions that invest in academic and social resources for students, institutions that have a large proportion of students

who attend full-time, and institutions where high proportions of low-income students receive need-based aid are expected to promote the chances that students would finish a credential.

### **Predictors of Degree Completion**

We now briefly examine results of multivariable logistic regression analyses in which degree completion was evaluated as the outcome. Results are displayed in Table 31, and just the findings from the final model (Model 4) are summarized here. Model 4 results were largely consistent with the results presented earlier in Table 31, with a few notable differences. While both the credential model and the degree model reported age of entry differences, the middle age group (19 or 20 years old vs. 19 or younger) significantly predicted degree completion while the top age group (21 or older vs. 19 or younger) significantly predicted credential completion. Post-entry parental status and pre-entry social support were marginally significant predictors of degree completion, and post-entry social support was not significantly associated with the expected odds of completing a degree. These three covariates were significant predictors in the credential model. Like the results in Table 29, attending four-year colleges increased the expected odds of completing a degree, but the magnitude of institutional selectivity was larger for degree completion than it was for credential completion.

Although not displayed, supplemental analyses investigated the interaction between gender and each of the two parental status covariates. The interaction between gender and post-entry parental status was not statistically significant ( $p > .50$ ). It was not possible to test the interaction terms between gender and the pre-entry parental status variable due to issues with model convergence that were reported earlier for credential completion.

Table 31. Multivariable Logistic Regression Results: Baseline, Pre-Entry, Post-Entry, and Institutional Predictors of Degree Completion (n = 329)

	Model 1	Model 2	Model 3	Model 4	p	95% CI
	OR	OR	OR	OR		
<b>Demographic Characteristics</b>						
Male (ref: female)	0.66	0.66	0.49 <sup>^</sup>	0.35*	.026	0.14 – 0.89
Race/ethnicity (ref: White)						
African American	0.84	0.83	1.20	1.01	.987	0.35 – 2.89
Hispanic	0.58	0.53	0.66	0.40	.231	0.09 – 1.80
Other race	1.05	1.07	0.81	0.66	.608	0.13 – 3.24
Age at baseline interview	2.70*	2.52 <sup>^</sup>	5.14**	5.18*	.016	1.37 – 19.6
State (ref: Illinois)						
Wisconsin	2.17 <sup>^</sup>	2.04	2.55 <sup>^</sup>	2.38	.158	0.71 – 7.93
Iowa	1.19	1.05	1.10	1.43	.654	0.30 – 6.96
Age first enrolled in college (ref: under age 19)						
19 to 20	0.29**	0.38*	0.27**	0.33*	.037	0.12 – 0.93
21 or older	0.43	0.56	0.20 <sup>^</sup>	0.21 <sup>^</sup>	.087	0.03 – 1.25
NSC indicator	0.57	0.66	0.96	0.81	.730	0.25 – 2.61
<b>Academic and Foster Care History</b>						
Reading level, standardized		1.10	1.40 <sup>^</sup>	1.26	.289	0.82 – 1.94
Ever repeated a grade		0.38*	0.34*	0.41	.119	0.13 – 1.24
Ever in special education		1.14	1.10	1.66	.294	0.64 – 4.29
Number foster care placements (1-40)		0.95	0.97	0.95	.321	0.86 – 1.05
<b>Pre-and Post-Entry Factors</b>						
Pre-entry parent			1.12	0.94	.923	0.26 – 3.33
Post-entry parent			0.31**	0.40 <sup>^</sup>	.055	0.16 – 1.02
Pre-entry married			1.21	1.84	.671	0.11 – 31.2
Post-entry married			0.55	0.55	.347	0.16 – 1.90

Table 31, continued

Pre-entry employment (ref: did not work)				
1 – 19 hrs./week	1.72	1.62	.451	0.46 – 5.71
20 – 34 hrs./week	1.43	1.43	.484	0.52 – 3.94
35+ hrs./week	1.64	1.74	.376	0.51 – 5.99
Post-entry employment (ref: did not work)				
1 – 19 hrs./week	2.06	1.91	.546	0.23 – 15.5
20 – 34 hrs./week	0.85	0.55	.393	0.14 – 2.16
35+ hrs./week	0.27*	0.22*	.011	0.07 – 0.71
Pre-entry social support	1.52	1.72^	.053	0.99 – 2.96
Post-entry social support	0.70	0.66	.152	0.37 – 1.16
Pre-entry alcohol/substance use problem	1.35	1.53	.442	0.51 – 4.57
Post-entry alcohol/substance use problem	1.06	0.99	.996	0.41 – 2.43
Pre-entry economic hardships (0-6)	1.27	1.29	.169	0.90 – 1.84
Post-entry economic hardships (0-6)	0.71**	0.69**	.003	0.54 – 0.88
<b>Institutional Characteristic</b>				
Type/Selectivity (ref: two-year college)				
Non-/minimally selective four-year		3.83*	.021	1.22 – 12.0
Selective/highly selective four-year		11.1***	<.001	3.69 – 33.1

<sup>^</sup> p<.10 \*p<.05 \*\*p<.01 \*\*\*p<.001

Supplemental analyses of collinear predictors resulted in similar conclusions as results from the analyses of credential completion. After omitting the collinear covariates described earlier, school expulsion ( $OR = .26, p = .232$ ), pre-entry mental health problems ( $OR = 1.20, p = .706$ ) post-entry mental health problems ( $OR = 0.96, p = .925$ ), pre-entry food insecurity ( $OR = 1.42, p = .592$ ), and post-entry food insecurity ( $OR = .97, p = .942$ ) did not significantly predict degree completion.

Recall that for credential completion, several institutional factors were significantly associated with the outcome (i.e., percent part-time students, percent receiving Pell grant, tuition costs, academic support expenditures, student services expenditures) and expenditures on instruction were marginally significantly related to the estimated odds of completing a credential. When analyzing degree completion, all of these predictors were statistically significant. In fact, the magnitudes of the institutional factors were consistently larger for degree completion than for credential completion, ranging from modest to quite large increases in the estimated odds ratios. The modest increases included the percentage of part-time students ( $OR = .64, p = <.001$ ; vs.  $OR = .73, p = .002$  in the credential model), expenditures on instruction ( $OR = 1.24, p = .010$ ; vs.  $OR = 1.13, p = .083$  in the credential model), percentage of Pell grant recipients ( $OR = 1.56, p = .003$ ; vs.  $OR = 1.32, p = .026$  in the credential model), and the cost of tuition and expenses ( $OR = 1.22, p = <.001$ ; vs.  $OR = 1.17, p = .001$  in the credential model). The large increases were found in two types of spending: expenditures on academic support ( $OR = 3.73, p < .001$ ; vs.  $OR = 2.65, p = .001$  in the credential model) and expenditures on student support services ( $OR = 3.12, p < .001$ ; vs.  $OR = 1.99, p = .001$  in the credential model). Similar to the results reported earlier for credential completion, institutional factors appear to have played an important role in the expected likelihood of foster youth attained a college degree. These findings come with the

caveat of the possibility of omitted variable bias. Although the estimates of institutional factors adjusted for a wide range of student characteristics and life circumstances, there may still have been other characteristics not well measured that influenced the sorting process into different types of colleges and that impact degree completion.

### **Accounting for Selection into College**

As a final step, we examined whether findings above were influenced by selection into college. Similar to the previous chapter, the number of types of college preparatory activities youth participated in was used as the exogenous variable. In this sample, the number of activities had a strong association with the expected likelihood of youth entering college ( $OR = 1.25, p < .001$ ), and was not related to the expected likelihood of youth finishing college among college entrants ( $OR = 1.05, p = .620$ ). While concerns about the exclusion restriction assumption being satisfied are still present for the current analysis, they may not be as pronounced. Unmeasured youth characteristics that were associated with participation in college prep activities may not have as strong of an association with long-term college outcomes. For example, reading proficiency was strongly associated with persistence but was predictive of credential attainment. Indeed, factors that were most strongly associated with college completion were life circumstances that occurred after youth entered college, and not characteristics of the youth measured at age 17.

To make the model more parsimonious for the two-stage bivariate probit model, several nonsignificant factors were excluded from Model 4 including grade repetition, special education, number of foster care placement, and pre-entry and post-entry marital status and alcohol/substance use problems.

Results of a probit model of the expected likelihood of earning a credential among college entrants is displayed in the left panel of Table 32, and results of the bivariate probit model are displayed in the right panel. The correlation between omitted variables was relatively small and nonsignificant ( $\rho = -.08$ ,  $p = .914$ ), suggesting that the influence of unmeasured variables did not have undue influence on the covariate estimates in the model estimating college completion. As seen in the point estimates in the probit and bivariate probit model, the beta values and conclusions are similar.

Table 32. Comparison of Probit and Bivariate Probit Results: Predictors of Credential Completion (n = 329).

	Probit Completion (n = 329)		Bivariate Probit: Completion (n = 329)		
	B		B	p	95% CI
<b>Baseline Characteristics</b>					
Male (ref: female)	-0.53	*	-0.50	^	.088 [-1.08, 0.07]
Race/ethnicity (ref: White)					
African American	0.04		0.03	.893	[-0.44, 0.50]
Hispanic	-0.62		-0.62	.119	[-1.41, 0.16]
Other race	-0.21		-0.21	.595	[-0.99, 0.56]
Age at baseline interview	0.56		0.57	^	.070 [-0.05, 1.19]
State (ref: Illinois)					
Wisconsin	0.41		0.42	.194	[-0.21, 1.06]
Iowa	0.11		0.13	.767	[-0.72, 0.98]
Age first enrolled in college (ref: under age 19)					
19 to 20	-0.39	^	-0.38	.103	[-0.85, 0.08]
21 or older	-0.85	*	-0.85	*	.044 [-1.67, -0.21]
NSC indicator	0.42		0.58	*	.023 [0.08, 1.08]
Reading level, standardized	0.14		0.12	.497	[-0.23, 0.47]
<b>Pre-and Post-Entry Factors</b>					
Pre-entry parent	0.19		0.19	.499	[-0.36, 0.74]
Post-entry parent	-0.56	*	-0.56	*	.016 [-1.01, -0.11]
Pre-entry employment (ref: did not work)					
1 – 19 hrs./week	0.07		0.07	.818	[-0.56, 0.70]
20 – 34 hrs./week	0.10		0.10	.683	[-0.37, 0.56]
35+ hrs./week	0.02		0.02	.966	[-0.58, 0.61]

Table 32, continued

Post-entry employment (ref: did not work)					
1 – 19 hrs./week	0.15	0.15	.798	[-1.02, 1.33]	
20 – 34 hrs./week	-0.22	-0.22	.501	[-0.84, 0.41]	
35+ hrs./week	-0.84 **	-0.83 **	.003	[-1.38, -0.28]	
Pre-entry social support	0.35 **	0.35 **	.007	[0.09, 0.61]	
Post-entry social support	-0.35 **	-0.35 *	.010	[-0.62, -0.09]	
Pre-entry economic hardships (0-6)	0.18 *	0.19 *	.022	[0.03, 0.34]	
Post-entry economic hardships (0-6)	-0.24 ***	-0.24 ***	<.001	[-0.35, -0.13]	
<b>Institutional Characteristic</b>					
Type>Selectivity				Entry (n = 732)	
(ref: two-year college)				B	p
Non-/minimally selective four-year	0.52 ^	0.51 ^	.073	[-0.05, 1.08]	
Selective/highly selective four-year	0.86 **	0.85 **	.003	[0.30, 1.41]	
Male (ref: female)				B	95% CI
	-0.32 **		.001	[-0.5, -0.13]	
Race/ethnicity (ref: White)					
African American	0.05		.674	[-0.19, 0.29]	
Hispanic	0.25		.185	[-0.12, 0.62]	
Other race	0.08		.685	[-0.31, 0.48]	
Age at baseline interview		-0.29 ^	.063	[-0.61, 0.02]	
State (ref: Illinois)					
Wisconsin		-0.36 **	.007	[-0.63, -0.10]	
Iowa		-0.41 *	.036	[-0.79, -.03]	
Reading level, standardized		0.28 ***	<.001	[0.18, 0.37]	
Number of college prep. activities (0-4)		0.12 **	.003	[0.04, 0.20]	
	ρ	-0.09	.914		

^ p&lt;.10 \*p&lt;.05 \*\*p&lt;.01 \*\*\*p&lt;.001

### **Exploration of Three Post-Entry Predictors of College Completion**

Three post-entry factors were found to significantly predict youths' likelihood of completing college: experiencing more economic hardships, working long hours, and tending to parental responsibilities. The implicit assumption was that each of these factors either led youth to drop out of college and/or was a barrier to returning to college after they dropped out. However, it is conceivable that these factors were related to the estimated likelihood of finishing college in other ways. In terms of employment, youth may have willfully chosen to forgo completing college because better work opportunities arose. In this case, full-time employment would be a positive opportunity rather than a deterrence to finishing college. Similarly, some youth may have decided that they wanted to have a child, and this took precedence over finishing college. In terms of encountering economic hardships, it could be that some youth lost interest in finishing college, and lack of a college degree later increased their chances of encountering more economic hardships. In this case, economic hardships would be a *consequence* of not finishing college rather than a hindrance to finishing college.

Fortunately, in the third, fourth, and fifth waves of the Midwest Study youth who had dropped out of college were asked about the reasons they left, and youth who were not enrolled in college at the time of the interview were asked about the barriers they encountered to returning to school. Both questions included the response options pertaining to not being able to afford college, needing to work, and having child care responsibilities, among others (e.g., transportation difficulties, academic difficulties, other reasons/barriers). These data allow us to check the assumptions about the three post-entry factors. For example, we would expect that youth who encountered greater numbers of post-entry hardships would be more likely to report that an inability to afford tuition was a hindrance to completing college (either a reason for

dropping out or a barrier to returning). To test our assumptions, two regression models were run for each post-entry factor—one for reason for dropping out and one for barrier to continuing college. If youth reported in waves 3, 4, or 5 of the Midwest Study that not being able to afford tuition was a reason they dropped out, they were assigned a one. If they did not report that tuition affordability was a reason for dropping out (or if they had not dropped out), a zero was assigned. A binary measure was constructed in a similar fashion for the barrier to continuing college measure, with a one indicating that the cost of college was a barrier to continuing their education and zero indicating that college cost was not a barrier. Similar dropout reason measures and barrier to reentry measures were created for needing to work and needing to tend to parental responsibilities.

Table 33 presents abbreviated results from six logistic regression models that investigated the associations between each post-entry factor and its respective reason for dropping out of college/barrier to reentering college. Each model controls for a small number of important covariates: the pre-entry counterpart of the post-entry factor, the age youth first entered college, the NSC indicator, and pre-entry and post-entry measures of their lowest educational aspirations. Lowest educational aspirations, rather than highest aspirations, were used to control for the possibility that youth downgraded their aspirations at some point after entering college.<sup>44</sup> Model 1 in Table 33 investigates the relationship between the number of post-entry economic hardships and the expected likelihood that youth reported that college cost was a reason for dropping out of college. Each additional hardship significantly increased the expected odds of tuition costs being a dropout reason by about 56 percent, net of their pre-entry hardships, educational aspirations,

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<sup>44</sup> Sensitivity analyses were conducted that used highest educational aspirations instead of lowest aspirations. Results were basically the same, and in some cases, more pronounced than the results reported in Table 32.

age of entry, and NSC indicator status. A similar association was found between the number of hardships and college affordability as being a barrier to reenrollment. Models 3 and 4 examined post-entry employment status. Only youth who worked full-time after entering college reported that needing to work had been a reason they dropped out and a barrier to reenrolling. Full-time employment was a significant dropout reason compared to youth who did not work, youth who worked 1 – 19 hours per week ( $OR = 8.54, p = .003$ ), and youth who worked 20 – 35 hours per week ( $OR = 2.55, p = .011$ ). Full-time employment was a significant barrier to returning to school compared to youth who did not work and youth who worked 20 – 35 hours per week ( $OR = 2.30, p = .022$ ), and it had a marginally significant association with youth who worked 1 – 19 hours per week ( $OR = 3.71, p = .053$ ). Finally and as expected, youth who were or became parents after starting college were significantly more likely than non-parents to report child care responsibilities as a reason for dropping out and a barrier to future education. In sum, these analyses supported the interpretation that post-entry economic hardships, full-time employment, and parental status each stand in the way of youth completing college, and were not merely desirable alternatives to or a consequence of leaving college.

*Table 33. Multivariable Logistic Regression Results: Post-Entry Factor Predicting Its Corresponding Reason for Dropout/Barrier to Reenrollment (controls not shown) (n = 364)*

	Odds Ratio	95% CI	p
<b>Regression model</b>			
1. Tuition costs (reason for dropout) on post-entry economic hardships (0-6)	1.57	1.35 – 1.82	<.001
2. Tuition costs (barrier to returning) on post-entry economic hardships (0-6)	1.55	1.34 – 1.76	<.001
3. Need to work (reason for dropout) on post-entry employment (ref: not employed)			
1 – 19 hrs./week	0.42	0.09 – 1.94	.264
20 – 34 hrs./week	1.39	0.53 – 3.69	.510
35+ hrs./week	3.54	1.58 – 7.95	.002
4. Need to work (barrier to returning) on post-entry employment (ref: did not work)			
1 – 19 hrs./week	1.12	0.26 – 4.93	.874
20 – 34 hrs./week	1.82	0.68 – 4.87	.236
35+ hrs./week	4.18	1.86 – 9.43	.001
5. Parental responsibilities (reason for dropout) on post-entry parental status	4.32	2.39 – 7.80	<.001
6. Parental responsibilities (barrier to returning) on post-entry parental status	4.36	2.40 – 7.92	<.001

## Chapter Summary

In this chapter we examined a variety of predictors of college completion among participant who had entered college. Males were less likely than females to finish college, as were students who first entered college at a later age compared to youth who entered college young. Youths' academic background and foster care history characteristics did not significantly predict college completion. Instead, we found that events and circumstances later in life, particularly after youth had enrolled in college, played a larger role in whether they earned a credential. After beginning college, youth who had children, who worked full-time, and who experienced more economic hardships were less likely to earn a postsecondary credential. The amount of perceived social support youth reported prior to entering college was positively

associated with the expected odds of later finishing college. Institutional factors of the colleges students attended also influenced their predicted likelihood of earning a credential after controlling for a range of youth background characteristics and life circumstances. When examined separately, characteristics of the institution itself (i.e., type/selectivity, tuition costs), characteristics of the student body (i.e., percent enrolled part-time, percent low-income), and amounts invested in students (i.e., academic services, student support) each predicted the expected odds of completion. Institution-level factors had particularly strong influences on the expected likelihood of completing a college degree. The main findings from the final regression models were robust after accounting for a possible selection process of college entry. In the next two chapters, we transition from investigating a broad array of predictors of college outcomes to focusing on two specific predictors: avoidant attachment and extended foster care.

## AVOIDANT ATTACHMENT AND COLLEGE OUTCOMES

This chapter investigates hypotheses surrounding avoidant attachment. Recall that it was hypothesized that (a) past maltreatment and relational instability would be associated with increased avoidant attachment, (b) higher avoidant attachment scores would decrease youths' likelihood of persisting in college and finishing college, and (c) the association between avoidant attachment and college outcomes would be mediated by youths' amount of perceived social support. This chapter is organized to explore the avoidant attachment measure and test these hypotheses. The first section reviews the construction and psychometric properties of the avoidant attachment scale. The second section tests the set of hypotheses about avoidant attachment's expected associations with past maltreatment and relational instability. The third section examines the associations between avoidant attachment and baseline covariates examined in this dissertation. The fourth section presents results of multivariable logistic regression analyses that examine the extent to which avoidant attachment predicts college outcomes, and whether perceived social support mediates these relationships. Finally, the fifth section presents abbreviated findings on anxious attachment, which was hypothesized to be related to past maltreatment and relational instability but unrelated to college persistence and completion.

Two measures were used as proxies for relational instability: the number of foster care placement changes, and the number of school changes due to a foster care placement change or a family move. It is important to note that these were indirect and imperfect measures of relational instability. It was assumed that relationship ruptures accompany each transition, but this may not necessarily have been the case. For example, some foster care placement changes involve a youth moving from one placement to a foster home with a family member (kinship foster care).

Importantly, the count of school moves and placement changes do not capture other qualitative information about the transition, such as the length of time youth had been at the previous school/placement, their emotional attachment to the people and places, and the extent to which some degree continuity was preserved (e.g., a youth may have changed placements but remained at the same school). The extent to which school changes and placement moves do not capture relational instability would have weakened the predictive associations between these variables and avoidant attachment.

### **Avoidant Attachment Scale Construction and Psychometric Properties**

Eleven items from the Experiences in Close Relationships-Revised (ECR-R) inventory that measured attachment avoidance were administered to Midwest Study participants during the baseline interview. All 11 questions had a seven-point response set, ranging from “disagree strongly” to “agree strongly.” The response options included a neutral/mixed response, but less than 10 percent of youth selected the neutral category for any of the 11 items (see Table 34). This section progresses from exploring the distributions of the 11 items to examining the pairwise correlations among the items. Understanding these associations are the building blocks for the later parts of this section, which investigated how these items cohere as a measure of avoidant attachment.

Descriptive statistics for each of the 11 items are presented in Table 34. The seven items in boldface were asked in the opposite direction of the items not in boldface. A higher score on the bolded items indicated lower avoidant attachment. The first five items relate to emotional guardedness and reluctance around disclosing and sharing personal feelings (V1-V5). The next three items pertain to comfortability around depending on others (V6-V8). The last three items pertain to emotional closeness and affection (V9-V11). Overall, the distributions tended to be

bimodal, with “agree” and “disagree” being the most commonly selected responses for most of items. The far right column in Table 34 presents the means for each item, after reverse coding the boldfaced items. In this column, a higher score indicates greater avoidant attachment. It can be observed that the highest scores pertained to the two items about depending on others (V6 and V7), and two of the lowest scores pertained to items about comfortability with being close to others (V9 and V10). The five items pertaining to emotional guardedness and disclosure of personal feelings (V1 to V5) had means that were in between the two extremes. The item with the smallest mean asked youth if they agree that it helps to turn to others in times of need. The particularly low score may have been due to the fact that this item asks youth to respond to a general statement about relying on others, rather than their own feelings or actions. Respondents may have agreed, generally, that it helps to seek assistance from others, and this belief may or may not have been attached to whether they actually did this or whether they felt comfortable with seeking assistance. Another general trend was that, after reverse coding the means, the average scores were generally higher for questions that asked about positive characteristics (boldfaced) than about negative characteristics (not boldfaced). This may be an instance of a cognitive bias in which respondents overestimate their positive qualities and underestimate negative qualities.

Table 34. Descriptive Statistics of Items Used to Create Avoidant Attachment Scale (n = 726)

Item	Response options							Original	Reverse <sup>a</sup>
	1 Disagree Strongly	2 Disagree	3 Some- what disagree	4 Neutral/ Mixed	5 Some- what Agree	6 Agree	7 Agree Strongly		
	%	%	%	%	%	%	%		
<b>(1) I usually discuss my problems and concerns with others</b>	6.3	14.4	7.4	8.5	16.0	33.3	14.1	4.69 (1.87)	3.30 (1.87)
<b>(2) I feel comfortable sharing my private thoughts and feelings with others</b>	8.6	20.8	7.0	8.6	20.3	26.2	8.5	4.24 (1.91)	3.76 (1.91)
(3) I don't feel comfortable opening up to others	9.3	29.7	7.3	9.3	14.9	22.3	7.1	3.86 (1.94)	3.86 (1.94)
(4) I prefer not to show others how I feel deep down	9.7	28.1	6.3	9.0	11.5	23.8	11.5	4.02 (2.04)	4.02 (2.04)
<b>(5) Others really understand me and my needs</b>	5.5	14.1	8.5	9.9	20.0	34.0	8.1	4.59 (1.76)	3.41 (1.76)
(6) I find it difficult to allow myself to depend on others	7.1	22.2	8.8	8.1	14.9	27.7	11.2	4.29 (1.94)	4.29 (1.94)
<b>(7) I feel comfortable depending on others</b>	15.1	31.4	7.3	6.9	12.5	22.0	4.9	3.56 (1.99)	4.44 (1.99)
<b>(8) It helps to turn to others in times of need</b>	2.6	7.4	5.2	7.0	14.0	48.0	15.8	5.29 (1.55)	2.71 (1.55)
(9) I get uncomfortable when others want to be very close	14.0	47.1	7.0	8.4	9.6	9.6	4.4	2.99 (1.75)	2.99 (1.75)

Table 34, continued

<b>(10) I am very comfortable being close to others</b>	3.3	12.4	4.8	6.6	18.1	43.9	11.0	4.99 (1.67)	3.01 (1.67)
<b>(11) It's easy for me to be affectionate with others</b>	4.8	18.0	7.4	9.6	14.2	37.1	8.9	4.57 (1.83)	3.43 (1.83)

<sup>a</sup>Note: Boldfaced items are reverse coded when calculating the means in this column so that a higher score indicates greater avoidant attachment for all items.

Next, we examine the bivariate associations among the scale items. The correlation matrix for the 11 items is displayed in Table 35. Most of the pairwise correlations were in the small to medium range (i.e., 0.15 to 0.5). Of the 55 correlations, all but 6 were statistically different from zero. Five of the six nonsignificant associations were related to Item 6 (“I find it difficult to allow myself to depend on others”). Many of the strongest correlations pertained to comfortability with sharing private thoughts and feelings, comfortability with being close to others, and usually discussing problems and concerns.

Overall, the correlation matrix displays a moderate degree of association among the items. Moreover, it does not appear that there were clear and distinct clusters of items, at least clusters that were based on substantive content of the questions. For example, the 10 boxes highlighted in light gray correspond to the items that I characterized earlier as emotional guardedness, the three medium gray boxes correspond to interrelations of the items characterized as disavowal of dependence, and the three dark gray boxes are the items characterized as comfortability with closeness. We might expect correlations of items within each group to have been particularly strong, and the correlations in unshaded boxes to have been weaker. What we find is that although the correlations in these three groups were moderate (less so for disavowal of dependence), there were also moderately strong associations with items across the groups (unshaded boxes). Moreover, a different pattern emerges upon closer inspection. Items that pertain to positive characteristics (boldfaced) tended to be correlated with other items that asked about positive characteristics. Similarly, there were consistently modest correlations among items that asked about negative characteristics (not boldfaced). Correlations tended to be weaker for positive-negative item pairs.

Table 35. Correlation Matrix of Avoidant Attachment Scale Item (n = 726)<sup>a</sup>

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
<b>(1) I usually discuss my problems and concerns with others</b>	1										
<b>(2) I feel comfortable sharing my private thoughts and feelings with others</b>	.48	1									
(3) I don't feel comfortable opening up to others	-.23	-.32	1								
(4) I prefer not to show others how I feel deep down	-.23	-.30	.49	1							
<b>(5) Others really understand me and my needs</b>	.33	.40	-.28	-.28	1						
(6) I find it difficult to allow myself to depend on others	.11	-.01†	.21	.16	-.05†	1					
<b>(7) I feel comfortable depending on others</b>	.22	.31	-.18	-.15	.29	-.20	1				
<b>(8) It helps to turn to others in times of need</b>	.38	.35	-.11	-.10	.33	.09†	.28	1			
(9) I get uncomfortable when others want to be very close	-.13	-.16	.28	.32	-.18	.14	-.04†	-.10	1		
<b>(10) I am very comfortable being close to others</b>	.26	.39	-.23	-.22	.39	-.04†	.33	.41	-.30	1	
<b>(11) It's easy for me to be affectionate with others</b>	.30	.34	-.22	-.25	.30	-.06†	.25	.24	-.23	.39	1

<sup>a</sup>Note: boldfaced items are reverse coded when creating the avoidant attachment scale.

Having explored the individual distributions and bivariate correlations among the items, the next step is to investigate the extent to which the all items cohered as a single factor. A common measurement of the overall internal consistency among a set of items is Chronbach's alpha. In the case of these 11 items, the Chronbach's alpha was .77, which indicates an acceptable to good degree of internal reliability (Tavakol & Dennick, 2011). Removing one or a few items caused only slight changes to the value of the Chronbach's alpha.<sup>45</sup> The alpha reported here was lower than the alphas found in most studies using the avoidant attachment scale of the ECR, where Chronbach's alphas of .90 or higher are typically reported (see Sibley & Liu, 2004 for review). This is likely due at least in part to the fact that not all 18 items of the original scale were administered. Additionally, the original ECR was developed to ask about one close relationships, and in the Midwest Study it was used to ask about relationships generally. Nevertheless, a Chronbach's alpha of .77 falls squarely in the acceptable to good range of internal reliability. Therefore, the 11 items were used to create a scale score for avoidant attachment based on the coding procedures outlined by the ECR-R (Brennan, Clark, & Shaver, 1998; Fraley, Waller, & Brennan, 2000).

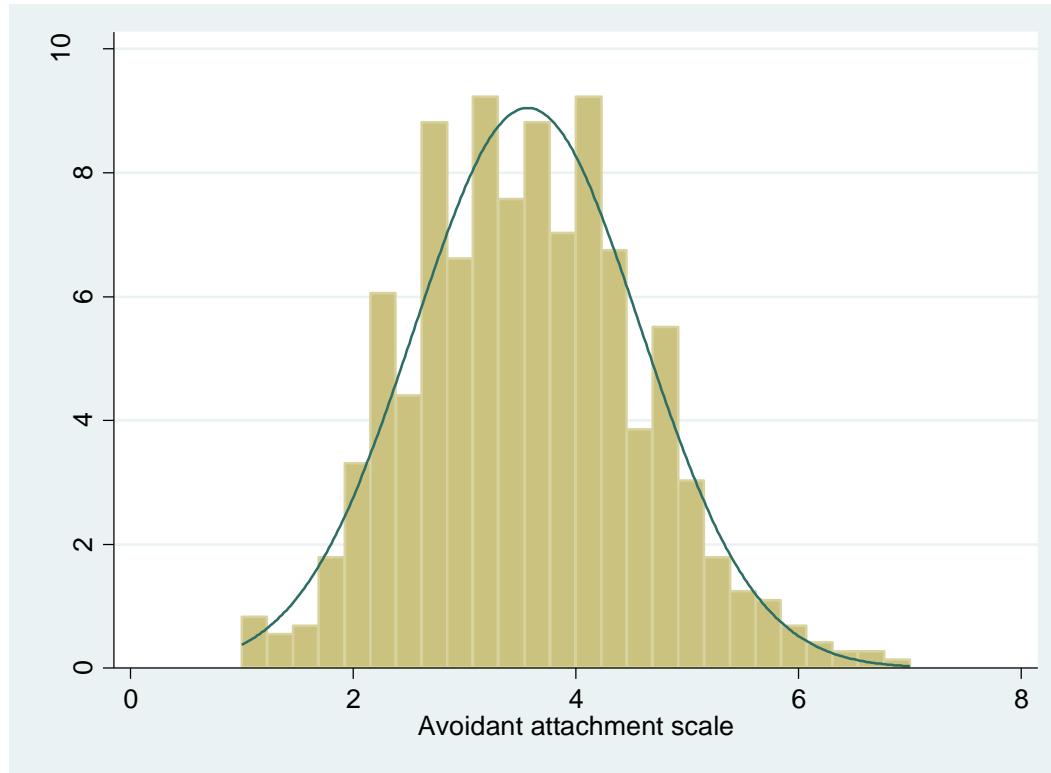
After reverse coding the boldfaced items in Table 34, an average score was calculated for each participant based on their responses to the 11 items. The scale score ranges from 1 to 7, with higher scores indicating greater attachment avoidance. A total of 726 respondents answered all 11 questions, and the average avoidant attachment score for the sample was 3.58 ( $SD = 1.02$ ; *median* = 3.6). Avoidant attachment scores were not significantly different by gender (males

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<sup>45</sup> For example, the largest increase in Chronbach's alpha came after omitting Item 5 (I find it difficult to allow myself to depend on others), which only increased the alpha value to .789. However, all 11 items were retained because I wanted to use as much information from the original ECR-R avoidance scale as possible. Additionally, Item 5 is a substantively important measure given the contention that disavowal of dependence may decrease youths' likelihood of seeking needed help in college. Thus, it was important to incorporate information gathered from this item in the avoidant attachment measure.

$=3.61$ , females  $= 3.55$ ,  $p = .431$ ) or race/ethnicity (White  $= 3.49$ ; Black  $= 3.61$ ; Hispanic  $= 3.51$ , Other race  $= 3.81$ ,  $p = .187$ ). As displayed in Figure 2, the avoidant attachment measure followed a roughly normal distribution.

*Figure 2. Distribution of Avoidant Attachment Scores (n = 726)*



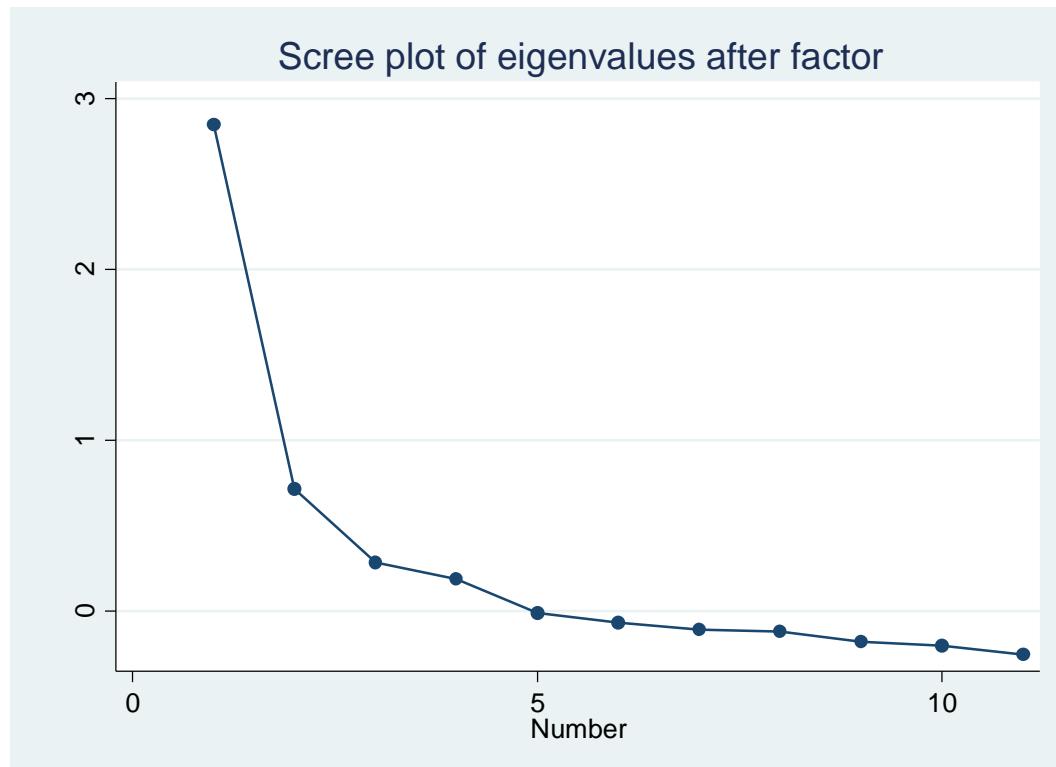
Before proceeding to the substantive analyses of the chapter, a summary is provided of results from EFA analyses that investigated the factor structure of the 11 items. These analyses were conducted for exploratory purposes. The first step involved selecting the appropriate number of common factors, which was based on a holistic consideration of results from the scree test, parallel analysis, and MAP test. In scree tests, the number of retained factors is indicated by the factor number that precedes the last major drop in eigenvalues. As displayed below in Figure 3, there were sharp declines in eigenvalues up to the third factor, and subsequent changes were more gradual as the eigenvalues approached zero. Thus, the scree test indicated two factors.

These results were consistent with the results of the parallel analysis, which also identified two factors as the appropriate number of factors to retain. Based on 1000 randomly generated datasets, each with 11 variables and 726 observations, the observed eigenvalues of the first and second common factors were significantly greater than the 95<sup>th</sup> percentile of eigenvalues generated from the random data. This was not the case for the third factor, resulting in the conclusion to retain two factors. In contrast to the findings from the scree test and parallel analysis, results from the MAP test indicated a one-factor solution. The lowest average squared correlation (.024) corresponded to one factor. However, results from simulation studies indicate that the MAP test tends to underestimate the number of common factors when factor loadings are not large and when there are few variables per latent factor (Zwick & Velicer, 1986). As presented below, factor scores in the EFA were not particularly strong, so it is plausible that the MAP test results underestimated the appropriate number of factors. Taken together, these results and observations from supplemental analyses<sup>46</sup> led to the decision to retain two factors in the EFA model.

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<sup>46</sup> As supplemental analyses, a series of EFA analyses were conducted that imposed varying numbers of factor extractions (from 2 to 4) and examined the factor loadings for each model. The two-factor solution displayed characteristics most consistent with simple solution. For example, in the three factor and four factor models, two or more items had small to medium factors loadings (i.e., .20 to .30) on multiple factors and large loadings on no factors. As presented in Table 35, the factor structure was clearer in two factor solution.

Figure 3. Scree Plot of Avoidant Attachment Factors



To aid in selecting the appropriate factor rotation for the two-factor EFA model, an EFA model was run using principal-factor estimation and promax rotation, which allows common factors to be correlated. The correlation among the two latent factors was .45, which suggests that it was not appropriate to utilize an orthogonal rotation method that imposes no correlation among factors during parameter estimation (Finch, 2013). The factor loadings for the two-factor EFA model with promax rotation are presented in Table 36. The factor variances for the first and second factors were 2.59 and 1.86, respectively. Unlike factor loadings from orthogonal solutions, which are interpreted as the correlations between an item and the common factor, factor scores in oblique solutions are interpreted similarly to standardized partial coefficients in regression analyses (Fabrigar & Wegener, 2011). For example, the factor score of .61 (first cell in Table 36) represents the expected change in the standardized score for Item 1 associated with a one-unit change in the standardized score of Factor 1, controlling for the effect of the second

common factor. Interestingly, the factors appeared to align with the direction in which the questions was originally asked. Questions in which an agree response indicated higher avoidant attachment tended to cohere, while questions in which an agree response indicated lower avoidant attachment tended to cohere.<sup>47</sup> Although the factors loadings varied in their values, the same factor structure was identified in an EFA analysis employing varimax rotation.

*Table 36. Exploratory Factor Analysis (EFA) Results for a Three-Factor Solution with Promax Rotation<sup>a</sup> (n = 726)*

Item	Factor 1	Factor 2
<b>(1) Usually discuss my problems/concerns with others</b>	.61	
<b>(2) Feel comfortable sharing private thoughts/feelings</b>	.61	
(3) Don't feel comfortable opening up to others		.60
(4) Prefer not to show others how I feel deep down		.59
<b>(5) Others really understand me and my needs</b>	.50	
(6) Find it difficult to depend on others		.44
<b>(7) Feel comfortable depending on others</b>	.39	
<b>(8) It helps to turn to others in times of need</b>	.67	
(9) Uncomfortable when others want to be very close		.43
<b>(10) I am very comfortable being close to others</b>	.56	
<b>(11) It's easy for me to be affectionate with others</b>	.42	

<sup>a</sup>Only factor scores greater than .30 are displayed for clarity of presentation.

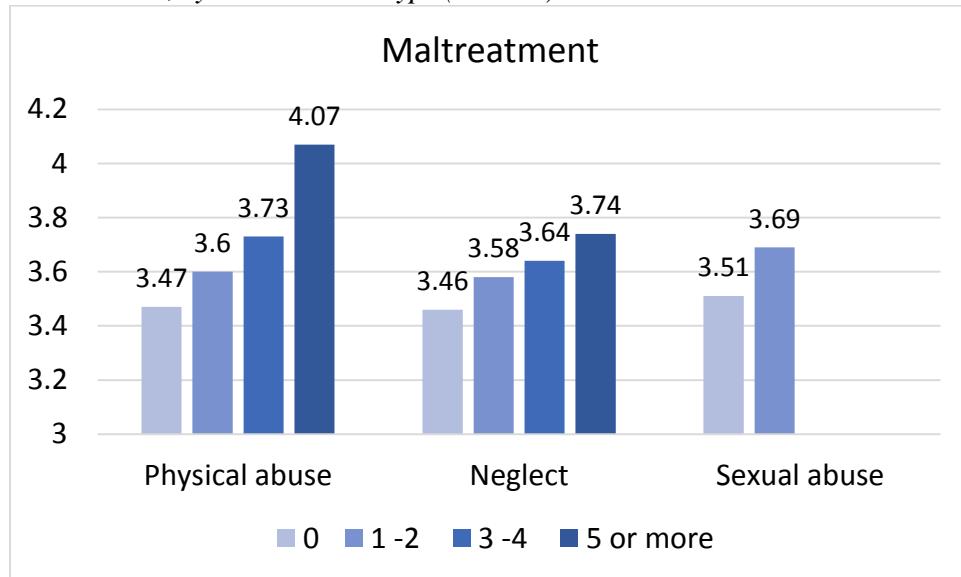
In sum, results from the investigation of the 11 avoidant attachment items suggested that there is an acceptable to good degree of internal consistency among the items. This supports the use of a scale measure of avoidant attachment. EFA results found that the items cohered around two factors, one that was associated with endorsement of positive traits and another associated with endorsement of negative traits. As described earlier, a single avoidant attachment scale was used in the analyses for the remainder of the chapter. The next sections examine the hypothesized precursors to and consequences of avoidant attachment.

<sup>47</sup> This was not due to coding. When the boldfaced items were reverse-coded, the EFA model produced identical results.

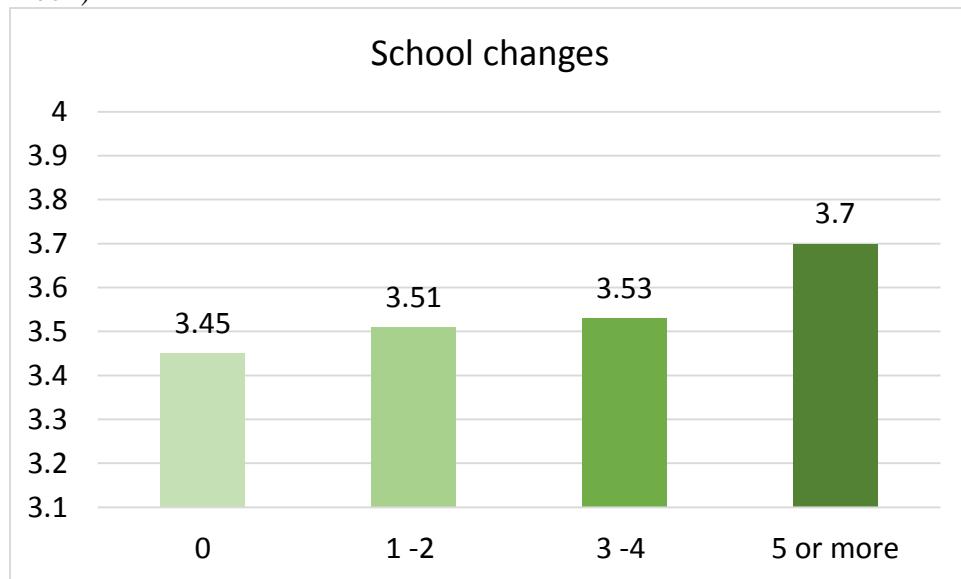
## **Associations between Past Maltreatment/Relational Instability and Avoidant Attachment**

This section tested the hypothesis asserting that greater maltreatment and relational instability predicted higher avoidant attachment scores. OLS regression was used to test these associations. Before turning to regression analyses, we briefly examine associations between different amounts of maltreatment (Figure 4) and relational instability (Figures 5 and 6). For each measure, categories were created for each maltreatment and relational instability variable to better illustrate overall trends. Regarding the number of instances of physical abuse ( $p < .001$ ) and neglect ( $p = .020$ ) reported by respondents, we see that greater numbers of maltreatment instances were associated with higher avoidant attachment scores. The jump in scores is particularly large when comparing youth who experienced 3 to 4 types of physical abuse to youth who experienced 5 or more. We see a similar jump that is slightly less pronounced for instances of neglect. The bar chart on the right of Figure 4 indicates that avoidant attachment scores for youth who were sexually abused were .17 points higher than youth who had not been sexually abuse ( $p = .035$ ). Figures 5 and 6 also show increasing trends in avoidant attachment scores for school changes ( $p = .013$ ) and foster care placement changes ( $p < .001$ ). We see a modest increase in avoidant attachment scores between youth in the lowest to next lowest category, little differences for youth in the middle categories, and a slightly larger increase for youth in the high category for school changes and foster care placement changes.

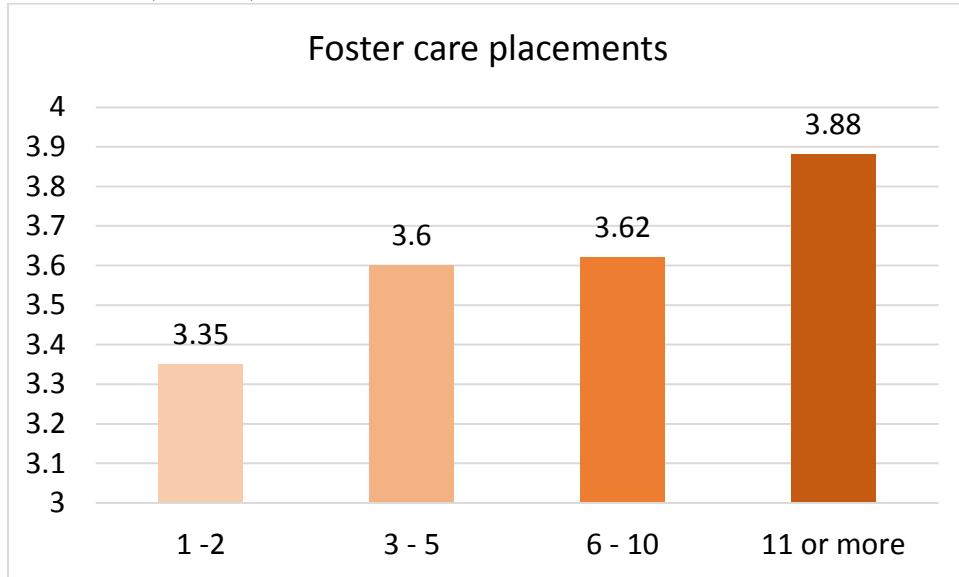
*Figure 4. Bar Graph of Average Avoidant Attachment Scores for Different Amounts of Maltreatment, by Maltreatment Type (n = 732)*



*Figure 5. Bar Graphs of Average Avoidant Attachment Score by Number of School Changes (n = 732)*



*Figure 6. Bar Graph of Average Avoidant Attachment Score by Number of Foster Care Placements (n = 732)*



The figures above suggest that youth who had experienced more maltreatment and relational instability had higher scores on the avoidant attachment measure. We next examine if these associations remain after controlling for a set of factors that could explain these associations. In Table 37, the left panel displays results from bivariate OLS regression models, and the right panel displays results from OLS models after controlling for demographic characteristics (age at the time of the interview, gender, race/ethnicity, state) as well as few covariates that could be plausibly associated with maltreatment/mobility and avoidant attachment, including: baseline measures of youths' delinquency score, mental health problems, and alcohol/substance use problems. The first variable evaluated was the maltreatment tertiles measure used in the regression analyses in previous chapters. Although not displayed, there was a statistically significant difference between youth in the highest and lowest maltreatment tertile in the bivariate model ( $B = .25, p = .012$ ) and in the model with the controls ( $B = .21, p = .045$ ). The youth in the middle versus bottom tertiles were not significantly different in avoidant attachment in the bivariate model ( $B = -.01, p = .964$ ) or the model with controls ( $B = -.02, p = .$

.816). A binary measure was created for the maltreatment variable, which combines the bottom and middle tertiles into a single category. This compared high maltreatment youth (top tertile) with lower maltreatment youth (bottom and middle tertiles). As displayed in Table 37, statistically significant differences were present when comparing these two groups. Avoidant attachment scores were about one-fourth of a point higher for youth in the top tertile versus youth in the middle and bottom tertiles (3.74 vs. 3.48). This association is similar after the control variables were added to the model. To get a better sense of how different types of maltreatment may be associated with avoidant attachment scores, regression analyses were run using a count variable of physical abuse instances, a binary variable of whether a youth had been sexually abused, and a count variable of the number of neglect instances. All three maltreatment types predicted higher avoidant attachment scores in both the naïve models and full models.

The bottom half of Table 37 displays findings from the two measures of relational instability. Both the number of foster care placements youth had lived in and the number of school changes youth experienced were significantly associated with higher avoidant attachment scores. The estimates were slightly smaller after adjusting for controls. Taken together, the hypothesis about the associations between past maltreatment/relational instability and avoidant attachment were supported. The associations were statistically significant but not very large. For example, youth with the maximum number of seven physical abuse instances were about three-fifths of a point higher in avoidant attachment than youth with no physical abuse instances (4.07 vs. 3.47). Youth who had been sexually abused were less than one-fifth of a point higher in avoidant attachment than youth who had not been sexually abused (3.69 vs. 3.51). When the maltreatment tertile measure and two indicators of relational instability were included in a single OLS model, the R-square value was just 2.8 percent (adjusted R-square = 2.2%). Thus, while

past maltreatment and relational instability appeared to predict youths' level of avoidant attachment, they explain only a small fraction of the avoidant attachment scores.

*Table 37. Bivariate and Multivariable Logistic Regression Results: Past Maltreatment and Relational Instability Predicting Avoidant Attachment Score (controls not shown) (n = 732)*

	Model 1: Bivariate			Model 2: with Controls		
	B	95% CI	p	B	95% CI	p
<b>Maltreatment History</b>						
Maltreatment instances (ref: Bottom two tertiles)						
Top tertile	.255	.096 – .414	.002	.221	.059 – .382	.008
Physical abuse (0-7)	.086	.044 – .128	<.001	.078	.034 – .122	<.001
Sexual abuse (ref: none)	.173	.013 – .334	.035	.119	.007 – .232	.038
Neglect (0-9)	.047	.011 – .083	.011	.037	.001 – .074	.044
<b>Relational Instability</b>						
Number of foster care placements (1-40)	.022	.010 – .034	.001	.018	.005 – .031	.006
Number of school changes (0-5+)	.049	.011 – .086	.011	.044	.004 – .084	.033

### **Associations between Avoidant Attachment and Baseline Covariates**

To get a fuller sense of how avoidant attachment is correlated with other characteristics measured at the baseline interview, separate bivariate OLS regression models were estimated (Table 38). This sample for these analyses included the 402 youth who had enrolled in college. Most factors were not significantly associated with avoidant attachment scores, with a few exceptions. First, and similar to the results with the full sample presented above, past maltreatment and relational instability (foster care moves, school changes) were positively associated with avoidant attachment. Second, several measures indicative of behavioral health problems were correlated with higher avoidant attachment scores. These include indicators of mental health problems, alcohol/substance use problems, and behavior problems (i.e., delinquency score, school expulsion). History of being placed in congregate care, which can be indicative of emotional, behavioral, and/or alcohol/substance use problems, was also positively associated with avoidant attachment. Third, social support and participation in college preparation activities had a negative association with avoidant attachment. The association between avoidant attachment and social support was particularly strong. A one-unit increase in social support predicted nearly three-fifths of a point decrease in youths' avoidant attachment score. This is consistent with previous research that suggests that adults with insecure attachment styles, including avoidant attachment, tend to perceive that they have less social support than individuals with secure attachment styles (Collins & Feeney, 2004). Finally, youth who aspired to earn more than a college degree were lower in avoidant attachment than were youth who aspired to complete just some college.

Table 38. Bivariate Ordinary Least Squares (OLS) Regression Results: Baseline Predictors of Avoidant Attachment (n = 402)

	B	95% CI	p
<b>Demographic Characteristics</b>			
Male (ref: female)	-.100	-.314 – -.114	.360
Race/ethnicity (ref: White)			
African American	.097	-.147 – .342	.434
Hispanic	-.014	-.420 – .392	.947
Other race	.282	-.154 – .717	.204
Age at baseline interview	-.006	-.307 – .294	.967
State (ref: Illinois)			
Wisconsin	.108	-.141 – .358	.394
Iowa	-.024	-.401 – .353	.899
Age first enrolled in college (ref: under age 19)			
19 to 20	.203	-.047 – .454	.111
21 or older	.124	-.144 – .392	.363
<b>Academic History</b>			
Highest completed grade (ref: 10 <sup>th</sup> grade or lower)			
11 <sup>th</sup> grade	.122	-.124 – .369	.331
12 <sup>th</sup> grade	-.265	-.604 – .073	.124
Reading level, standardized	-.019	-.124 – .085	.714
High school math and English grades (ref: Bottom tertile)			
Middle tertile	-.066	-.343 – .212	.640
Top tertile	-.032	-.298 – .234	.814
Ever repeated a grade	.190	-.042 – .421	.108
Ever expelled	.361	.043 – .678	.026
Ever in special education	.194	-.021 – .410	.076
Number of college prep. activities (0-4)	-.160	-.240 – -.081	<.001
<b>Foster Care Characteristics</b>			
Number of foster care placements (1-40)	.035	.017 – .053	<.001
Ever in congregate care	.354	.144 – .564	.001
Number of school changes (0-5+)	.062	.009 – .115	.022
Maltreatment instances (ref: Bottom tertile)			
Middle tertile	.061	-.210 – .333	.657
Top tertile	.490	.216 – .764	<.001
<b>Other Risk and Promotive Factors</b>			
Education aspirations (ref: High school credential or less)			
College degree	-.071	-.594 – .454	.792
More than college degree	-.461	-.893 – .030	.036
Parental status	.090	-.223 – .403	.573
Social support (1-5)	-.613	-.707 – -.520	<.001
Ever worked for pay	.145	-.122 – .411	.286
Delinquency score (0-3)	.253	.059 – .447	.011
Mental health problem	.341	.115 – .568	.003
Alcohol/substance use problem	.284	.016 – .552	.038

## **Avoidant Attachment Predicting College Persistence and College Completion**

We now turn to multivariable models of college outcomes, focusing whether youths' level of avoidant attachment predicted their expected likelihood of persisting in and finishing college. The model building strategy in this chapter differed from the strategy used in previous chapters in two important ways. First, except for youths' age of college entry and the type/selectivity of the college they first attended, these models only include covariates measured at baseline. The purpose of including covariates to the avoidant attachment models was to statistically control for factors that might confound the relationship between avoidant attachment and the college outcomes. However, covariates measured at a later age (i.e., pre-entry and post-entry factors) may be a *consequence of* youths' level of avoidant attachment, rather than something that influenced avoidant attachment and the outcome. For example, youth high in avoidant attachment may have been more likely than youth lower in avoidant attachment to have experienced economic hardships because of a reluctance to seek and accept support during times of financial strain. To preserve clarity in temporal ordering, pre-entry and post-entry factors were not included as controls. The second difference in the modeling strategy used in this chapter concerns multicollinearity among covariates. In previous chapters, covariates were both of substantive interest in their own right and they served as statistical controls for other predictors. Thus, a high degree of care was used to avoid multicollinearity among predictors. In the current chapter, concern about multicollinearity among control variables was less of a concern because interpretation of these covariates is not the focus. Greater emphasis was instead placed on statistically accounting for a broad range of potential confounders. Accordingly, variables that were analyzed separately in previous chapters (e.g., congregate care and delinquency) were included in the same model in this chapter.

Table 39 presents the results of multiple logistic regression analyses, in which persistence was regressed on to youths' avoidant attachment scores and blocks of covariates. Only the estimates for avoidant attachment are presented. The far right column lists the covariate blocks that were successively added in each model. For example, Model 0 was the bivariate model, Model 1 contained demographic controls, Model 2 contained demographic controls and educational history controls, and so forth. The controls variables were selected either because they were significantly associated with avoidant attachment (see above), they were significantly associated with college persistence, or they were substantively important (e.g., demographic characteristics). Note that youths' baseline measure of perceived social support from the MOS was not included as a control variable in Models 1 through 6. As explained in Chapter 3, perceived social support is hypothesized to mediate the relationship between avoidant attachment and college outcomes. Even though attachment styles and perceived social support were measured contemporaneously at wave 1, it may be more appropriate to conceptualize perceived social support as a mediator rather than as a control, since youths' attachment orientation influences their perception of available social support. To further clarify the temporal ordering, Model 6M investigated social support as a mediator of avoidant attachment, using the pre-entry measure of youths' social support.<sup>48</sup>

As reported in Table 39, college students in the NSC sample with higher avoidant attachment scores had significantly lower estimated odds of persisting than did youth with lower avoidant attachment scores. An increase of one point on the avoidant attachment measure was

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<sup>48</sup> A second reason for not including baseline social support as a control variable is because, for the youth who entered college at an early age, their social support score at baseline is the same as their pre-entry social support score. Indeed, the baseline social support score and pre-entry social support score are highly correlated ( $r = .89$ ).

expected to decrease the estimated odds of persisting by about 29 percent. This estimate remains consistent after controlling for demographic characteristics, but slightly weakened after accounting for aspects of youths' educational histories. The drop was largely attributable to a history of school expulsion. After adjusting for indicators of behavior problems we see a further reduction in the association between avoidant attachment and persistence, which is marginally significant in Model 3. Controlling for behavioral health issues slightly strengthened the association between avoidant attachment and persistence, while adjusting for characteristics of youths' maltreatment and foster care history caused a small attenuation. The full model, Model 6, added a measure of the type and selectivity of the college youth first attended. In this model, there was a marginally significant relationship between youths' avoidant attachment scores and persistence, with the expected odds of persistence decreasing by about 26 percent for each point increase in avoidant attachment score. Although in the final model (Model 6) the coefficient for avoidant attachment score fell below the .05 alpha level, the odds ratios for avoidant attachment score was relatively even after controlling for a wide range of covariates.

Model 6M added pre-entry social support, which was expected to mediate the association between avoidant attachment and persistence. Youths' avoidant attachment score was strongly related to their pre-entry social support ( $B = -.45, p < .001$ ). Against expectations, adding pre-entry social support as a mediator had a rather small impact on the odds ratio and p-value for avoidant attachment. This suggests that factors other than youths' level of social support, as measured by the MOS, explains the association between higher avoidant attachment scores and persistence. Avoidant attachment was also significantly associated ( $p > .05$ ) with youth's pre-entry employment status (i.e., youth higher in avoidance were more likely to be unemployed than employed FT) and mental health status. These pre-entry factors were also investigated as

potential mediators, but they had a very small impacts on the association between avoidant attachment and persistence.

Table 39. Multivariable Logistic Regression Results: Avoidant Attachment Predicting College Persistence (controls not shown) (n = 331)

	Persistence on avoidant attachment			Controls Added
	OR	95% CI	p	
Model 0	0.71	0.56 – 0.91	.006	None
Model 1	0.70	0.55 – 0.91	.006	<b>Demographics:</b> Gender, Race/ethnicity, Age, State, Age first enrolled, Parental status
Model 2	0.71	0.54 – 0.93	.013	<b>Educational history:</b> Highest completed grade, Reading score, Grade repetition, Special Education, Expulsion, Number of college prep activities, College aspirations
Model 3	0.76	0.57 – 0.99	.048	<b>Behavior problems:</b> Delinquency score, Ever in congregate care
Model 4	0.73	0.55 – 0.98	.035	<b>Behavioral health:</b> Mental health problems, Alcohol/substance use problems
Model 5	0.74	0.55 – 0.99	.046	<b>Foster care history:</b> Number of foster care placements, Number of school changes, Maltreatment tertiles
Model 6	0.74	0.55 – 1.00	.053	<b>Institutional factor:</b> College type/selectivity
Model 6M	0.73	0.52 – 1.04	.079	<b>Mediator:</b> Pre-entry social support

Table 40 presents results from logistic regression models that examined whether avoidant attachment decreased youths' expected likelihood of completing a college credential (left panel) and a college degree (right panel). The sample for these analyses included the 329 youth whose college outcomes could be observed for at least six years. The model building strategy for this analysis was the same as above. As seen in Table 40, the association between avoidant attachment and credential completion was not as strong as the association between avoidant attachment and degree completion. The models in the left panel display that avoidant attachment significantly predicts the completion of a credential in most models, but after adjusting for maltreatment and foster care history characteristics, and then college type/selectivity, avoidant attachment is marginally significantly predictive of credential completion. However, attachment avoidance is negatively associated with the estimated odds of earning a college degree across all six models. Similar to the regression models for persistence, what is striking is the relative consistency in the odds ratios for avoidant attachment across models. In the final model, the expected odds of completing a college degree was about 30 percent lower for every one-point increase in youths' avoidant attachment scores.

Model 6M reports the impact of adding pre-entry and post-entry social support as a potential mediator. The amount of pre-entry and post-entry social support fully mediated the association between avoidant attachment and college completion. In the degree completion model, there was roughly a 14.5 percent decrease in the association between avoidant attachment and the expected odds of earning a degree after accounting for the average amount of social support youth had before entering college and after entering college. In addition to social support, it was also found that youth higher in avoidant attachment experienced more post-entry economic hardships than did youth lower in avoidant attachment ( $B = .29, p = .007$ ). Adding the

amount of economic hardships youth experienced before and after entering college explained some of the association between avoidant attachment and college completion, particularly when considering degree completion.

Table 40. Multivariable Logistic Regression Results: Avoidant Attachment Predicting College Completion (controls not shown) (n = 329)

	Credential Completion on avoidant attachment			Degree Completion on avoidant attachment			Controls Added
	OR	95% CI	p	OR	95% CI	p	
Model 0	0.77	0.60 – 0.98	.033	0.69	0.52 – .92	.012	None
Model 1	0.73	0.57 – 0.95	.019	0.66	0.49 – 0.91	.010	<b>Demographics:</b> Gender, Race/ethnicity, Age, State, Age first enrolled, Parental status
Model 2	0.75	0.57 – 0.99	.042	0.66	0.47 – 0.93	.016	<b>Educational history:</b> Highest completed grade, Reading score, Grade repetition, Special Education, Expulsion, Number of college prep activities, College aspirations
Model 3	0.73	0.55 – 0.96	.025	0.65	0.46 – 0.91	.011	<b>Behavioral problems:</b> Delinquency score, Ever in congregate care
Model 4	0.72	0.54 – 0.97	.029	0.64	0.45 – 0.90	.012	<b>Behavioral health:</b> Mental health problems, Alcohol/substance use problems
Model 5	0.75	0.56 – 1.02	.065	0.65	0.46 – 0.93	0.20	<b>Foster care history:</b> Number of foster care placements, Number of school changes, Maltreatment tertiles
Model 6	0.77	0.57 – 1.05	.098	0.67	0.46 – 0.98	.038	<b>Institutional factor:</b> College type/selectivity
Model 6M	0.78	0.565 – 1.11	.168	0.71	0.47 – 1.09	.115	<b>Mediator:</b> Pre-entry and post-entry social support
Model 6M	0.76	0.54 – 1.06	.103	0.68	0.46 – 1.01	.058	<b>Mediator:</b> Pre-entry and post-entry economic hardships

Although not reported here in detail, more parsimonious versions of Model 6 were run as bivariate probit models for each of the three outcomes (persistence, credential completion, and degree completion). These models assessed whether results for avoidant attachment were robust after accounting for possible selection effects. Similar to the previous chapters, number of college preparatory services was used as the exogenous predictor of college entry in the stage 1 model. The second stage model controlled for demographic characteristics, reading score, grade repetition, educational aspirations, delinquency, mental health problems, maltreatment tertiles, school changes, foster care placement changes, age of college entry, and college type/selectivity. Coefficients for avoidant attachment from probit models and bivariate probit models were similar for persistence ( $B = -.16, p = .059$  vs.  $B = -.13, p = .055$ ), credential completion ( $B = .14, p = .106$  vs.  $B = -.14, p = .111$ ), and degree completion ( $B = -.21, p = .039$  vs.  $-.21, p = .035$ ).

### **Abbreviated Findings for Anxious Attachment**

The analyses reported in this chapter were also conducted for anxious attachment. Similar to the measure of avoidant attachment, 11 of the 18 ECR-R items for anxious attachment were administered during the baseline interview. The Chronbach's alpha for the anxious attachment scale was .858, which indicated good internal reliability. The anxious attachment score ranged from 1 to 7, with the average score being 3.23 ( $SD = 1.19$ ). There were significant differences in anxious attachment by gender [3.34 (females) vs. 3.10 (males),  $p = .006$ ] and race/ethnicity, with youth in the "other race" category having significantly higher scores (3.55) than African American youth (3.15,  $p = .021$ ) and Hispanic youth (3.04,  $p = .021$ ) but not White youth (3.35,  $p = .263$ ). Some of the indicators of past maltreatment predicted higher levels of anxious attachment. After adjusting for baseline demographic characteristics, delinquency score, mental health problems, and alcohol substance use problems, sexual abuse ( $B = .158, p = .015$ ) and

neglect ( $B = .051, p = .015$ ) predicted significantly higher levels of anxious attachment, but physical abuse was not significantly associated with anxious attachment ( $B = .039, p = .127$ ). For the composite maltreatment variable, there was a marginally significant difference between youth in the top tertile versus youth in the bottom two tertiles ( $B = .175, p = .060$ ). In terms of relational instability, there was a significant association with the number of foster care placements ( $B = .018, p = .021$ ) but not school changes ( $B = .012, p = .621$ ).

The association between anxious attachment and college persistence and completion are presented in Table 41. For brevity, only results for Model 0 (naïve model) and Model 6 (full model) are displayed. Anxious attachment was not significantly related to college persistence or credential completion, either in the bivariate models or the full models for each outcome. Higher anxious avoidant scores did significantly predict completion of a college degree in the model that included no controls, but was marginally significantly related to degree completion in the model that included all controls.

As supplemental analyses, I also ran models in which both avoidant attachment and anxious attachment were included in the same regression model. As explained in the methods chapter, this is not the primary question of interest but was conducted for exploratory purposes. Including anxious attachment in the model changes the interpretation of the avoidant attachment regression coefficient to the relationship between avoidant attachment and the college outcome for youth *who are the same in terms of their level of anxious attachment*. The primary research question was whether youths' level of avoidant attachment predicted college outcomes, regardless of their level of anxious attachment. Additionally, since avoidant attachment and anxious attachment were moderately correlated ( $r = .43$ ), including both in the model was expected reduce each predictor's explanatory power. In the full model for college persistence,

avoidant attachment was significantly related to persistence ( $OR = 0.69, p = .042$ ) while anxious attachment was not ( $OR = 1.22, p = .203$ ). In the full model for credential completion, neither avoidant attachment ( $OR = .78, p = .166$ ) nor anxious attachment ( $OR = .96, p = .825$ ) significantly predicted the outcome when both were included in the model. This was also true in the naïve model with no controls; neither type of insecure attachment was significantly associated with credential completion (both  $p > .10$ ). Similar conclusions were found for degree completion. In the full model, neither avoidant attachment ( $OR = .73, p = .148$ ) nor anxious attachment ( $OR = .85, p = .453$ ) significantly predicted the odds of earning a college degree. In the naïve model with both types of insecure attachment, avoidant attachment was marginally significant ( $p = .071$ ) and anxious attachment was nonsignificant ( $p = .383$ ).

As supplemental analyses, for each of the three outcomes, I also tested interactions between avoidant attachment and gender, and avoidant attachment and anxious attachment. No significant interactions were found (all  $p > .10$ ). These findings suggest that association between avoidant attachment and the college outcomes did not significantly differ for males and females, and higher levels of anxious attachment did not amplify the decreased risk of college outcomes associated with avoidant attachment.

Table 41. Multivariable Logistic Regression Results: Anxious Attachment Predicting College Persistence and Completion (controls not shown)

	Persistence on Anxious Attachment (n = 331)			Credential Completion on Anxious Attachment (n = 329)			Degree Completion on Anxious Attachment (n = 329)		
	OR	95% CI	p	OR	95% CI	p	OR	95% CI	p
Model 0	0.91	.079 – .117	.381	0.84	0.67 – 1.06	.141	0.76	0.58 – 0.99	.049
Model 6	1.05	0.80 – 1.36	.771	0.87	0.65 – 1.16	.347	0.73	0.51 – 1.05	.093

## **Chapter Summary**

This chapter examined a measure of youths' avoidant attachment, and its relation to past maltreatment and relational instability as well as its predictive association with later college outcomes. Examination of the avoidant attachment scale items administered during the baseline survey indicated that they had acceptable to good internal consistency. Youth with more severe maltreatment histories displayed higher levels of avoidant attachment than did youth with less severe maltreatment histories. Young people who experienced multiple ruptures in place and relationships, as captured by number of school changes and number of foster care moves, also predicted higher avoidant attachment. When examining other factors measured at baseline, respondents with higher avoidant attachment were also more likely to display behavioral disruptions and mental health and substance use problems, and also reported markedly less available social support. When examining college outcomes, higher levels of avoidant attachment decreased youths' expected likelihood of persisting in college and ultimately finishing college. These findings largely held up after controlling for a wide range of possible confounders. We saw that the relationship between avoidant attachment and earning a degree was mediated by the amount of social support youth had before and after entering college, and to a lesser extent by encountering financial hardships. Anxious attachment was also investigated, but this type of insecure attachment was not predictive of college outcomes after accounting for possible confounders. In the final analytic chapter we turn to the policy of extended foster care and its relationship with college entry, persistence, and completion.

## **EXTENDED FOSTER CARE AND COLLEGE OUTCOMES**

The purpose of this chapter is to evaluate the impact of extended foster care on college entry, persistence, and completion. As described in the Background chapter, at the time of the Midwest Study, state policy in Illinois allowed foster youth to remain in care up to their 21<sup>st</sup> birthday, while youth in the Iowa and Wisconsin generally exited care on or before their 18<sup>th</sup> birthday. Exploiting these policy differences, state was used as an exogenous instrument when evaluating the impact of the remaining in care past age 18 on college outcomes (Courtney & Hook, 2017).

As summarized in previous chapters, there are two primary assumptions of an instrumental variable approach. The first assumption is that the instrument (state) is related to the treatment (time in care past the 18<sup>th</sup> birthday). The first assumption can be tested empirically by examining the correlation between state and time in extended care, and examining the model fit statistic in the first stage of the IV model. A second major assumption of IV models is the exclusion restriction, which states that the instrument is only related to the outcomes through the treatment. Violations of this assumption would occur if there were other factors associated with state, other than the amount of time that youth spend in care after age 18, that impact the college outcomes of interest. For example, state differences in youth characteristics (e.g., Illinois youth more academically prepared than youth in Iowa and Wisconsin) or differences in state-level characteristics (e.g., Illinois colleges did a much better job of retaining and graduating students than college in the other two states) could bias the estimated impact of extended care in the IV models. The exclusion restriction assumption cannot be empirically verified, since by definition

we do not have measures of the universe of unobservable factors that could potentially be related to state and the outcomes of interest.

Although the exclusion restriction assumption cannot be empirically confirmed, there were a few steps that were taken to make the assumption more plausible. The first step involved looking for state differences in youth characteristics that had been measured, particularly the characteristics that were related to college outcomes. If few state differences in college-relevant factors were present, this adds credence to the assumption that the instrument is unrelated to the outcome in our second stage equation. Another check of the plausibility of the exclusion restriction assumption involved examining several state differences that could plausibly impact college entry, persistence, and completion. The following state-level factors were inspected: high school graduation rates, college entry rates among recent high school graduates, education and training voucher (ETV) grants, state-specific need-based grants, youth unemployment rates, college persistence rates, and degree completion rates.

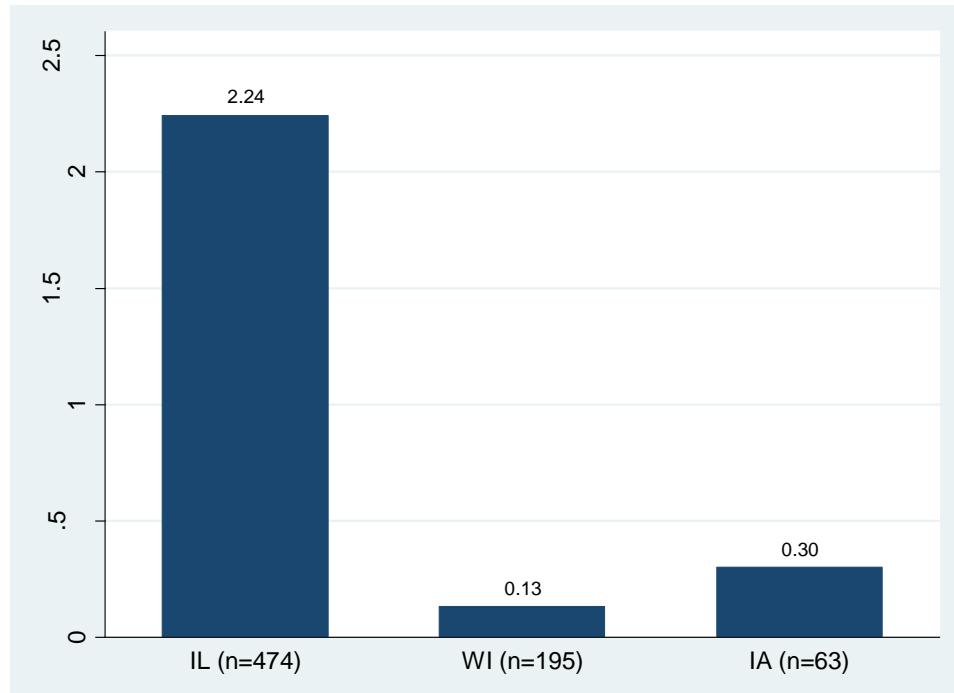
This chapter begins with an inspection data relevant to the two main assumptions of IV models. The association between state and time in care past age 18 was evaluated, followed by an inspection of state differences in baseline youth characteristics and state-level factors. The final three sections correspond to the three main outcomes of this dissertation: college entry, college persistence, and college completion. Each section first descriptively explored the association between extended foster care and the outcome, and then results regression analyses are presented on the impact of extended foster care (EFC).

### **Examining Assumptions about the Suitability of State as an Instrument**

#### **The Strength of the Instrument: State Differences in Years in Care Past Age 18**

The first task was to assess the strength of the association between state and EFC. Figure 7 is a bar graph of the average number of years youth remained in care past age 18, separated by state.<sup>49</sup> This figure shows there was a strong relationship. Illinois youth exited care about full two years later than youth in Iowa and Wisconsin (both  $p < .001$ ).

*Figure 7. Average Years in Care after Age 18, by State (n = 732)*

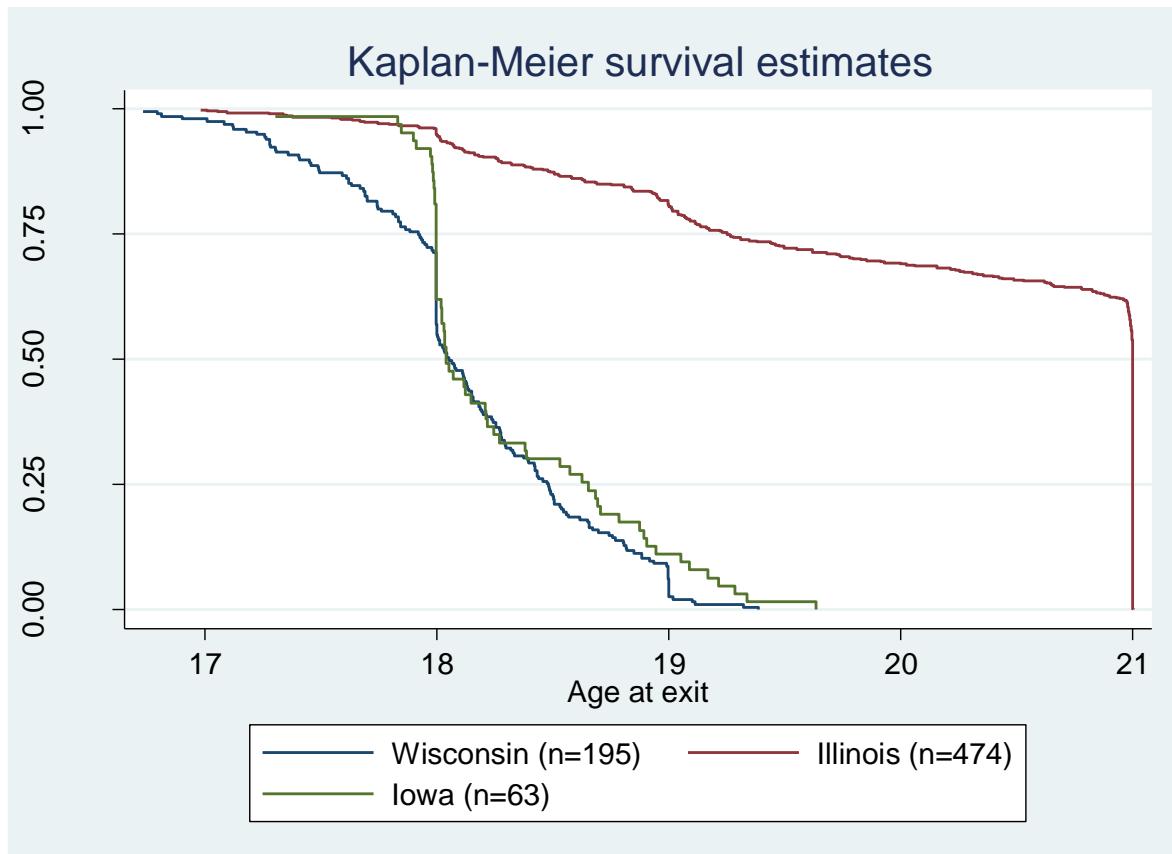


To get a more detailed picture of the relationship between state and age at which youth left care, Figure 8 presents a survival curve of age of exit by state. The trends for Wisconsin and Iowa followed a roughly similar pattern and contrast sharply with the trend for Illinois. In Iowa and Wisconsin, there was a gradual decline in exits up to age 18, and a steep cliff at age 18 followed by precipitous declines in the proportion of youth who remained in care. This was not

<sup>49</sup> In Figure 7, exits before age 18 were counted as negative values when calculating the state averages (e.g., a youth who exited at age 17.5 had a value of -0.5 years in care after age 18). However, even after negative values were coded as zero, there were still pronounced state differences in the average number of years youth spent in care past age 18 in Illinois (2.26) and Wisconsin and Iowa (0.27 and 0.32) ( $p < .001$ ).

surprising, given that the de facto foster care age limit for these two states was age 18. However, it can be seen that about 45.1 percent of youth in Wisconsin and 39.7 percent of youth in Iowa were in care on or after their 18<sup>th</sup> birthday. This is due to policies that allowed youth to remain in care under special circumstances. Under federal law, young people could remain in care past age 18 up to their 19<sup>th</sup> birthday (and states can claim reimbursement under Title IV-E of the Social Security Act) if they were expected to finish high school before age 19. Additionally, in Wisconsin youth who were pregnant or parents were permitted to remain in care past age 18. However, by age 19, effectively all youth had exited care in Wisconsin (2.5% were still in care) and nearly all youth had left care in Iowa (9.5% were still in care). A markedly different trend was observed for youth in Illinois, where a state policy that was in effect since the late 1990s permitted youth in care on their 18<sup>th</sup> birthday to remain in care up to age 21 (Peters, 2012). There was a gradual decline in the proportion of youth in care between ages 18 and 19, a slight drop on or around youths' 19<sup>th</sup> birthdays, and a slow and steady decline between ages 19 1/4 and 21. Just over 95 percent of youth in Illinois were in care on or after their 18<sup>th</sup> birthday (94.3%), almost 70 percent of youth remained in care past their 20<sup>th</sup> birthday (69.2%), and over half were still in care on their 21<sup>st</sup> birthday (53.8%). Figures 6 and 7 indicate that there was a clear and strong association between the instrument and treatment, which builds confidence that the first IV assumption is satisfied.

Figure 8. Survival Curves of Age of Exit, by State (n = 732)



### Exclusion Restriction Assumption

#### State differences in youth characteristics.

We now turn to investigating state differences in baseline youth characteristics. Chi-square tests were used to assess state differences in categorical variables, and ANOVA tests were used to assess state differences in variables measured on a continuous or ordered category scale. When statistically significant differences were found in these overall tests, regression analyses were used to identify specific state differences (reported in text).

As displayed in Table 42, there were some notable differences in youths' baseline characteristics across states. There were marginally significant and significant gender and race/ethnicity differences, respectively, with Wisconsin having a relatively high proportion of

males and Illinois having significantly higher proportions of African American youth than both of the other states (both  $p < .001$ ). Youth in Illinois were also significantly older than youth in the other two states at the time of the baseline interview (both  $p < .001$ ). This is important, because although there were state differences in the highest grade youth completed by the interview (i.e., more Illinois youth had completed 12<sup>th</sup> grade than did youth in Iowa and Wisconsin), all state differences became nonsignificant after controlling for age at the time of the interview (all comparisons  $p > .10$ ). There was a mixed picture for Iowa youth compared to their counterparts in other states in terms of factors that could promote or hinder their higher education prospects. On the one hand, reading scores were significantly higher for youth in Iowa than for youth in Wisconsin and Illinois (both  $p < .01$ ). On the other hand, Iowa youth were more likely to have been in special education, to have reported mental health problems, and to have ever been in congregate care than youth in the other two states (all  $p < .05$ ). Compared to Wisconsin youth, Iowa youth also had more school changes and were more likely to report alcohol and substance use problems (both  $p < .05$ ). Youth in Illinois also displayed some characteristics that may have had a negative impact on their higher education prospects. Illinois youth had more foster care placements than did youth in Wisconsin ( $p < .01$ ), were more likely to have ever been in congregate care than youth Wisconsin ( $p < .05$ ), reported a greater number of school changes than youth in Wisconsin ( $p < .001$ ), and were significantly more likely than youth in the other two states to have a child (both  $p < .05$ ). Thus, in a few respects, youth in Illinois appear to have been different from youth in the other two states in ways that may have disadvantaged them in going to college and succeeding in college. At least in the characteristics assessed here, there was little evidence suggesting that Illinois youth had an advantage over youth in Iowa and Wisconsin. If there were systematic differences that favored participants in

Illinois, this would raise concerns that other unmeasured (and thus statistically non-controllable) differences might have also existed that could upwardly bias the estimated impact of EFC on college outcomes in the IV models.

*Table 42. Descriptive Statistics for Youth Baseline Characteristics, by State*

	Illinois (n = 474)	Wisconsin (n = 195)	Iowa (n = 63)	p
<b>Demographic Characteristics</b>				
Male (%)	46.0	55.9	44.0	.054
Race/ethnicity (%)				<.001
White	20.0	34.4	77.7	
African American	67.3	42.6	4.8	
Hispanic	7.6	10.8	9.5	
Other race	5.1	12.3	7.9	
Age at baseline interview (Mean/SD)	18.03 (.30)	17.60 (.32)	17.68 (.31)	<.001
<b>Academic History</b>				
Highest completed grade (%)				.009
10 <sup>th</sup> grade or lower	34.3	41.2	28.6	
11 <sup>th</sup> grade	51.2	52.1	65.1	
12 <sup>th</sup> grade	14.6	6.8	6.4	
Reading level, standardized (Mean/SD)	-.81 (1.15)	-.93 (.94)	-.32 (.90)	<.001
High school math and English grades (%) <sup>a</sup>				
Bottom tertile	33.9	38.5	29.0	
Middle tertile	32.0	36.9	33.9	
Top tertile	35.1	24.6	37.1	
Education aspirations (%)				.119
High school credential or less	10.5	16.2	11.7	
Some college	13.9	12.6	21.7	
College degree or more	75.7	71.2	66.7	
Ever repeated a grade (%)	36.0	43.1	30.2	.106
Ever expelled (%)	18.1	13.0	17.5	.273
Ever in special education (%)	45.7	46.7	63.5	.029
Number of college prep. activities (Mean/SD)	.91 (1.27)	.77 (1.14)	.97 (1.17)	.328
Bottom tertile	26.6	29.8	17.5	
Middle tertile	40.0	39.8	39.7	
Top tertile	33.4	30.4	42.9	

Table 42, continued

<b>Foster Care Characteristics</b>				
Number of foster care placements (Mean/SD)	6.24 (5.87)	4.76 (5.36)	5.82 (5.95)	.010
Ever in congregate care (%)	60.9	51.8	77.8	.001
Number of school changes (Mean/SD)	2.94 (1.88)	2.06 (2.06)	3.44 (1.80)	<.00 1
Maltreatment instances (%)				.302
<b>Risk and Promotive Factors</b>				
Parental status (%)	14.2	9.3	4.8	.002
Social support (Mean/SD)	3.90 (.97)	3.94 (.80)	4.02 (1.53)	.561
Ever worked for pay (%)	72.1	75.4	79.4	.377
Delinquency score (Mean/SD)	.45 (.46)	.50 (.47)	.48 (.51)	.414
Mental health problem (%)	66.7	68.2	85.7	.009
Alcohol/substance use problem (%)	26.1	18.7	37.1	.010
Avoidant attachment (Mean/SD)	3.56 (1.04)	3.62 (.97)	3.50 (1.01)	.643

Table 43 includes just the 402 youth who enrolled in college, and examines state differences in characteristics of the first college youth attended. Overall, about one-quarter of Illinois youth had attended four-year colleges, one-third of Wisconsin youth had attended four-year colleges, and a little over one-tenth of Iowa youth had attended four-year colleges. Compared to youth in Iowa, youth in Illinois and Wisconsin were more likely to have first attended four-year colleges than two-year colleges (both  $p < .05$ ). Youth in Illinois had entered college significantly earlier than youth in both other states (both  $p < .05$ ). As we will see later in our analyses of EFC (i.e., Figure 15), a benefit of EFC was the promotion of early entry into college. A swell of youth in Illinois first entered college before age 21, followed by slow increase in the number of new college students after age 21. In Iowa and Wisconsin, smaller proportions of youth had entered college by age 21 in these states than in Illinois, but after that age there were consistent inflows of new college students in those two states. The mean differences in age of entry is driven by these divergent trends between Illinois and the other two

states over the entire study period. When the comparison of average ages of entry into college is limited to just youth who first entered by age 21, there are no differences between the states ( $p > .35$ ).

Turning to expenditures, on average, Wisconsin youth enrolled in colleges with higher average proportions of low-income students ( $p < .05$  vs. Illinois) and that spent more on instruction and student support services ( $p < .001$  vs. Illinois, and vs. Iowa). These analyses suggest that Illinois youth may have had an advantage over Iowa youth in terms of enrollment in four-year versus two-year colleges (which tend to have higher persistence and completion rates). But the colleges that Wisconsin youth enrolled in tended to devote more resources to instruction and student support than colleges that Illinois enrolled in. This was mostly driven by the relatively large proportion of Wisconsin youth who had first attended four-year colleges. Thus, these analyses do not suggest that Illinois youth had a consistent upper hand in the types of colleges that they attended relative to the other two states.

Table 43. Descriptive Statistics for Institutional Characteristics of First College Attended, by State

	Illinois (n = 266)	Wisconsin (n = 100)	Iowa (n = 63)	p
Age of first entry (Mean)	20.30	21.68	21.68	< .001
College type/selectivity (%)				.007
Two-year college	73.8	65.8	88.9	
Nonselective/minimally selective four-year college	12.3	25.8	2.8	
Selective/highly selective four-year college	13.9	8.4	8.3	
Size (%)				.086
Less than 2500	12.2	20.9	13.8	
2501 to 5000	12.8	7.0	6.5	
5001 to 10,000	31.0	17.9	26.9	
More than 10,000	44.0	54.1	52.8	
Percent part-time students (Mean)	51.3	56.2	46.7	.089
Percent low-income students (Mean)	31.2	41.0	32.9	.003
In-state tuition cost (Mean)	\$4752	\$5979	\$4344	.117
Expenditures on instruction per FTE (Mean)	\$4523	\$8366	\$5161	<.001
Expenditures on academic services per FTE (Mean)	\$986	\$876	\$748	.376
Expenditures on student support services per FTE (Mean)	\$1305	\$1989	\$939	<.001

### State differences in state-level characteristics.

As a further check of the plausibility of the exclusion restriction, we now examine state differences in several factors that are related to or measures of college entry, persistence, and completion. Nearly 9 in 10 youth in the sample (89%) had first attended college in the state they resided in. The presentation of findings focus particularly on differences between Illinois and the other two states. To the extent possible, data were obtained that were most proximal to the years that participants in the Midwest Study were completing high school, entering college, and working toward their college credential, respectively.

### ***State high school graduation rates and college entry rates.***

We first examine state differences in high school graduation rates and college entry rates among recent high school completers. Completing a secondary credential is an important precursor to entering college that impacts a state's flow of students into higher education. In a recent study, Courtney and Hook (2017) reported that Illinois had lower rates of high school completion and college entry than did the other two states in the Midwest Study. I reached a similar conclusion in the findings reported below. As displayed in Figure 9, graduation rates<sup>50</sup> were nearly the same for high school students in Iowa and Wisconsin, but between five to ten percentage points lower each year for Illinois. Figure 10 presents biannual rates of college entry among recent public high school diploma completers.<sup>51</sup> Illinois had the lowest rates of college entry in all three years, and in two years Iowa had higher rates than the other two states by roughly five percentage points. Taken together, these two graphs suggest that Illinois certainly did not have an advantage over the other states in terms of high school graduation and college entry, and my in fact have been at a disadvantage.

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<sup>50</sup> State public high school graduation rates for 2002, 2003, and 2004 were obtained from the Common Core Data (CCD) managed by the Institute for Education Sciences. CCD's graduation rates are estimates of the percentage of entering freshmen that graduated within four years. For example, the 2002 graduation rate is calculated by dividing the number of diplomas awarded in 2002 by the average membership of the 8<sup>th</sup> graders 1998-1999, the 9<sup>th</sup> graders in 1999-2000, and 10<sup>th</sup> graders in 2000-2001. The 2003 high school graduation rate for Wisconsin was not reported, so I averaged the rate of the 2002 (85.8%) and 2004 (86.7%) to estimate a rate for 2003 (86.3%).

<sup>51</sup> State averages for the proportion of public high school graduates that enter college within a year after graduation were obtained from multiple years of the Digest of Education Statistics. The first year that college entry rates were reported separately by state was for the 2004-2005 college academic year, which was reported in the 2007 Digest (Table 194). No statistics were reported for the 2005-2006 college academic year. Rates were reported for the 2006-2007 college academic year in the 2008 Digest (Table 203) and reprinted in the 2009 Digest (Table 203). Rates for the 2008-2009 college academic year were published in the 2010 Digest (Table 211).

Figure 9. High School Graduation Rates, by Year and State

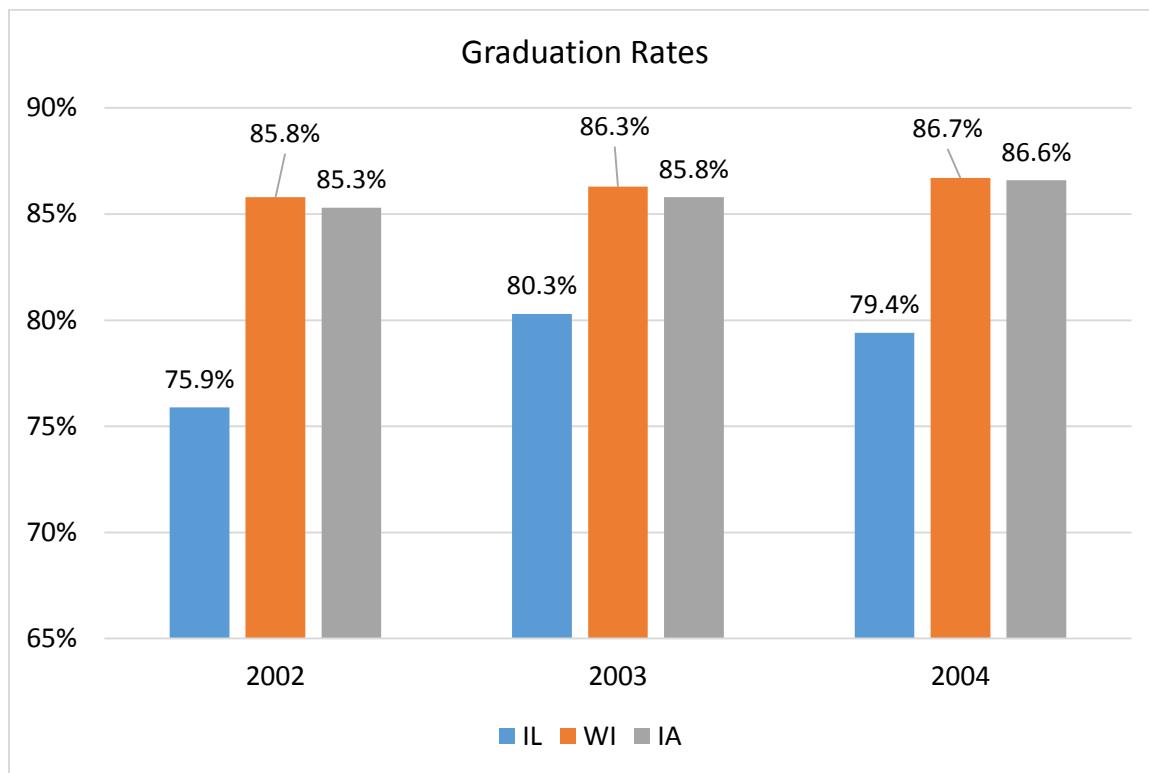
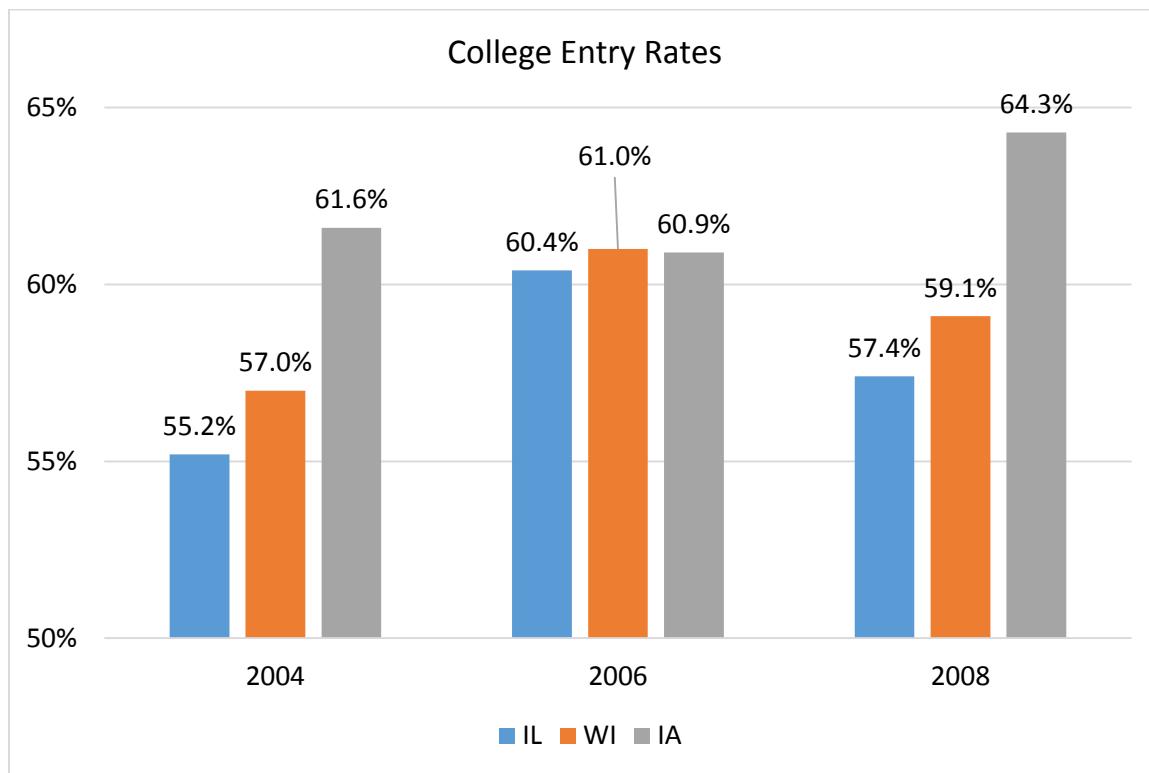


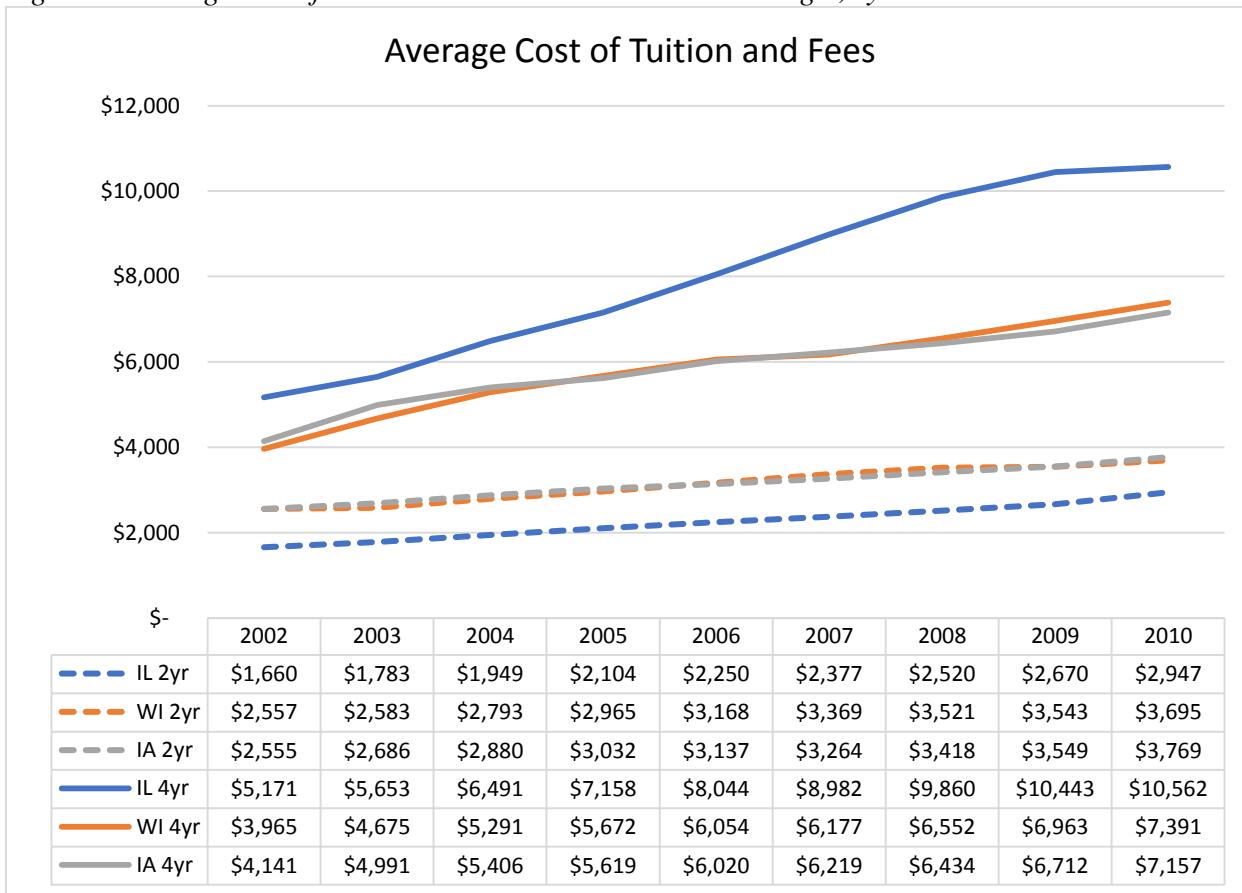
Figure 10. Rates of College Entry among Recent High School Completers, By Year and State



***State costs of college attendance.***

A second set of state-level factors pertain to the cost of college attendance and educational grants used to pay for college expenses. Figure 11 displays the cost of in-state tuition and fees for public two-year and four-year colleges from the times pan of 2002 to 2010. In both two-year and four-year colleges, Illinois stood apart from the other two states. The cost of tuition in four-year public colleges was considerably higher in Illinois than in the other two states, equaling about a \$1000 difference in 2002 and increasing to over a \$3000 difference in 2010. Conversely, the cost of two-year college tuition in Illinois was about \$900 less than in the other two states, and this difference in dollars remained about the same from 2002 to 2010. The two-year tuition gap is particularly important since about 75 percent of the youth who go to college in this sample started out in two-year colleges, and most attended public schools in their own state. To the extent that these roughly \$900 differences in tuition at two-year colleges matter in terms of youths' likelihood of going to college and staying in college, successful college outcomes could be misattributed to extended care when they were driven, at least in part, by state differences in tuition costs.

Figure 11. Average Cost of In-State Tuition and Fees at Public Colleges, by Year and State



### ***State college financial aid for foster care youth.***

Another potentially important source of state variation is the availability of aid to help foster youth pay for college. As reported in the chapter on college completion, financial hardship was identified as an impediment to finishing college. Federal financial aid is one of the main sources of aid used by college students to pay for college, but standard eligibility criteria are used across the U.S. However, variation existed across states in the availability and generosity of aid programs that target foster care youth and other underrepresented student groups.

We first consider tuition waivers or grant programs specifically earmarked for foster care youth. For the purposes of this study, it was particularly important to identify aid programs that

did not have highly stringent eligibility requirements or competitive selection processes, that support a high percentage of eligible students, and that offer aid amounts that would meaningfully offset college costs for foster youth. In terms of tuition waivers, only Illinois had programs that were operational during the years in which foster care youth most frequently enrolled in college (i.e., early- to mid-2000s). Established in 1964, the Illinois Department of Children and Family Services Scholarship supports foster care youth for four years while they earn a Bachelor's degree. The scholarship covered the cost of tuition at one of nine public four-year colleges in Illinois, provided a monthly stipend for living expenses (\$445 in 2003), and provided four years of medical coverage. While very generous, the scholarship was awarded to just 48 foster youth per year at the time of the Midwest Study when Illinois youth mostly frequently entered college (2003-2005). I estimated that about 6 youth in the Midwest Study received a DCFS Scholarship, so its effect is likely minimal on evaluation of EFC.<sup>52</sup>

Illinois DCFS funded a second tuition waiver program, which only available to youth who were still in foster care and who were attending an Illinois community college. Thus, this program was closely tied to Illinois' extended foster care policy. The Community College

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<sup>52</sup> Information on the DCFS Scholarship was obtained from the IL DCFS website, particularly from the periodic Family Now and Forever newsletters that reported information on DCFS Scholarships and recipients. In the years 2003, 2004, and 2005, over 250 foster youth applied for the scholarship each year, but only 48 scholarships were awarded annually (acceptance rate ~ 20%). Some of the criteria that is considered as part of the application is the youths' record of academic performance (e.g., high school GPA, SAT scores), work history, awards and achievements, among other factors. Four of the 48 awards each year were reserved for children of military veterans. Nearly all of the DCFS recipients were recent high school graduates, and foster youth had to apply by their 21<sup>st</sup> birthday. In the Midwest Study sample, a total of 28 youth enrolled in a public four-year college in Illinois by age 21. With an acceptance rate of 20%, it is estimated that about 6 youth received a DCFS Scholarship. Thus, it is expected that the program may have only had a small impact on outcomes in which several hundreds of foster youth achieved (i.e., entering college and persisting in college). The program may have had a more substantial impact on the rarer outcomes of credential completion (80 youth completed a credential) or degree completion (56 youth earned a two- or four-year degree). However, as reported later, no statistically significant association between EFC and college completion are found in the IV models.

Payment Program provided funding for up to four semesters of tuition, fees, books, and supplies that are not covered by federal financial aid grants. This program had the potential to influence a larger proportion of Midwest Study participants. A total of 152 participants in Illinois enrolled in a public two-year college before they aged out of foster care. However, since applicants were required to complete a FAFSA, since it is likely that many foster youth would qualify for a Pell grant, and since the maximum amount of Pell grant for each year was well above the cost of in-district community college tuition and fees<sup>53</sup>, it is unclear how much extra benefit this program provided foster care youth in Illinois. It may be more accurate to view this program as a supplemental or safety net program for foster youth rather than as a program that disbursed significant amounts of college aid. However, by requiring youth to apply for federal aid, the program could have induced some youth to gain access to federal funds who would have otherwise not received these funds.

The other two states in the Midwest Study did not have tuition waiver programs for foster care youth that participants would have been able to use. In 2007, Iowa created a state tuition waiver program called the All Iowa Opportunity Foster Care Grant. This grant was available to youth who were in Iowa foster care on or after their 18<sup>th</sup> birthday (or who had been adopted after age 16), and offered several thousand dollars that could be used to cover a wide range of college expenses such as tuition and fees, books and supplies, on-campus housing and meal plans, and transportation and living expenses. However, Iowa foster youth in the Midwest Study would have surpassed the application age limit when the grant first became available in 2008.<sup>54</sup> To my

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<sup>53</sup>For example, the average cost of Illinois in-state tuition and fees for the 2003-2004 school year was \$2686, and the maximum Pell Grant award amount for the same year was \$4050.

<sup>54</sup> Applicants had to be younger than age 23 when applying for the grant. Even if Midwest Study participants met the application age requirement, they would have only been able to receive the grant for one year, since the maximum age limit for the program was age 24.

knowledge, Wisconsin did not have a state grant program specifically for foster care youth during the time of the Midwest Study. Wisconsin's child welfare department did administer the Department of Children and Families Scholarship Program, however, this is the state's name for its federally-funded ETV program. This misnomer brings sets us up for the next topic of discussion—state variation in the availability of ETVs.

The ETV program was created in 2002 as an amendment to the 1999 Chafee Foster Care Independence Program. Foster youth who were in care on or after their 18<sup>th</sup> birthday, or who were adopted after age 16, could receive up to \$5000 per year up to age 21 (or up to age 23 if they received an ETV by age 21) in funding that can be used for postsecondary education expenses. Federal allocations of ETVs were first made to states in 2003, when \$60 million in funding was approved by Congress, but most years thereafter the allocation dropped to under \$45 million. States are required to provide a 20 percent match to federal funds, and unspent federal funding had to be returned to the U.S. Treasury. The annual federal allocation of \$46.6 million in 2005 would have covered about 9,200 ETVs if funded at \$5000. To put this into perspective, in 2005 over 29,000 young people left foster care after the age of 18 (AFCARS, 2006).<sup>55</sup> The amount states received for ETVs were calculated based on a state's proportion of foster care children in the country from prior years, and the extent to which available funds meet the need for ETV varies by state (Simmel, Shpiegel, & Murshid, 2013).

Table 44 presents the average ETV disbursement by state for the modal years of college entry for Midwest Study participants (2003, 2004, and 2005).<sup>56</sup> The original plan entailed

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<sup>55</sup> Note that this figure does not include youth exited foster care to adoption after age 16 in this year, or youth who exited care after age 18 in previous years or were adopted after age 16 in previous years. These youth are also eligible for ETVs in 2005.

<sup>56</sup> ETV allotment amounts by state and year were obtained from annual program instruction memoranda from the Administration for Children and Families (numerator). Point-in-time estimates for the total

calculating the average ETV amounts per eligible youth in each state for each of the three years, however, specific data needed for an accurate count of eligible youth were not able to be attained.<sup>57</sup> Simmel and colleagues (2013) accessed data needed to calculate the average ETV amount per eligible youth broken down by state for the fiscal year of 2009. The authors reported that the average allocated ETV amount for youth in Illinois (\$1396) was within \$60 of the average ETV amounts for Wisconsin (\$1456) and Iowa (\$1355). If these relatively small differences hold for the previous years, when Midwest Study participants would most likely have used ETVs, then the availability of ETVs would not have been a meaningful difference between the three states.

*Table 44. ETV Allocations, by Year and State*

Year		
	State	ETV allocation
2003	Illinois	\$2,140,739
	Wisconsin	\$773,579
	Iowa	\$384,314
2004	Illinois	\$2,060,822
	Wisconsin	\$637,913
	Iowa	\$436,007
2005	Illinois	\$1,898,960
	Wisconsin	\$687,591
	Iowa	\$440,378

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number of foster care youth in care on September 30<sup>th</sup> of each year come from Kids Count Data Center, which uses data from the national AFCARS foster care administrative data system.

<sup>57</sup> To estimate the average ETV amount, data would be needed for the number of youth who were in foster care on or after their 18<sup>th</sup> birthday for each state and each year. Annual AFCARS reports provide national estimates of these figures, but they do not separate by state. The Kids Count Data Center uses AFCARS data to provide estimates by state, but the ages 16 and older are combined into a single group. University of Oklahoma's National Resource Center for Youth Development (<http://www.nrcyd.ou.edu/>) provides the needed data, but the webpage was disabled at the time this dissertation was written. However, even if these data were available, the figures would still exclude youth who exited care after age 16 to adoption, who should also be included in the denominator.

A limitation of the ETV findings presented above is that these estimates corresponded to the amount states were *allocated* for ETVs, not how much states actually disbursed to youth. Some states do not use all of their allocated funds, and the amount that states actually spend is arguably a more accurate measure of the numerator than allocated funds.

***State college financial aid for low-income students.***

In addition to programs specifically for foster care youth, each of the three states had grant programs for low-income college students for which many foster youth would have qualified. The primary need-based grant programs for each state are listed in Table 45, with information from 2003, 2004, and 2005.<sup>58</sup> Illinois' Monetary Award Program was funded as a single program for all college types (four-year, two-year and vocational) and sectors (public and private). The Wisconsin Higher Education Grant (HEG) provided funding to students attending four-year colleges in the University of Wisconsin college system (HEG-UW) and public technical-vocational and two-year colleges (HEG-TC), whereas the Wisconsin Tuition Grant provided funds to students attending private postsecondary education institutions. The Iowa Tuition Grant had separate funds for public vocational-technical colleges (Iowa V-T Tuition Grant) and other institutions of higher education (Iowa Tuition Grant). Eligibility for the state aid programs generally aligned with federal Pell Grant eligibility parameters.

As displayed in the Type and Sector columns of Table 45, differences in how each state structured its need-based grant program(s) makes it difficult to do one-to-one comparisons of award amounts for specific types of institutions. Despite this limitation, it can be discerned that

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<sup>58</sup> Information on expenditure amounts, number of recipients, and average expenditure per recipient were obtained from the National Association of State Student Grant and Aid Programs (NASSGAP) online search tool. The college type(s) and sector(s) included in each aid program, as well as the annual award maxima and minima, were obtained from NASSGAP annual reports and reports found on state student aid council webpages.

Illinois and Iowa had more generous aid awards than did Wisconsin. Although not shown in Table 45, a 2004 report by the Illinois Student Assistance Commission broke out average MAP amounts by college type. The average award amount in Illinois public four-year colleges was nearly \$3000, which was substantially higher than grant amount for Wisconsin, which was just over \$1000 (Illinois Student Assistance Commission, 2004). The average grant amount for Illinois public two-year colleges in 2003 was about \$1550, which was more than double the amount in Wisconsin. Although Iowa's Tuition Grant combined private and public two-year and four-year colleges, the average grant amount received each year was substantially higher than the maximum allowable grant amount in all of Wisconsin grant programs. When considering the cost of tuition for schools in each state (Figure 11), the relatively large grant amounts paid to Illinois recipients may have helped to offset the higher costs of tuition in four-year colleges and may put students on better financial footing in paying the relatively low tuition costs at two-year colleges.

State differences in average aid amount is only part of the story. Another important factor is the proportion of applicants that actually received a grant. Data on grant receipt in each state was difficult to find, and was only available for certain years. In 2004, about 59 percent of Illinois applicants received a MAP grant (Illinois Student Assistance Commission, 2005). In 2005, 57 percent of applicants received an Iowa Tuition Grant and just 14 percent of applicants for the Iowa Vocation-Technical Tuition Grant (Iowa College Aid, 2017). I was not able to locate information for Wisconsin HEG and Wisconsin Tuition grants.<sup>59</sup>

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<sup>59</sup> For example, the 2005 Student Financial Aid Report to the Wisconsin Legislative Fiscal Bureau noted that "over half" of Wisconsin college students apply for need-based aid, it does not report what percentage receive aid, how the proportions break down by source (i.e., federal vs. state) and state program.

Table 45. Primary Need-Based College Grant Program(s), by State and Year

Program	Type	Sector	Year	Expenditure	Recipients	Average Expenditure per Recipient	Minimum Award	Maximum Award
<b>ILLINOIS</b>								
Monetary Award Program	F, T, V	P, R	2003	\$335,155,967	134,636	\$2,489	\$300	\$4,968
Monetary Award Program	F, T, V	P, R	2004	\$331,807,486	140,898	\$2,355	\$300	\$4,968
Monetary Award Program	F, T, V	P, R	2005	\$330,328,687	150,311	\$2,198	\$300	\$4,968
<b>WISCONSIN</b>								
Wisconsin HEG - UW	F	P	2003	\$22,213,203	20,505	\$1,083	\$250	\$1,800
Wisconsin HEG - UW	F	P	2004	\$28,352,131	22,820	\$1,242	\$250	\$2,500
Wisconsin HEG - UW	F	P	2005	\$33,713,710	26,106	\$1,291	\$250	\$2,500
Wisconsin HEG - TC	T, V	P	2003	\$14,369,851	20,112	\$714	\$250	\$1,800
Wisconsin HEG - TC	T, V	P	2004	\$14,796,980	20,232	\$731	\$250	\$2,500
Wisconsin HEG - TC	T, V	P	2005	\$14,628,703	23,497	\$623	\$250	\$2,500
Wisconsin Tuition Grant	F, T, V	R	2003	\$22,431,409	11,673	\$1,922	\$250	\$2,350
Wisconsin Tuition Grant	F, T, V	R	2004	\$21,738,985	10,392	\$2,092	\$250	\$2,500
Wisconsin Tuition Grant	F, T, V	R	2005	\$22,483,699	10,880	\$2,067	\$250	\$2,500
<b>IOWA</b>								
Iowa Tuition Grant	F, T	P, R	2003	\$45,199,928	15,976	\$2,829	none	\$3,600
Iowa Tuition Grant	F, T	P, R	2004	\$46,938,709	16,002	\$2,933	none	\$3,875
Iowa Tuition Grant	F, T	P, R	2005	\$49,561,258	16,606	\$2,985	none	\$3,900
Iowa V-T Tuition Grant	V	P	2003	\$2,335,653	2,642	\$884	none	\$1,200
Iowa V-T Tuition Grant	V	P	2004	\$2,530,570	2,891	\$875	none	\$1,200
Iowa V-T Tuition Grant	V	P	2005	\$2,532,192	2,961	\$855	none	\$1,200

Table notes: Type: F=four-year college, T=two-year college, V=vocational-technical program. Sector: P=public, R=for-profit.

### ***State youth unemployment rates.***

State differences in unemployment rates is a relevant factor to consider because poor labor market conditions could have made it difficult for working college students to have found employment that would pay for living expenses. Unfavorable working conditions could also have led young people to have entered or returned to higher education. Figure 12 displays the average annual unemployment rates for individuals between the ages of 20 to 24 from 2003 to 2013.<sup>60</sup> There are two important time frames in this graph. The first is the years 2005 to 2006, which is when Midwest Study participants turned 21 years old. The second is 2008, which marks the beginning of the Great Recession.

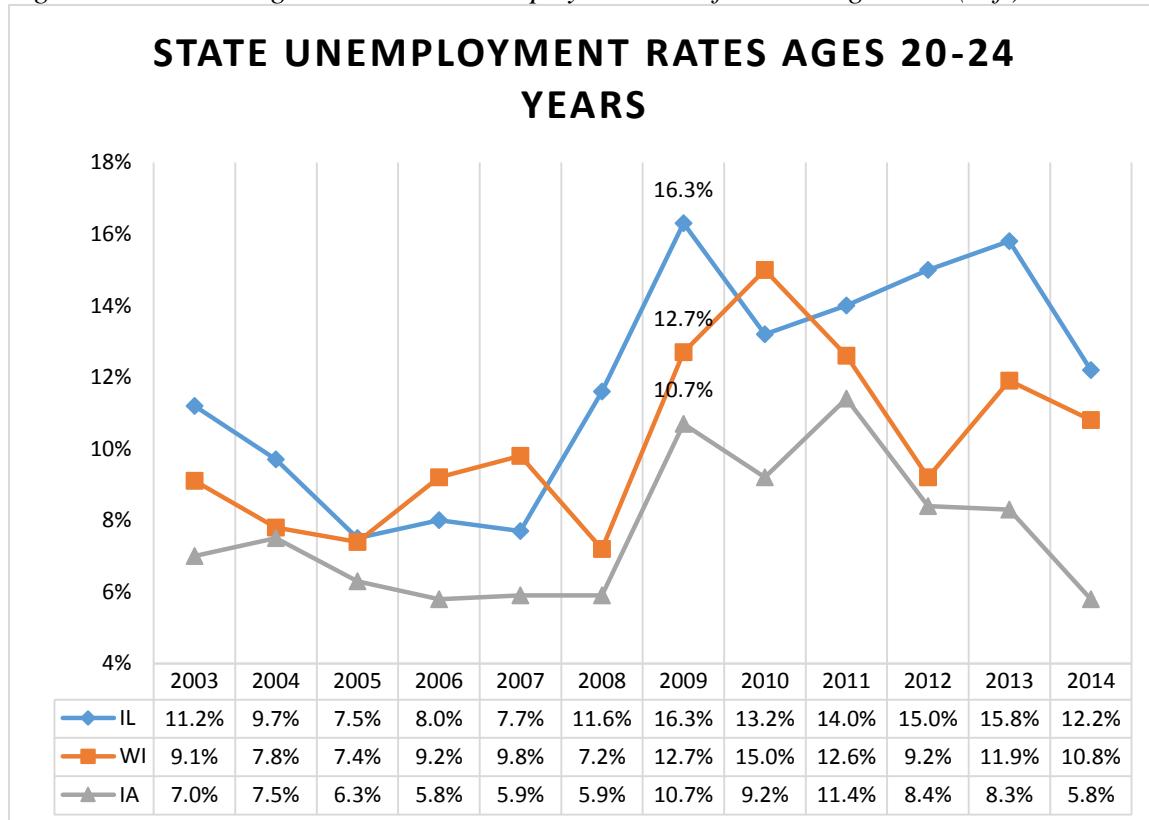
As seen in Figure 12, in the years when participants were 19 and 20 (2003-2005) the job market was particularly trying in Illinois. This could have made it difficult for youth in this state to have found employment. To the extent that this was the case, and to the extent that college students relied on employment as a means of remaining enrolled, these state differences could have suppressed the benefit of extended care. It can also be seen in Figure 11 that after the economic downturn in 2008, the unemployment rate spiked in all three states, but Wisconsin and Iowa (especially) recovered more quickly than did Illinois in the years that followed. The negative effects of the economic downturn may have disproportionately impacted Illinois, causing some students to drop out of college because they could not find employment to pay for college. If this occurred, any leg up that Illinois youth had from extended care in their progression they made through college may have been reduced or nullified as a result of state differences

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<sup>60</sup> State unemployment rates were obtained from the Bureau of Labor Statistics' Local Area Unemployment Statistics webpage.

in the job market. Thus, high unemployment rate and slow recovery in Illinois may have worked against the effect of extended care on college outcomes.

*Figure 12. State Average Annual State Unemployment Rates for Youth Age 20-24 (Left)*



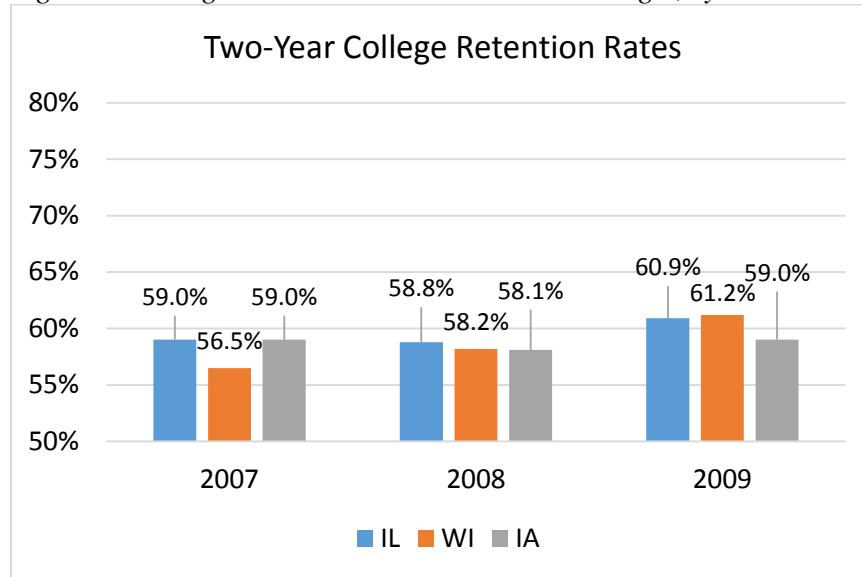
***State college persistence and degree completion rates.***

Finally, state measures of two college outcomes pertinent to this dissertation are examined. Figures 13 and 14 display rates of college retention in two-year and four-year colleges, respectively.<sup>61</sup> The earliest year these data were available by state was the 2007-2008 academic year. For two-year colleges, no clear and consistent trend in state differences in retention appeared from year to year. However, in four-year colleges, retention rates were almost the same for Wisconsin and Iowa colleges, but retention rates were about five percentage points lower in Illinois colleges for each of the three years.

<sup>61</sup> Rates of college retention were computed using the IPEDS Trend Generator data system available on the National Center of Education Statistics website.

The retention graphs suggest that Illinois youth attending four-year colleges may been at a slight disadvantage compared to students in the other two states in terms of remaining at the same college to the second year.

*Figure 13. College Retention Rates at Two-Year Colleges, by Year and State*



*Figure 14. College Rates at Four-Year Colleges, by Year and State*

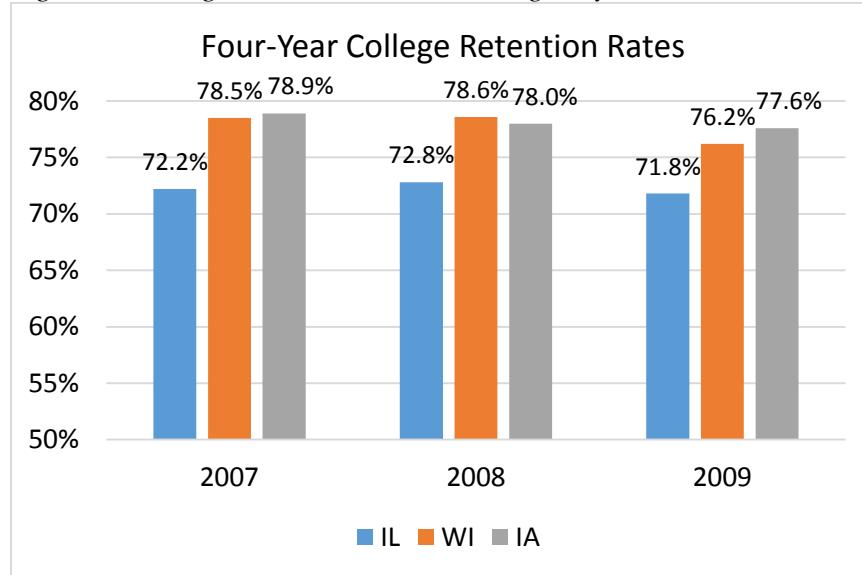
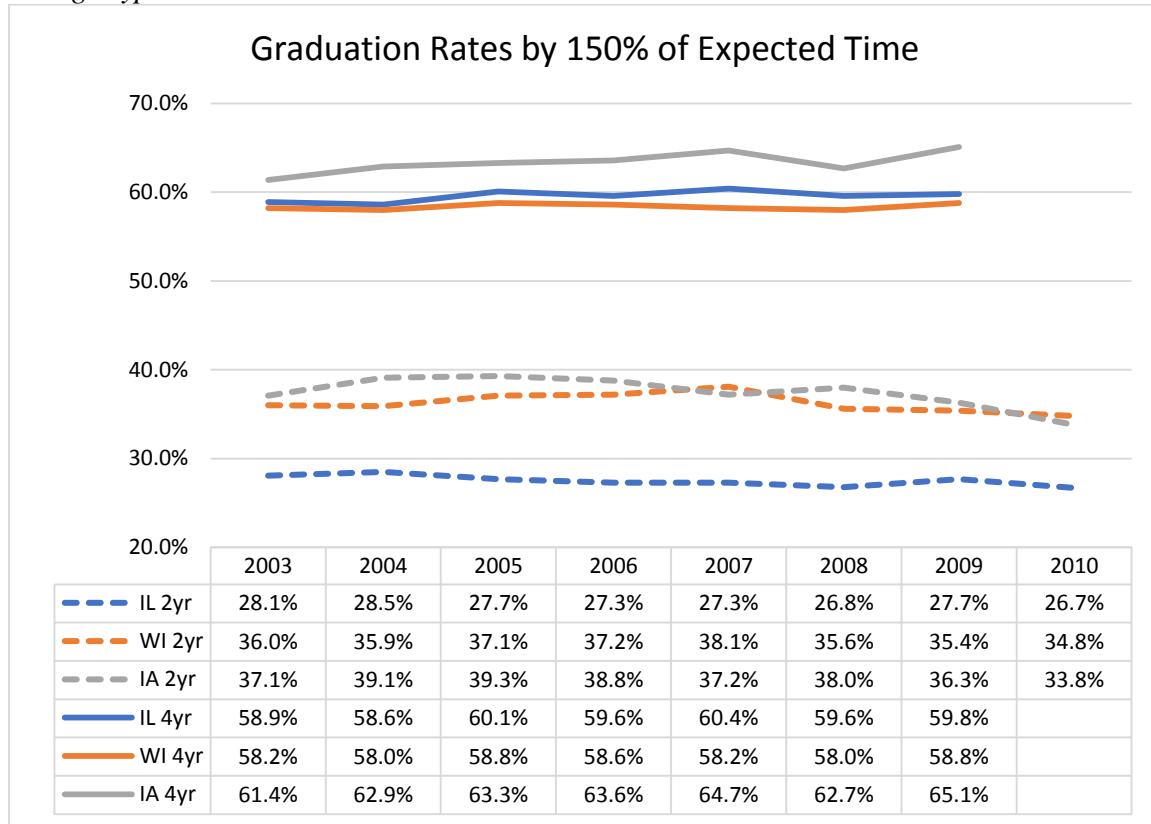


Figure 15 displays rates of degree completion by 150 percent of expected time at two-year colleges and four-year colleges.<sup>62</sup> For two-year colleges, degree completion rates were substantially lower in Illinois than in the other two states, reaching nearly a 10 percentage point gap in some years. In four-year colleges, degree completion rates were more comparable between states, although the completion rates in Iowa colleges were consistently higher than the rates in Illinois and Wisconsin by about 2 to 5 percentage points. These graphs indicate that Illinois students in two-year colleges completed degrees at lower rates than did students in the other two states, and Iowa students in four-year colleges had a slight advantage in graduation rates over their counterparts in nearby states.

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<sup>62</sup> Rates of degree completion were computed using the IPEDS Trend Generator data system available on the National Center of Education Statistics website.

Figure 15. College Degree Attainment Rates by 150% of Expected Time, by Year, State and College Type



To summarize, in this section we explored many state differences in the baseline characteristics of Midwest Study participants and several state-level characteristics pertinent to college entry, persistence, and completion. We were particularly interested in differences between Illinois and the other two states that may cast doubt on the plausibility of the exclusion restriction assumption. In terms of youth characteristics, there were not many significant differences, overall, and few differences that could reasonably be expected to give Illinois youth an upper hand over youth in the other two states in terms of their college prospects. Rather, Illinois youth were significantly worse off than youth in the other two states in certain respects (e.g., higher rates of congregate care and more school changes). Illinois youth entered college a full year earlier than did

youth in the other two states, and had relatively high rates of entry into selective and highly selective four year colleges (although only about 1 in 7 Illinois youth entered one of these institutions).

In terms of state-level characteristics, there were several indications that Illinois lagged behind its neighboring states in educational attainment, as evidenced by lower high school graduation rates, college entry rates among recent high school completers, lower retention rates in four-year colleges, and lower rates of degree completion in two-year colleges. These state level difference would have likely *disfavored* Illinois youth in terms of entering college, persisting in college, and competing college. Compared to the other two states, Illinois had a higher unemployment rate for most years of the study period and had a slower recovery after the Great Recession. This may have compromised Illinois college students' ability to afford college and remain enrolled. Thus, if significant effects are found in the relationships between extended foster care and college outcomes in the IV models, these findings would arise *in spite* of these state-level disadvantaging factors. If these and other differences between states are large enough to influence foster youths' college outcomes in Illinois, the effect of extended care may be underestimated had the states been equal in these factors.

While Illinois lagged behind Wisconsin and Iowa in some respects, there may have been an advantage in terms of the amount students had to pay for college, particularly in two-year colleges. Illinois' need-based grants were more generous than grants in the other two states (especially Wisconsin). This could have been a particular advantage to youth in two-year colleges, where Illinois tuition costs were lower than in the other two states. The low cost of tuition, relatively generous state grant, and the

DCFS-funded award that filled in federal need-based gaps may have made the cost of attendance particularly manageable for youth in extended care in Illinois relative to foster youth in the other two states. One thing to keep in mind though is that the maximum award for Pell grants for across the years of the Midwest Study (from \$2702 in 2002 to \$5500 in 2010) would have covered the cost of in-state tuition and fees at two-year colleges in any of the states.

There is of course a long list of other state-level factors not assessed that could arguably play a role in postsecondary outcomes. For example, if costs of living, housing, and transportation are higher in Illinois than in the other two states, this could have offset (or even tipped the balance of) the advantages associated with Illinois' more generous grants. When considering all of the factors that were assessed, there appears to be countervailing state-level differences coming to bear on the association between extended care and college outcomes, with state educational outcomes threatening to suppress observable benefits of extended care and educational aid threatening to exaggerate possible benefits of extended care. Although differences were observed between states, it is not possible to include them in the IV models because they were highly correlated (and in some cases almost perfectly correlated) with the instrument.<sup>63</sup>

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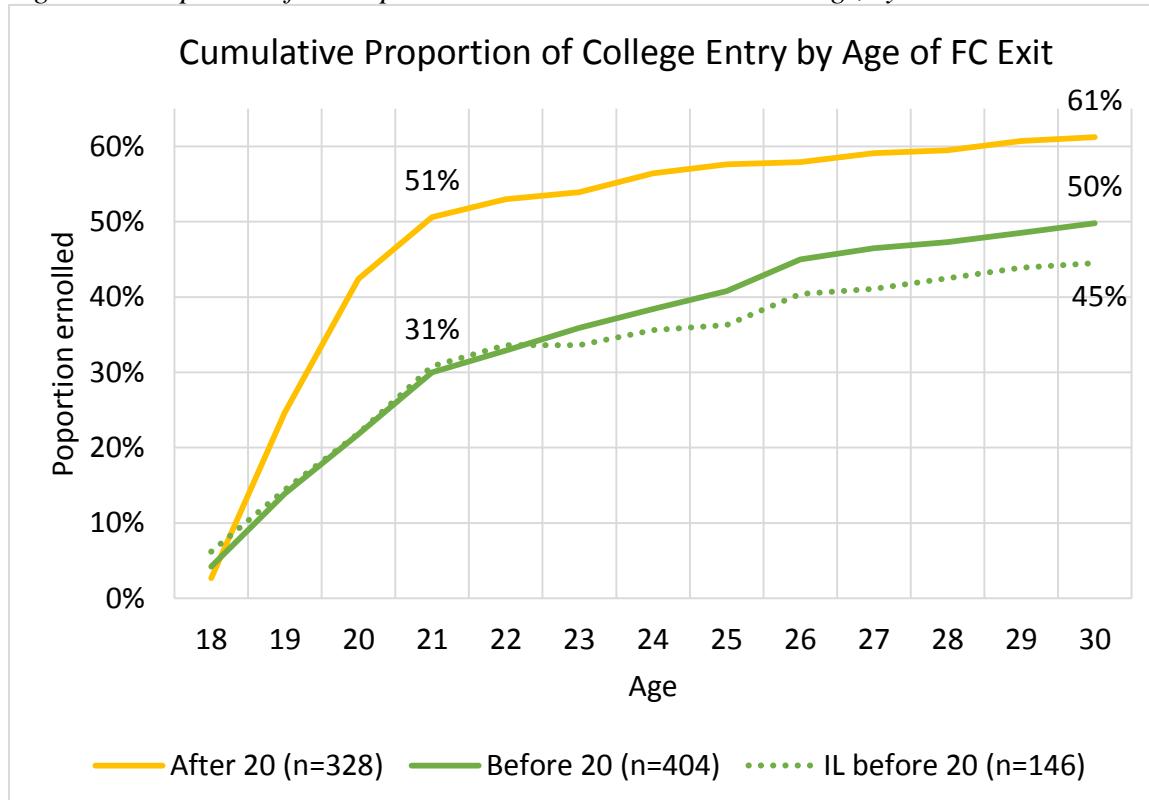
<sup>63</sup> All exogenous predictors in IV models (e.g., demographic characteristics) must be included in both the first and second stage of the IV model. Failing to do so will lead to biased estimates (Baltagi, 2011). It is thus not possible, for example, to include state-level variables in just the second stage equation as statistical controls. When any one of the state level variables were added in the IV models below, including state-level variables that were not related to the outcome being assessed ( $p > .600$ ), the standard errors for years in care past age 18 coefficient in the second stage increased by fivefold or more. For example, in Model IVa in Table 45, when the state level control of high school complete rate was added to the 2SLS model, the point estimate did not change ( $B = .100$ ) but the results went from highly significant to nonsignificant ( $p < .001$  to  $p < .368$ ) because of the ballooning standard errors. This occurred because the state level variable was highly collinear with state. The county group instrument faced similar collinearity problems with state-level variables.

## **Extended Foster Care and College Entry**

The first outcome that is investigated is whether extended care increased youths' likelihood of entering college. Figure 16 plots the proportion of youth who had ever enrolled in college by year of age from ages 18 to 30. The subsequent graphs in this chapter separate youth who had exited care by before age 20 (green line) from youth who remained in care after age 20 (yellow line). The cut was made at age 20 for three reasons. First, this distinction makes it easier to visually compare the potential benefit of extended foster care. Second, it helps to distinguish youth who remained in care past age 18 because they were pregnant or completing high school (Wisconsin and Iowa) from Illinois' extended care policy that is the focus of this chapter. If the cut was made at age 18, for example, youth who remained in care under special provisions in Iowa and Wisconsin would be counted as having received the treatment. Designating these youth in the EFC group would likely underestimate the impact of EFC. A third reason the cut was made at age 20 has to do with dosage—the amount of EFC that could reasonably be expected to impact the college outcomes of interest. Since the average age that participants finished high school was about 19  $\frac{1}{4}$  years of age, the benefit of EFC on college outcomes may not really kick in for most youth until after they finish their secondary credential and can actually attend college. The comparison between youth in care past age 20 versus those who exited care before age 20 reflect this timing, and it will be used when exploring graphs throughout the chapter. The graphs also parse out a third group—Illinois youth who exited care before age 20 (dotted green line). This will be a useful point of comparison of youth who did and did not remain in care past age 20 in the same state where EFC was available.

Figure 16 displays the cumulative proportion of youth who had ever enrolled in college across ages. By age 21, there was a 20 percentage point difference in the proportion of college entrants between youth who stayed in care past 20 versus youth who had left care before then ( $p < .001$ ). By age 30, youth who had left care before age 20 caught up somewhat to the group who stayed past age 20; the gap narrowed to 11 points ( $p = .002$ ). When focusing on just on youth in Illinois, the enrollment difference at age 30 was even greater, with more than a 15 percentage point gap ( $p = .001$ ).

*Figure 16. Proportion of Participants Who Had Ever Enrolled in College, by Year and Care Status*



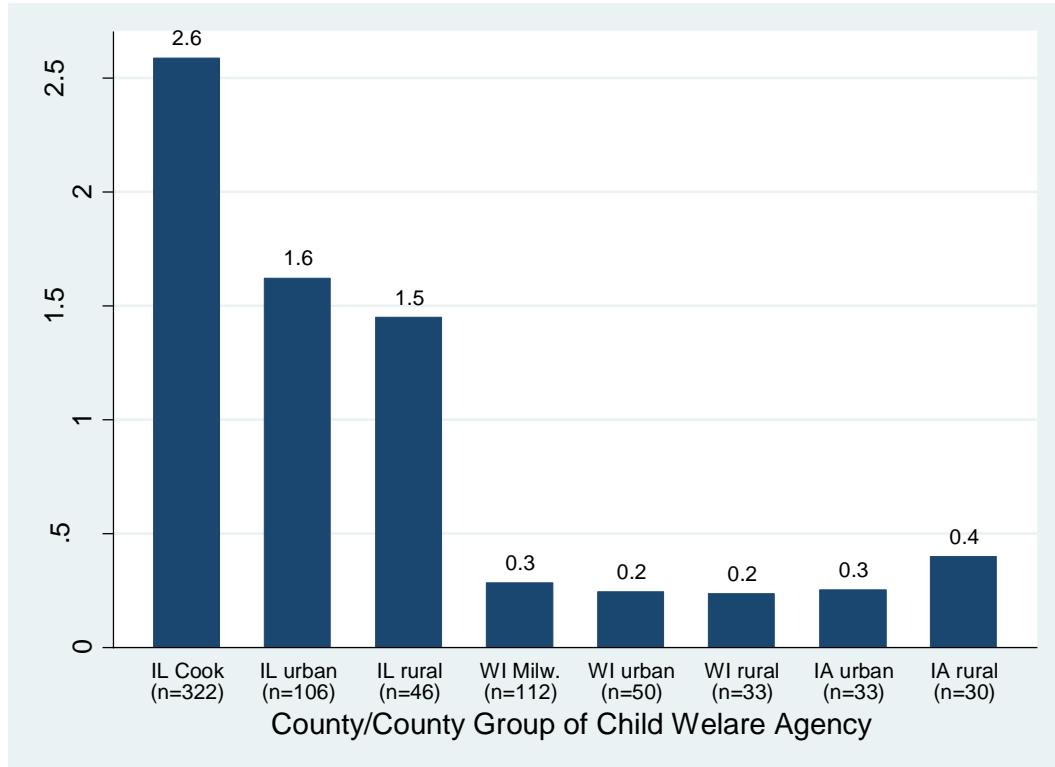
Given that an association appeared to exist between remaining in care and the expected likelihood of entering college, we now investigate whether these differences remain after taking into account possible confounders. Two outcomes will be investigated in this section: college entry by age 21, and college entry by age 29/30. The first outcome

investigated whether EFC impacted college entry within the policy window, and the second outcome examines the extent to which EFC benefits may have extended or persisted beyond the policy window. We start with a naïve regression model that included no controls (Model 0), add demographic covariates in the second model (Model 1), and then add baseline control variables in the third model (Model 2) and the IV models (Models IVa – IVc). Since IV models consume substantial statistical power, a parsimonious set of controls were selected for the analyses. The controls included: reading score, educational aspirations, highest completed grade, number of foster care placements, and ever placed in congregate care. These variables were significantly associated with both years in care past age 18 and college entry, and they covered different aspects of youths' baseline attributes. The sample for these analyses included 713 youth who were not missing information on any of the model covariates. The post-estimation test to check the strength of the instrument could not be performed when using multiple imputation. However, only 2.6 percent of youth were missing data on one or more of the covariates, and results were basically the same as results when multiple imputation was used.

Linear probability models (LPM) with robust standard errors were estimated in the IV models because violations of assumptions of the functional form of the outcome could lead to biased estimates in IV probit and logit models (Elwert & Winship, 2014). LPMs are commonly used with a continuous endogenous predictor and a binary outcome, including in analyses evaluating education outcomes such as first to second year college persistence and degree completion (Bielby et al., 2013). Thus, for Models 0, 1 and 2, linear probability model results (OLS regression with robust standard errors) are reported

so that these estimates can be compared to the IV model estimates. Two-stage least squares (2SLS) was employed for the first IV model (Model IVa). The second stage used the predicted years in care after age 18 from the first stage model to predict the probability of entering college, net of the baseline controls. As a robustness check, a second IV model was run using limited information maximum likelihood (LIML). LIML performs well when instruments do not have strong relationships with the endogenous variable and when sample sizes are small, and simulation studies indicate that LIML produces estimates that can be more consistent and reliable than 2SLS estimators in these circumstances (Sovey & Green, 2011). As a sensitivity analysis, a third IV model was estimated with 2SLS estimation that used county groups as the instrument instead of state (Model IVc). The county group variable contains five categories: Cook County (IL), other urban counties in Illinois, rural counties in Illinois, a group for Wisconsin state, and a group for Iowa state. As displayed in Figure 17, there was significant variation between the three Illinois county groups in time in care ( $p < .001$ ). Work by Peters (2012) suggests that regional variation in child welfare courts and advocacy is a critical driver of county variation in the amount of time youth remain in care past age 18. For Iowa and Wisconsin, there were neither substantive reasons nor empirical reasons (see Figure 16) to separate county groups within Iowa or Wisconsin.

Figure 17. County Group Differences in Average Time Youth Remained in Care Past Age 18



The first analysis examined the impact of each year in care past age 18 on the probability of enrolling in college by age 21. As presented in Table 46, the naïve model with no controls estimated that each year in care beyond age 18 increased the expected probability of enrollment by about 7.4 percent. The estimated effect remains consistent in the naïve models that introduced the control variables. In the first instrumental variable model, the estimated impact of extended care increased to 10 percent per year in extended care and remains highly significant, despite the larger standard errors. Results in these models are estimates of the local average treatment effect (i.e., foster youth whose state of residence would affect how long they remained in care past age 18), and not the average treatment effect for the entire population of foster care youth. In this model, the first stage F-statistic is well above the rule of thumb of 10 ( $F = 23.7, p < .001$ ), which

indicated that the instrument is sufficiently strong (Angrist & Pischke, 2009). The IV model with LIML estimation reached virtually the same conclusion as the 2SLS model. Using the county group variable as the instrument in the 2SLS model reduced the estimated impact by about two percentage points, but extra years in care past age 20 remains a significant predictor of the likelihood of entering college by age 21.

The right panel examined the association between extended care on the probability of ever enrolling in college measured nearly about a decade later. The association between extended care and enrollment over this extended period was weaker than enrollment by age 21. The naïve models indicate that each additional year in care past age 18 was associated with over a four percentage point increase in the estimated probability of enrolling in college. The 2SLS model found a sufficiently strong instrument ( $F = 15.1, p < .001$ ). However, results from the three IV models greatly diminish the predicted impact of extended care and find that it is not significantly related to enrolling in college when measured up to age 29/30.

Table 46. Comparison of OLS and IV Regression Results: Impact of Extended Care on College Entry (covariates not shown) (n = 713)

	Enrolled in College by Age			Enrolled in College by Age			Controls	Estimation	IV			
	21			29/30								
	B	Robust SE	p	B	Robust SE	p						
<b>Naïve Models</b>												
Model 0	.074	.013	<.001	.044	.013	.001	---	OLS	---			
Model 1	.089	.015	<.001	.056	.015	<.001	D	OLS	---			
Model 2	.080	.014	<.001	.043	.015	.004	D, B	OLS	---			
<b>IV Models</b>												
Model IVa	.100	.022	<.001	.016	.024	.519	D, B	2SLS	State			
Model IVb	.100	.023	<.001	.015	.024	.519	D, B	LIML	State			
Model IVc	.081	.021	<.001	.009	.215	.680	D, B	2SLS	County			

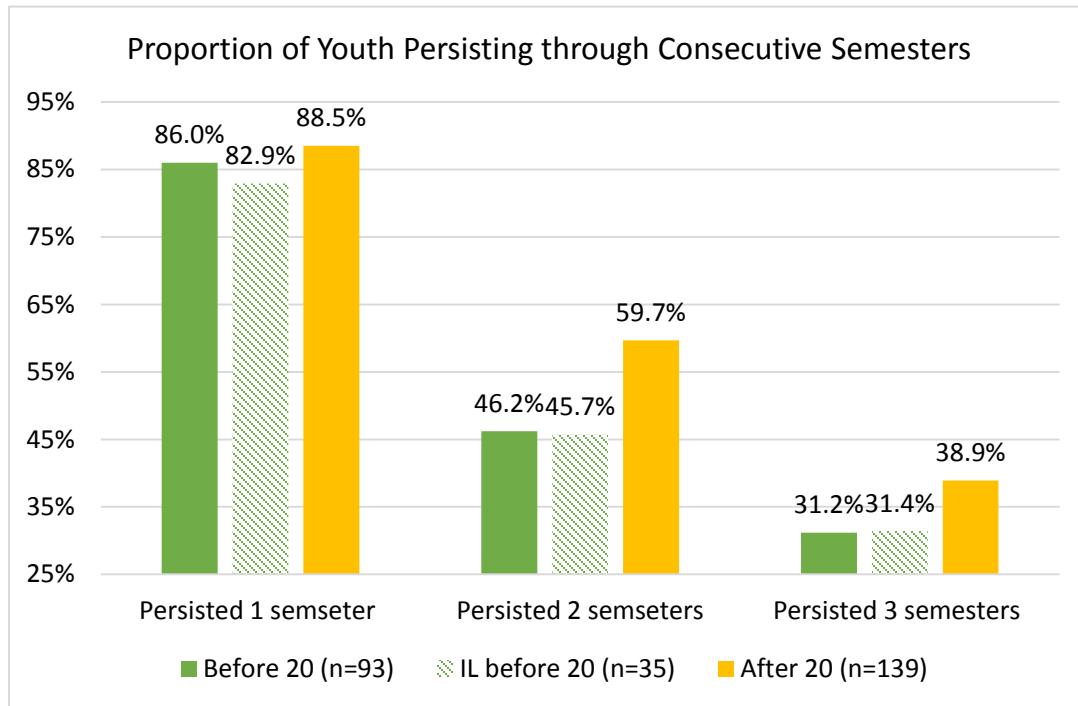
D = Demographic Characteristics (gender, race/ethnicity, age at baseline)

B = Youth Baseline Characteristics (reading score, educational aspirations, highest completed grade, number of foster care placements, history of congregate care.

### **Extended Foster Care and College Persistence**

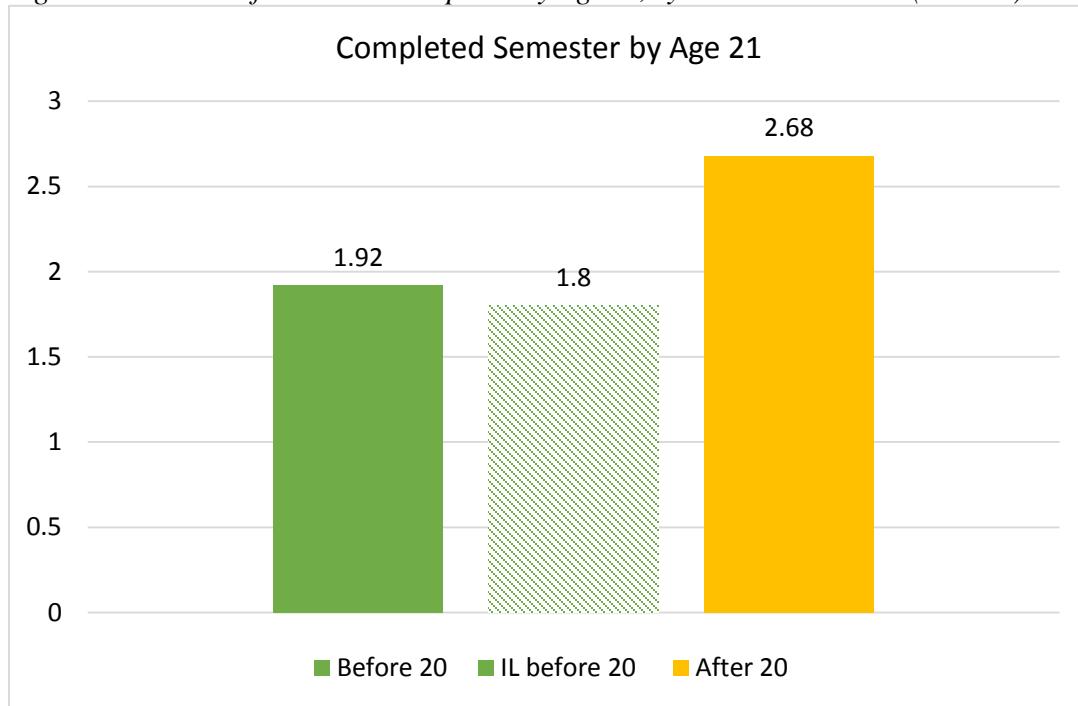
Next, we examine whether extended care increases the estimated likelihood of persisting in college and completing more semesters of college. The first part of this section was limited to just youth who had enrolled in college before age 21 ( $n = 232$ ) so that we were focusing on the time when youth were enrolled in college and could have potentially been in extended care. Results of regression analyses with different sample specifications are reported in the second part of this section. Persistence rates by care status are presented in Figure 18. There were no significant differences by care status in terms of one-semester persistence ( $p = .578$ ), but youth who stayed in care past age 20 were significantly more likely than youth who left before age 20 to have persisted through two consecutive semesters ( $p = .043$ ). Differences were similar for just Illinois youth, but did not reach statistical significance ( $p = .135$ ). There was about an eight percentage point difference between youth who stayed in care past 20 and youth who exited before 20 in three-semester persistence rates, but this difference was not statistically significant ( $p = .233$ ), nor were care status differences for just Illinois youth ( $p = .417$ ).

*Figure 18. Rates of College Persistence among Youth who First Enrolled Before Age 21, by Persistence Duration and Foster Care Status*



In terms of the number of semesters that youth completed by age 21, significant differences were found by care status. As presented in Figure 19, youth still in care past age 20 had completed nearly three-quarters of a semester more than youth who had not remained in care past age 20 ( $p = .007$ ). Although less than a one semester difference is not very large in and of itself, it is large when considering that college entrants completed few semesters before age 21; this was about a 40 percent increase. The difference between youth in care over 20 and youth who left care before 20 was even larger for just Illinois youth; the difference was about 1.2 semesters, or a 74 percent increase ( $p = .004$ ).

Figure 19. Number of Semesters Completed by Age 21, by Foster Care Status (n = 232)



Regression analyses for college persistence and the number of completed semesters were conducted in a similar fashion as in the previous section. We started with naïve OLS regression models with robust standard errors and built up to IV models. Due to the small sample size, control variables were limited to: demographic characteristics, reading proficiency score, history of placement in congregate care, age of first enrollment, and type/selectivity of the first college attended. The left panel in Table 47 displays results for three-semester college persistence. There were no significant associations between years in care past age 18 and college persistence in any of the models. I also examined the association between extended care and persistence through two semesters. Although time in care past age 18 significantly predicted a greater expected probability of two-semester persistence in the naïve models (Model 2:  $B = .070$ ,  $SE = .029$ ,  $p = .017$ ), the estimate was not significant in the 2SLS model ( $B = .051$ ,  $SE = .051$ ,  $p = .312$ ). In terms of number of completed semesters, all three OLS models

suggest that each year of care is significantly associated with an increase of just over .10 semesters. In the two IV models that designated state as the instrument, coefficients increased to .16 semesters per year in care but are not statistically significant. Interestingly, in the model in which county was instrumented, the coefficient nearly doubled, with each year in care predicting an extra .30 completed semesters by age 21. As a robustness check, and as a way to address possible confounding introduced by unmeasured state-level characteristics, institutional retention rate was added to the OLS and IV models in lieu of institutional type/selectivity. There was little change to the results reported below.

Table 47. Comparison of OLS and IV Regression Results: Impact of Extended Care on College Persistence and Number of Completed Semesters (covariates not shown) (n = 228)

	Three-Semester Persistence			Completed Semesters By Age 21			Controls	Estimation	IV
	B	Robust SE	p	B	Robust SE	p			
<b>Naïve Models</b>									
Model 0	.039	.024	.107	.272	.110	.014	---	OLS	---
Model 1	.041	.031	.193	.276	.132	.038	D	OLS	---
Model 2	.040	.030	.191	.265	.110	.017	D, B	OLS	---
<b>IV Models</b>									
Model IVa	.030	.048	.531	.130	.160	.416	D, B	2SLS	State
Model IVb	.026	.043	.552	.126	.162	.441	D, B	LIML	State
Model IVc	.026	.043	.544	.311	.306	.031	D, B	2SLS	County

D = Demographic Characteristics (gender, race/ethnicity, age at baseline)

B = Youth Baseline Characteristics (reading score, history of congregate care, age of first college entry, type/selectivity of first college)

The results above addressed the question about whether foster youth who enrolled in college early experienced a benefit in terms of completing more credits if they are in extended care. A related but distinct question is whether foster youth, in general, completed more semesters of college by age 21 if they participate in extended care. This question incorporates EFCs impact of getting youth into college *and* promoting the completion of more semesters. To test this question, I reran the analyses above on number of completed semesters by age 21, omitting age of college entry and college type/selectivity since foster youth who did not attend college have not data on these variables.<sup>64</sup> However, the following controls were added back to the model: college aspirations, highest completed grade, number of foster care placements. Youth who had not enrolled in college were marked as completing zero semesters. In addition to answering a different question, this analyses has a much larger sample size with more statistical power. The results of these analyses find that each year in care past age 18 is associated with more than a one-quarter semester completion bump in both the naïve OLS model with controls (Model 2:  $B = .270$ ,  $SE = .049$ ,  $p < .001$ ) and in the 2SLS model (Model IVa:  $B = .310$ ,  $SE = .073$ ,  $p < .001$ ).<sup>65</sup>

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<sup>64</sup> As a note, when these two variables are omitted from Model IVa in Table 46, the results change little ( $B = .143$ ,  $SE = .149$ ,  $p = .337$ ).

<sup>65</sup> For this analysis, there were 71 youth who enrolled in college as per Midwest Study records but who did not have NSC data on the number of semesters they completed. Of the 71 youths, 16 first enrolled after age 21 (coded as completing 0 semesters by age 21) and 55 enrolled before age 21. Various specifications for imputing the number of semesters for these 55 youth were used as robustness checks. First, the mean number of semesters completed for youth in their respective state who enrolled in college before age 21 was imputed as their value. These results are reported in the text. Second, the overall mean for youth who enrolled in college before age 21 was used to impute the number of semesters they completed, and results from the 2SLS model changed little ( $B = .344$ ,  $SE = .069$ ,  $p < .001$ ). Third, I coded all 55 youth as having completed zero semesters and reran the analyses. The findings changed only slightly in the 2SLS model ( $B = .310$ ,  $SE = .067$ ,  $p < .001$ ). Fourth, all 55 youth were coded as having completed the maximum number of semesters completed by a youth (10). The coefficient was larger in the 2SLS model ( $B = .475$ ,  $SE = .175$ ,  $p = .007$ ).

I also examined whether the benefit of extended care in number of semesters completed extended beyond age 21. The outcome for this analysis was the number of semesters completed by the end of the NSC observation period. Additional time in care was not significantly associated with total semesters completed in the bivariate model ( $B = .35, p = .181$ ) or the models that added controls.

Thus, these findings indicated that extended care helped foster youth to complete more semesters by age 21, overall, but when considering just youth who enrolled in college by age 21, youth who stayed in care for longer do not have an apparent benefit in how many semesters they complete. Additionally, the overall advantage in completed semesters observed before age 21 did not last in the years following youths' 21<sup>st</sup> birthday. As discussed in the concluding chapter, one limitation of these analyses is that they did not account for a possible selection effect. That is, extended care may have induced young people in Illinois to attend college who were not academically prepared or particularly motivated to do so.

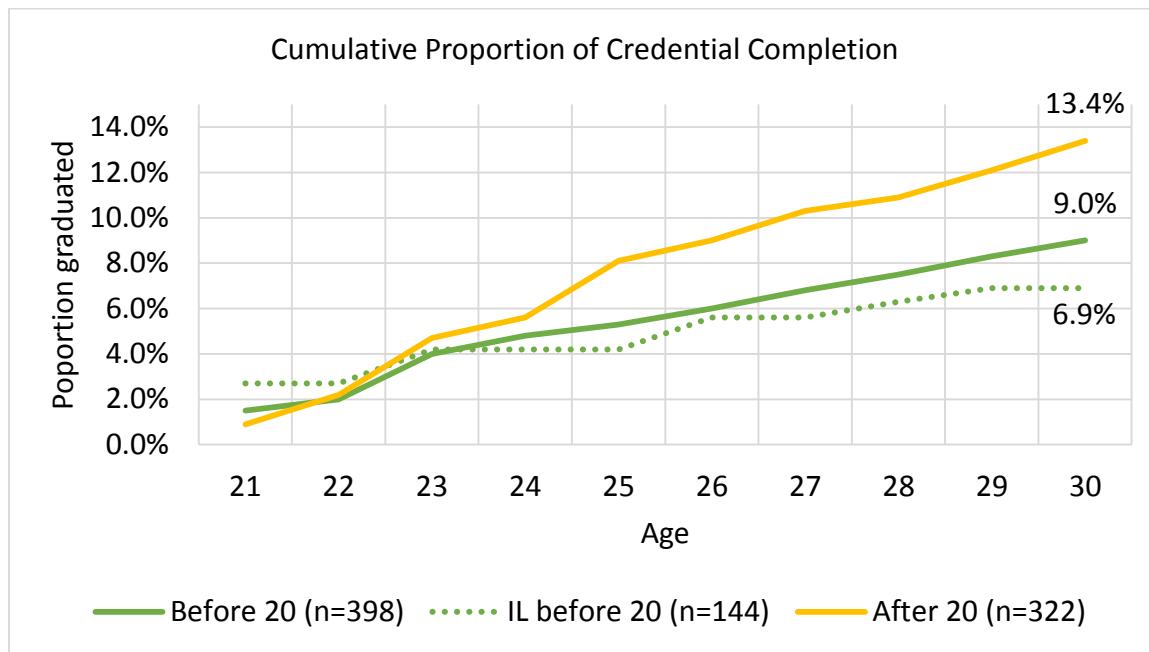
### **Extended Foster Care and College Completion**

The final college outcomes investigated is credential completion (certificate, two-year degree, and four-year degree) and degree completion (only two-year degree and four-year degree). Since attainment of a postsecondary credential was a rare event, there is limited statistical power to detect significant differences. Figure 20 displays credential completion rates over time for the entire Midwest Study sample, separated by care status. Beginning around age 23, we see that the credential completion rate for youth in care past age 20 started to pull away from the rate of youth who had left care before age 20. By age 30, the proportion of youth who had completed a credential was marginally

significantly higher for youth who had stayed in care past age 20 versus youth who had exited care past age 20 ( $p = .085$ ). Although not shown in the graph, at age 30 there was a statistically significant difference in degree completion rates between youth who left after and before age 20 (10.6% vs. 5.5%,  $p = .012$ ). When restricting the sample to just Illinois, youth in care after age 20 had significantly higher completion rates than youth who had exited care in terms of both credential completion ( $p = .044$ ) and degree completion (10.6% vs. 2.1%,  $p = .002$ ).

When examining rates of college completion among just college entrants who can be observed for six or more years ( $n = 329$ ), there were no differences between youth exited after and before age 20 in credential completion (23.6% vs. 24.5%,  $p = .855$ ) or degree completion (18.7% vs. 15.0%,  $p = .373$ ). This was also the case when the sample was restricted even further to just youth who had first enrolled in college before age 21 (credential: 23.6% vs. 25.2%,  $p = .760$ ) (degree: 19.4 % vs. 15.1%,  $p = .351$ ). When restricting the sample to just college entrants in Illinois who could be observed for six years and first entered college before age 21 ( $n = 284$ ), no significant differences were found for credential completion (23.6% vs. 22.7%,  $p = .899$ ), but there was a significant difference in degree completion (19.4% vs. 6.9%,  $p = .047$ ).

Figure 20. Credential Completion Across Ages, By Foster Care Status (n = 720)<sup>a</sup>



<sup>a</sup> Excludes 12 youth who became deceased during the study period.

Since significant differences were not found among college entrants, the multivariable analyses below focused on the general sample of foster youth, excluding those who became deceased during the study period (and excluding youth missing on control variables). The question addressed here is whether extended care impacted credential completion and degree completion rates for all foster youth. Control variables included youth demographic characteristics and the baseline characteristics that were used in previous models (see Table 47). As presented in Table 48, we see that extended care was not associated with the estimated probability of completing a credential in any of the models. Additional years in care past age 18 increased the estimated probability of earning a two-year or four-year degree in the naïve models, but was not statistically significant in any of the IV models.

Table 48. Comparison of OLS and IV Regression Results: Impact of Extended Care on College Completion (covariates not shown) (n = 702)

	Credential Completion			Degree Completion			Controls	Estimation	IV
	B	Robust SE	p	B	Robust SE	p			
<b>Naïve Models</b>									
Model 0	.012	.009	.162	.016	.007	.034	---	OLS	---
Model 1	.013	.009	.168	.018	.008	.023	D	OLS	---
Model 2	.010	.009	.273	.016	.008	.038	D, B	OLS	---
<b>IV Models</b>									
Model IVa	-.004	.015	.795	-.007	.011	.548	D, B	2SLS	State
Model IVb	-.004	.015	.793	-.007	.011	.544	D, B	LIML	State
Model IVc	-.005	.014	.695	-.002	.010	.857	D, B	2SLS	County

D = Demographic Characteristics (gender, race/ethnicity, age at baseline)

B = Youth Baseline Characteristics (reading score, educational aspirations, highest completed grade, number of foster care placements, history of congregate care)

## Chapter Summary

This chapter examined the impact of extended care on college outcomes, using state as an instrument. In assessing two main assumptions of IV models, we found that state was a sufficiently strong instrument for the number of years youth remained in care past age 18, that there were some but not many state differences in baseline youth characteristics, and that state differences in educational outcomes may threaten to underestimate the impact of extended care whereas the availability of need-based grants may lead to an overestimation of the impact of extended care. Results from regression analyses found that extended care had a large impact on getting foster youth into college before age 21, which contributed to them completing more semesters by age 21. This advantage did not persist when the number of completed semesters was assessed several years after youths' 21<sup>st</sup> birthdays. We did not find evidence that extended care increased college persistence among college entrants, nor did we find that extended care significantly increased the expected probability that foster youth ultimately completed a college degree.

## CONCLUSION

The overarching goal of this dissertation was to gain a better understanding of individual, institutional, and policy factors that impact the college outcomes of foster youth. The specific aims of this dissertation build on and extend what we know from previous research on college outcomes for foster youth. The final chapter comes full circle by integrating the findings reported in the last seven chapters. The first section revisits the research questions motivating this dissertation, summarizes the findings, and provides brief discussion along the way. This is followed by a more thorough discussion of extended foster care and four main barriers to postsecondary educational attainment for foster youth— inadequate advising and college mismatch, financial need, academic underpreparedness, and avoidant attachment. Implications and possible action steps for policy and practice are suggested in each of these barriers. The third section presents limitations and caveats of the dissertation, and the final section presents areas for future research.

### Summary of Findings

**Question 1a and 1b: What are the trends in college entry, persistence, and degree completion for foster youth? How do rates of persistence and completion for foster youth compare to a representative sample of low-income, first generation college students?** This study found that, as adolescents, more than nine in ten Midwest Study participants aspired to go to college. Fast forward a decade later and we see that only 55 percent of the participants had ever enrolled in a postsecondary education institution. Nearly 75 percent hoped to earn a college degree, but a decade later only 11

percent had completed a postsecondary credential, including just 8 percent who earned a two- or four-year degree. These completion rates are low on their face, but are also low in comparison to a nationally representative sample of low-income first-generation students who entered college around the same time as Midwest Study participants. Among college entrants, the comparison group was more than 2.5 times as likely as the young people in foster care to have earned a postsecondary credential six years after first enrolling (44% vs 16%). The stark disparities in college success underscore the magnitude of the problem, and the need to advance policy and programmatic responses to support foster youth through college.

**Question 2: What are the common enrollment patterns among youth who make it to college?** Taking a look at what happened to study participants after they entered college helps to shed light on these overall trends in college completion. While the majority of college students made it through their first semester (83%), there was an appreciable drop in the proportion of students who returned to college the following semester (47%) and another drop in the proportion who return the next academic year (30%).

A fuller picture emerged after analyzing participants' semester-by-semester enrollment patterns up to age 30. When considering the entire arch of youths' college careers, nearly half of the youth were classified as belonging to the "toe-in-the water" group, meaning that they had only enrolled for one or two semesters and then never returned to college. Another quarter of youth displayed intermittent enrollment patterns, either sampling multiple institutions ("buffet" group) or boomeranging in and out of the same institutions over time ("boomerang" group). Only about one-quarter of foster youth

displayed a pattern of consistent enrollment, in which they remained enrolled at the same institution, or a small number of institutions, for two consecutive years (“consistently enrolled” group). College completion rates were highest for the consistently enrolled group (64%), and were considerably lower for the boomerang (18%) and buffet (9%) groups. None of the youth in the toe-in-the-water group completed a postsecondary credential.

The toe-in-the-water group was similar to the group that Adelman (2005) dubbed “Visitors.” About half of the youth in this study who entered college never saw past the first few semesters. This suggests that the first year of college is a critical time period for intervention. However, analyses of data from the Midwest Study indicates that the toe-in-the-water group faced considerable challenges relative to the other groups, and the youth in these group would likely require more intensive college support. This group had more academic difficulties (i.e., lower reading scores, more likely to have repeated a grade, more likely to have been in special education) and behavioral problems (i.e., more likely to have been expelled from school and to have ever been placed in congregate care) at baseline than did the other groups. Importantly, the toe-in-the-water youth entered college about two to three years later than the other groups. Consequently, these young people were more likely to have been parents, to have experienced an alcohol or substance use problem, to have been working full-time, and to have encountered economic hardships and food insecurity by the time they first enrolled. Entering college at an older age can be a disadvantage because supports designated specifically for foster care youth that are age-limited (e.g., education and training vouchers, extended care) are cut short or missed altogether. Indeed, about 48 percent of toe-in-the-water youth first

enrolled in college after they turned 21. In addition to missed benefits, more life events and responsibilities are in play for older entrants that compete for their time, attention, and money. Thus, one strategy involves encouraging foster youth to enter college at a younger age, when they can take advantage of the supports in place for foster youth.

Recommendations for addressing academic underpreparedness are discussed in the next section and are particularly relevant to the toe-in-the-water group.

The remaining 51 percent of college entrants were split between the consistently enrolled group (27%), the boomerang group (17%), and the buffet group (7%). There were few differences between youth in these three groups in terms of their demographic characteristics, academic history, foster care history, and baseline risk and protective factors. The consistently enrolled group consisted of a greater number of females (70%) than the boomerang and buffet groups (about 50% apiece). There were a few differences between the groups in characteristics measured after they entered college. Consistently enrolled youth had fewer problems than the other groups with economic hardships and food insecurities, and a larger proportion of boomerang group worked full-time than the other groups. The types of institutions youth in these groups attended may explain some of the group differences. Overall, consistently enrolled youth (21%) were twice as likely as boomerang and buffet youth (about 10% each) to have enrolled in selective institutions. However, these differences do not appear to be due to just differences in the academic qualifications of the two groups. When parcelling out just youth in these groups who were at or above age level in reading proficiency (third and fourth reading proficiency quartiles), consistently enrolled youth were still about twice as likely as boomerang and buffet youth to have attended selective colleges (32% vs. 17%).

Attending schools with higher graduation rates and more resources, and that better match foster youths' academic qualifications, may be part of the explanation of why consistently enrolled youth were able to spend more uninterrupted time in college and ultimately graduate compared to youth with interrupted enrollment patterns.

What is clear, however, is that consistently enrolled youth were able to start college early and clocked a long stint of uninterrupted time at college. In contrast, youth in the other two groups either boomeranged in and out of the same college(s) or skipped between several different colleges. The boomerang group may be capturing youth making dogged attempts to chip away at a college credential, interrupted by life circumstances such as the need to work. The buffet group may include youth who try different schools after a poor fit with a previous institution, who have unstable housing situations and relocate often, or who change their minds about their postsecondary goals. These are speculations about the different groups, and it is difficult to make qualitative distinctions between the groups without having more information about their journeys through college. However, one may wonder if supports and structures could have been put in place that would have allowed the boomerang and buffet youth to remain consistently enrolled at the same college, and if this would have increased the percentage of these youth who would have finished college.

**Questions 3 to 5: What factors predict college entry, persistence, and completion?** This subsection is organized around predictor groups that were used in the multivariable regression models for the three main college outcomes evaluated in this dissertation.

***Demographic characteristics.*** In terms of demographic characteristics, males were less likely than females to go to college, and among entrants, males were less likely than females to complete a college credential. The gender difference in college entry rates is consistent with historical shifts that have occurred over the last four decades, in which more females than males enter college each year. Scholars attribute this trend to factors such as lowering of the labor market barriers for women, the larger share of males than females directly entering the labor force after completing high school, and behavioral problems that tend to be higher in males than females (Lopez & Gonzalez-Barrera, 2014). This latter point may be a particularly poignant factor for youth in this study. For example, compared to females, at age 19 males were nearly twice as likely to have been arrested since the baseline interview, more than twice as likely to have been convicted of a crime, and about three times as likely to have spent a night in jail (Courtney et al., 2005). In terms of differences by race/ethnicity, there were no statistically significant differences except for one, in which Hispanic college students were less likely to persist through three semesters than were White college students. Other studies examining college persistence and completion among foster youth have not reported differences by race and ethnicity (Day et al., 2011; Day, Dworsky, & Feng, 2013; Salazar, 2012), which is attributed to the multiple risk factors that affect foster youth generally (e.g., low SES, attendance in underperforming schools, history of maltreatment). In the broader student population, Hispanic college students persist at lower rates than do White youth (for review see Crisp, Taggart, & Nora, 2015). Research points to several factors that may be at play that are driving these difference, such as sociocultural characteristics, racial/ethnic beliefs and coping styles, perceptions of campus climate, and interactions with supportive

individuals (Crisp, Taggart, & Nora, 2015). These and other factors may be at play among Hispanic youth in this sample, but a degree of caution is in order due to the small number of Hispanic youth in the NSC sample ( $n = 30$ ).

***Academic history.*** The second predictor group included characteristics of youths' academic histories. The brief assessment of youths' reading proficiency was one of the strongest predictors, with each standard deviation increase in reading score predicting about a 60 percent and 40 percent increase in the expected odds of entering college and persisting through three semesters, respectively. Indications that youth were academically behind at age 17 (highest grade that was completed, history of repeating a grade) decreased the expected likelihood of going to college. Contrary to expectations, high school grades in math and English, history of being in special education, and prior school expulsions did not significantly predict any of the college outcomes after adjusting for the other covariates in the regression models. The high school grades measure may not have been a strong predictor because it only included information from youths' English and math grades in their most recent high school marking period, rather than their cumulative high school GPA. Additionally, self-reported grades are less reliable than grades taken from administrative records (Kuncel, Crede, & Thomas, 2005). Information was not available on the type of classes students were enrolled in (e.g., basic, regular, honors, AP) or the quality/competitiveness of the school they attended, which are other important factors to consider when assessing the role of high school grades.

The measure of youths' involvement with special education may not have been measured with enough acuity to capture associations with future outcomes. For example, information was not available about the reasons youth were placed in special education

(e.g., ADHD, learning disability, speech production disorder, emotional problems); the severity of the disorder; whether it was a past or current issue; and the type, quality, and duration of services and accommodations youth received. Another explanation is that many youth in this study may have been placed in special education because of emotional or behavioral problems rather than a learning disability or some other reason. In a study eighth grade students in Chicago Public Schools who were in foster care, 45 percent were receiving special education services, and among the children in special education about 40 percent were classified as having an emotional or behavior disorder (Courtney et al., 2004). In this dissertation, youth who had been in special education were more likely than those who had not been in special education to have baseline mental health problems, alcohol/substance use problems, prior school expulsions, and higher delinquency scores (all  $p < .05$ ). Thus, special education may have been a marker of psychological and behavioral problems for large proportion of youth with special education histories, which explains why special education was did not independently explain college outcomes after these other markers of emotional and behavioral problems were included in the regression models.

An unexpected finding that ran contrary to the hypothesis is that none of the academic history measures predicted the expected likelihood of youth graduating from college. This may be due in part to the fact that with each passing year the academic measures (e.g., reading proficiency) become a less reliable assessment of the youths' current level of academic skill and ability. Moreover, events and life circumstances that occurred after youth enrolled in college (e.g., economic hardships, parenthood) appeared

to play a more prominent role in predicting college completion than did covariates measured at an earlier time.

***Maltreatment history and foster care history.*** The third covariate group included measures of youths' maltreatment history and foster care history. Ever residing in congregate care decreased the predicted odds of entering college. This finding was expected since placement in the most restrictive care settings is indicative of severe behavioral and/or emotional problems. An increased number of foster care placements and school changes each decreased the expected likelihood that college students persisted through three semesters. One hypothesis is that increased mobility may have disrupted the educational continuity of youth in primary and/or secondary school, which can result in academic difficulties or a greater need for remediation in college. However, neither foster care mobility nor school mobility predicted lower reading proficiency scores or high school grades. Another possible explanation is that increased mobility had a psychosocial impact on the participants, such as the associations described in the avoidant attachment hypothesis. Indeed, adding avoidant attachment into the full persistence model fully mediated the relationship between foster care changes and persistence ( $p = .116$ ) and the relationship between school changes and persistence ( $p = .081$ ). This suggests that at least some of the negative repercussions of mobility during foster care affects college outcomes through disruptions in psychosocial functioning.

Contrary to expectations, maltreatment was not significantly related to any of the outcomes, including in the results of supplemental analyses that examined different types of maltreatment separately (i.e., physical abuse, sexual abuse, and neglect). Maltreatment may affect college outcomes to the extent to which it increases youths' emotional and

behavioral problems and alcohol/substance use problems, and these latter factors were more direct predictors of college outcomes. Similar to baseline academic factors, none of the maltreatment history or foster care history characteristics predicted college completion.

***Other risk and promotive factors measured at baseline.*** Some of the other various risk and protective factors were found to predict college outcomes. Becoming a parent at a young age delayed the timing of when youth entered college, but it did not affect their probability of ever having enrolled in college by age 30. Although young mothers and fathers did not enroll in college as early as their peers, many did eventually did enroll later in life. Consistent with the hypotheses, the results also suggested that indications of behavioral problems and alcohol/substance use problems (which are correlated) negatively affected the estimated likelihood of entering college. School expulsion (marginally significant), engaging in delinquent behaviors (marginally significant), and alcohol/substance use problems at baseline decreased the estimated likelihood that youth went to college. The presence of mental health problems, however, was not significantly associated with entering college. The most common mental health problems that adolescents in foster care report are depressive disorders and PTSD (Havliceck et al., 2013). While these conditions can interfere with daily functioning, they may not be as disruptive or pervasive as the effects of alcohol/substance use problems and the constellation of behavioral problems that are correlated with substance use. Additionally, the measures used to capture mental health problems (i.e., positive screen for depression/PTSD symptoms, psychiatric hospitalization, psychotropic drug use) may

cast a broad net that does not differentiate between discomfiting versus debilitating levels of mental health severity.

As hypothesized, paid employment and participation in college preparatory activities each increased youths' expected likelihood of going to college. There may be value in each of the activities in and of themselves (e.g., developing a good work ethic, increasing college-relevant knowledge), but they may also reflect unmeasured attributes of youth that are associated with college entry.

***Pre-entry and post-entry characteristics.*** In terms of predictors of college persistence and completion, most of the action involved factors measured during the time periods before and after youth entered college. Recall that the analyses of college persistence included just pre-entry measures, whereas the college completion analyses assessed both pre-entry and post-entry measures. The age at which youth first entered college was an important predictor of whether college entrants persisted. Youth who enrolled after age 21 were less likely to persist than were youth who enrolled before turning 19. This is consistent with findings from studies of non-traditional age college students, which report that older students have more life demands than younger students that impede their ability remain in college (e.g., Davidson & Wilson, 2016). This was reflected in the findings of college completion. In the model of credential completion that excluded pre-entry and post-entry characteristics, youth who had enrolled in college after age 21 were significantly less likely to finish than were youth who had entered college before age 19. Age differences became non-significant after factors such as parental status and the number of hours working were added to the model.

Youth who had held a job before entering college were more likely to persist than were youth who had never worked. As discussed above, work may be capturing unmeasured skills and attributes that are also associated with persistence (e.g., budgeting time, balancing work and other responsibilities, completing tasks even when one does not feel like it), it may have given youth an opportunity to develop these skills and attributes, or a combination of the two. There may also be other benefits of pre-entry employment. Practically, work may have allowed youth to save money for later college expenses or set them up with a job that they could continue after enrolling in college. Early employment might also give youth a dose of reality. For example, working long hours at low pay can give youth perspective about the value of completing a college degree.

Whereas pre-entry employment made it more likely that youth would persist, post-entry employment (full-time employment in particular) decreased youths' chances of completing a degree. Two additional post-entry life circumstances each had a strong negative association with the expected likelihood that youth earned a college credential: encountering economic hardships and being/becoming a parent. Results from the multivariable regression models, which control for a wide range of other factors, are consistent with self-reports of participants in later Midwest Study interviews. Needing to work, not being able to afford college, and having childcare responsibilities were the three top reasons for leaving college and barriers to returning to college. Each of these will be discussed in more detail in the following section.

In the analyses of college persistence, overall, pre-entry parental status was not significantly associated with the expected odds of persistence. However, a statistically significant interaction effect was found between gender and pre-entry parental status.

Entering college as a parent was significantly worse for males than for females in terms of their expected odds of persisting. In the Midwest Study, males were far less likely than females to reside with their children. Male parents may have had to pay child support (either formally or informally), which could have been a barrier to remaining in school. Having a child to provide for may have also created greater incentives for leaving college work, which meets more immediate needs than does remaining in school with the promise of a long-term payoff from completing a credential.

Prior research with foster youth reports that access to certain types of social support (e.g., tangible support and advice from adults with a college education) increases youths' likelihood of entering college (Okpych & Courtney, *in press*). The current study finds that youth who entered college with more social support at the outset were significantly more likely to have completed college than were youth who entered with less support. Youth high in social support may have more dense networks of individuals that can be accessed later in college. It is important to recognize that there are different reason why youth vary in their perceptions of the availability of social support. For example, higher social support scores could result from: (a) youth actually having more available social support, (b) youths' proclivity to forming relationships with others who can be relied on for support, and/or (c) youths' likelihood of perceiving and acknowledging the support that is available to them. The regression analyses controlled for the amount of social support youth had *after* entering in college, which suggests that the amount of support youth enter college with has an independent relationship with completing a credential. Another point to recognize is that the social support scale used in this study is a composite measure that captures five different types of support. It may be

that the sum total of youths' perception of available support drives their success in college. Alternatively, certain types of support may serve different functions in promoting college completion. For example, emotional support may help to alter youths' appraisals of threats (e.g., providing assurance after failing an exam that leads youth to question whether they are cut out for college), instrumental support may help with solving practical problems (e.g., emergency money to fix a flat tire), and informational support may give youth access to information needed to solve problems, complete tasks, and access resources (e.g., assisting youth with completing the FAFSA) (Cohen, Underwood, & Gottlieb, 2000). As discussed in the Future Research section, examining different types of social support is a potential next step for this study.

***Institutional characteristics.*** Consistent with the study's hypothesis, attendance at selective/highly selective four-year colleges was associated with higher persistence and completion rates than attendance at two-year colleges. Schools with higher average persistence rates increased the likelihood that foster youth persisted. It was also found that institutions that spent more on academic support (e.g., academic administration, instruction development, libraries) and student services (e.g., health and well-being programs, student activities) had large impacts on foster youths' success, even after controlling for institutional type and selectivity. Every \$100 increase in spending per student in student services increased the expected odds of earning a credential by about 6 percent. The association was even larger for spending on academic support services such as college advising and tutoring. Every \$100 increase per student predicted nearly a 10 percent increase in the estimated odds of credential completion. These results are consistent with findings from other studies of college-level predictors, which suggest that

institutions are a powerful influence on the success of their students after accounting for individual characteristics of the students.

Interestingly, academic and student support expenditures were not associated with persistence. For persistence, it may be that students who did not make it through three semesters are so academically behind (e.g., need to take several remedial courses) that extra funding devoted to usual types of support may not be enough to retain them. The students who did persist through the first few terms, which mostly consist of basic and introductory courses, may have been able to make it on their own. However, investments in academic and student supports may be more of a factor for long-term outcomes, as students move on to more advanced elective courses. The robustness of a school's investment in tutoring, academic advising, social programming, and other activities may impact whether students are ultimately able to navigate their path to a credential.

As expected, higher proportions of part-time students at an institution decreased the estimated likelihood that college entrants in this study graduated from college. Not only does a large part-time student body make it difficult to establish cohesive, palpable, supportive college culture, but it also reflects a student body that has commitments outside of school. In contrast to findings from other studies, higher proportions of Pell grant recipients at a college *increased* foster youths' chances of completing a credential. It is suspected that finding resulted from characteristics of the sample. Transition-age foster youth are a subgroup of students with few material resources who are generally living on the verge of economic hardship. Among this group, colleges in which aid is adequately distributed may be particularly critical to their college success. There may also be a psychosocial component. When the culture of the college and its study body is

consistent with the students' own background can create a sense of belongingness and comfortability that is not present when there is mismatch between the youths' sociocultural upbringing and the college culture (e.g., working class students attending elite colleges) (Stephens, Townsend, Markus, & Phillips, 2012).

**Questions 6a and 6b. Does increased maltreatment and relational instability (i.e., number of placement changes, number of school changes) increase youths' avoidant attachment? Do higher levels of avoidant attachment predict college persistence and completion?** The findings supported both hypotheses about avoidant attachment. Youth who experienced more maltreatment and relational instability had higher levels of avoidant attachment by the time they were 17 years old. In turn, youth higher in avoidant attachment were less likely to persist in college ( $p = .053$  in the full model) and to earn a two- or four-year degree ( $p = .038$  in the full model). The latter association was mediated in part by the amount of social support youth reporting having before and after entering college. Although past maltreatment and relational instability also predicted higher levels of anxious attachment, youths' amount of anxious attachment was not significantly associated with youths' college outcomes after accounting for possible confounders. Implications about avoidant attachment are discussed in the next section.

**Question 7. Does extended foster care promote college entry, persistence, and completion?** The naïve ordinary least squares (OLS) regression models indicated that extended care increases college entry and persistence. However, results from the two-stage least squares instrumental variable models, which yield a more rigorous evaluation of the extended care policy than do standard multivariable regression models, reached

somewhat different conclusions. It was found that extended care had an impact on the estimated likelihood of entering college by age 21 and the number of semesters completed by age 21. However, extended care was not found to impact the expected likelihood that youth persisted in college or that they ultimately completed a credential. As discussed below in the Limitations section, it is possible that state-level differences in the instrumental variable models led to an underestimation of the effect of extended care on college outcomes.

### **Discussion and Implications of Key Findings**

The focus of this dissertation was on understanding factors that influence college persistence and completion among foster youth. This section elaborates on some of the key findings summarized above with a particular focus on helping college entrants succeed in college. We first consider extended foster care, including a discussion of why it may not have had an impact on the long-term college outcomes of foster youth. This leads us to consider four major barriers to foster youths' college success: inadequate college advising and college undermatch, economic hardships and the need to work, academic underpreparedness, and avoidant attachment. For each of these areas, implications for policy and practice are presented along with recommended action steps for professionals working in different fields.

The forthcoming recommendations are separated by topic, but taken together they serve as a response to addressing higher education outcomes for foster youth. This response spans multiple intervention levels (i.e., practice, institutions and systems, and policy) and engages professionals from a variety of fields. Table 49 helps to see the gestalt by mapping the recommendations on to a timeline of foster youths' academic

career, beginning in the junior year of high school and ending after the sixth year of college. This timeline is laid out on the horizontal axis. The rows of the chart on the left vertical axis break out the recommendations by the level of action and professional field. This helps to clarify the action steps that can be taken by professionals working in different fields at different levels of intervention (i.e., practice, systems, and policy). It is important to point out that this generic chart that will certainly not apply to every child welfare system and every foster youth who goes to college. For example, this chart depicts a scenario in which foster youth enroll in college in the year after they finish their secondary education and in which the child welfare department continues to serve foster youth after age 18. Not all foster youth enroll in college right after they finish high school (although one of the recommendations is to encourage early college entry) and states vary in the extent to which they continue to serve foster youth in college beyond age 18 either through extended foster care or through independent living services (although these are both recommended). Thus, this chart is best understood as a general schematic to help organize the recommendations rather than as a blueprint of the college entry and intervention process for foster youth.

Table 49. Summary of Recommendations to Promote College Success for Foster Youth<sup>66</sup>

LEVEL OF ACTION	EDUCATION TIMELINE							
	HIGH SCHOOL		COLLEGE					
Junior	Senior	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	
Child Welfare Workers	Formalize benchmark goals in TILP Encourage early college entry	TILP and IL services: Meet EFC, ETV, and other financial aid requirements						
High School Staff	Identify SMR colleges							
College Professionals	Summer bridge programs	Use FAFSA (q53) and institution's application to identify and proactively recruit FC youth Create Campus Support Programs (CSP) for FC Youth. Designate FC Liaison if CSP not feasible. CSP functions: <ul style="list-style-type: none"> <li>• Early identification of academic problems</li> <li>• Assist youth with reapplying for ETVs and other financial aid</li> <li>• Provide/link youth to services that address trauma</li> <li>• Develop peer network relationships</li> <li>• Administer IDA savings accounts</li> </ul>						
Child Welfare System and Policy	Extend foster care age limit to 21 (state) Use Chafee independent living funds to contract with local youth-serving organizations (local) Designate specialized case workers to help with college planning, application, persistence (local) Use admin. data to identify colleges with high presence of FC youth (state) Use admin. data to identify colleges with good outcomes for FC youth & special groups (state) Use NYTD as tool to follow FC youth in college and to collect supplemental information (state)	Align ETV timeline with FAFSA timeline (state) Increase ETV Allocation (federal) Extend ETV age limit to 26 (federal)						
Postsecondary Education System and Policy	Collaborate with CW to recruit promising FC youth (colleges)	Move foster care question (q53) to front of Independent Student status section (federal) Link FAFSA to state ETV applications (federal) Give foster youth priority for work-study program (state) Add question on application form to identify foster care youth (colleges) Use alternatives to traditional remediation such as co-curricular classes (colleges) Develop/enhance systems to identify early academic problems and provide feedback to students (colleges)						

<sup>66</sup> Acronyms in this table include: TILP (Transitional Independent Living Plan), IL (Chafee independent living services, as established by the 1999 John H. Chafee Foster Care Independence Act), SMR (Safety Net, Match, and Reach colleges), EFC (extended foster care), ETV (Education and Training Voucher)

Before turning to the specific recommendations, a promising intervention model that could be used to improve college outcomes for foster youth, and which pertains to several of the recommendations, is described. *Campus support programs* are located on college campuses and serve young people who are or were in the foster care system (Geenen et al., 2015; Geiger, Hanrahan, Cheung, & Lietz, 2015; Phillips et al., 2015; Salazar, Haggerty, & Roe, 2016; Watt, Norton, & Jones, 2013). These programs are promising for at least four reasons. First, they are designed to offer a wide range of academic, financial, social/emotional, and logistical supports to promote college persistence (Dworsky & Perez, 2010; Dworsky, Smithgall, & Courtney, 2014). They can serve as a “one stop shop” in meeting youths’ various needs, or providing accurate referrals if the needs cannot be met in-house. Second, foster care alumni can continue to participate in these programs even after they reach the age limit for other benefits (e.g., extended foster care). The programs may be able to help sustain gains made by earlier investments. Third, most foster youth will be the first in their family to attend college. College can a culture shock for first-generation students, and having a program that help youth to acclimate to and guide through the transition may prevent dropout during the first critical year. Fourth, campus support programs are more targeted and they may be more feasible to implement than some of the larger, systemic changes discussed below. For example, community colleges may be slow to redesign their developmental education program for students deemed to need remedial coursework. In the meantime, foster youth need to be able to navigate and succeed in the existing structures, which campus support programs can assist with. To better identify incoming foster youth who would be eligible for campus support programs and other services, it is recommended that colleges include

a question on their admissions application that will identify young people who had been in foster care in their adolescence.

While campus support programs are promising, they are relatively uncommon in US colleges and have not yet undergone rigorous evaluation. Additionally, most campus support programs exist in four-year institutions, despite the fact that most foster youth attend two-year colleges. There are some colleges where it may not be feasible or justifiable to create a program (e.g., schools with few foster youth). However, recent gains signal that these four facts need not be setbacks or nonstarters the development of campus support programs. The first support program for foster youth was created at California State University, Fullerton in 1998, which served three students. Today, thousands of foster youth participate in over 80 colleges in the US (Fostering Success Michigan, 2017). Efforts are underway to rigorously evaluate some campus support programs, and to develop model programs that can be replicated and adapted in other colleges (e.g., Geenen et al., 2015; Salazar, Haggerty, & Roe, 2016). There are a number of two-year colleges that have developed or are in the process of developing campus support programs for foster youth (Fostering Success Michigan, 2017). For example, a recent state law in California allocates \$12 annually to support the development of programs and services for foster youth in 10 community college districts in the state. In all of California's community colleges, an administrator on campus is designated as a liaison to assist foster youth with accessing financial aid, academic support, and other services. A liaison model may be a viable alternative for campuses where there are too few foster youth to justify creating a full-fledged campus support program. Campus

support programs have a role to play in addressing the barriers to college success discussed below.

### **Extended Foster Care**

This study found that the main impact of extended care was getting foster youth into college before age 21. The magnitude of the effect was large; each year in care past age 18 predicted a 10 percent increase in the expected probability that youth would have enrolled in college by age 21. It is important to keep in mind that these findings only apply to “compliers” in Rubin’s causal inference framework. That is, they apply to youth for whom the amount of time they spend in care past age 18 would be impacted by whether or not state law permitted them to remain in care up to age 21. The findings do not apply, for example, to youth who are adamant about leaving care at age 18 whether or not their state had an extended care law. There are some important reasons why getting foster youth into college at an early age (versus an older age) is important. Youth are closer to their secondary education, have fewer life events and obligations that can get in the way, and are also eligible for foster care benefits that have age limits. For example, youth must apply for an education and training vouchers by age 21 or else they are not eligible to receive it thereafter.

While the study did not find that extended foster care impacted college completion, there may be other benefits to remaining in care past age 18. An earlier study found employment benefits for foster youth associated with completing some college versus no college, so there is some advantage to completing some college (Okpych & Courtney, 2014). More recent research on extended care indicates that remaining in care past age 18 may shield foster youth from other negative outcomes in early adulthood,

such as homelessness and experiencing economic hardship, and promotes positive outcomes such as being able to save money (Courtney & Okpych, 2017). On the other hand, it is also important to be attentive to unintended negative consequences of increasing the number of foster youth in college without providing them adequate support to see that they finish. For example, if foster youth accumulate debt from going to college and do not leave with a degree, they may be placed in financially trying situations. This is more true today than in the mid-2000s as the costs of attendance (tuition and fees, supplies, housing expenses, living expenses) have risen over the past 10 years while the ETV disbursement has not increased and the Pell grant increases have not kept pace with the growing cost of college (Okpych, 2012; Goldrick-Raab, 2016).

Overall, the findings suggest that extended care helps foster youth make the important first step of entering college, but extended care alone may not be enough to impact graduation rates. Additional supports must be in place to address obstacles that foster youth face, both during the extended care eligibility window and especially after they have reached the extended care age limit. This will require multiple stakeholders to work toward addressing the major barriers that stand in the way of foster youth completing college.

### **College Advising and College Match**

Promoting college success for foster youth begins well before they set foot inside of a college. In this dissertation, it was estimated that about one in three college entrants were undermatched, attending a college below a selectivity level that they may have been able to gain entry into. Keeping in mind that only a rough estimate of college match was able to be calculated in this dissertation, it nevertheless suggests that a sizeable

portion of foster youth attend colleges below their level of academic qualifications. This has implications for their college success. Research on the general college student body indicates that students who attend college below what their qualifications fare worse in their chances of graduating than do students with similar qualifications and characteristics who attended colleges that met or exceeded their qualifications (Alon & Tienda, 2005; Melguizo, 2008). Results from this dissertation are consistent with this finding. In the regression analyses, youth similar in academic and other background characteristics had different chances of succeeding in college depending on the type of school they entered into and the resources available within those colleges. These findings suggest that ensuring that foster youth enter colleges that appropriately match their qualifications, with a particular target on reducing undermatching, is an important step to increasing the chances that foster youth will succeed in college. Moreover, undermatching can work against initiatives intended to promote college success, such as extended foster care and ETVs. Conversely, if foster youth enroll in colleges that fit their qualifications, needs, and preferences, the impact that other initiatives have on college success can be maximized.

To get foster youth into colleges that match their qualifications, needs, and preferences, these young people will need to be provided with high quality hands-on guidance with the college search, application, and selection process. As described in the Background chapter, even well-qualified students can fail to meet critical benchmarks in the college search and choice process without structured support. Hitting these benchmarks is predicated on students having structured support to help them walk through each of these tasks. Like other low-income students, foster youth come from

families and communities where college-going is not the norm and attend high schools where guidance counseling offices are understaffed (Frerer et al., 2013). In a recent study of California foster youth, less than half of foster youth who wanted to go to college reported that they had enough help with college planning (Courtney et al., 2016). Conversely, the greater number of professionals with college experience that youth in this study could rely on for support significantly increased their likelihood of entering college (Okpych & Courtney, *in press*). Not providing foster youth with enough structured support means that some will not go to college and others will enroll in colleges below their qualifications where their chances of graduating are slim.

The recommendations outlined here involve strategies for increasing foster youths' access to high quality college advising and information. The first recommendation entails using the transitional independent living plan (TILP) meetings, which occur every six months for youth in care ages 16 or older, as a mechanism to formalize action steps to link youth with college advising and information. A brief standardized assessment of youths' college plans and knowledge can be required as part of the first TILP meeting. This is warranted both because most foster youth plan on going to college. The specific college goals in the TILP can be guided by benchmarks used by high school guidance counselors that lay out the timing and sequence of concrete tasks relating to gaining admission to college. For example, identifying prospective colleges and taking standardized tests typically occur in junior year, visiting colleges and narrowing the list of schools students will apply takes place in the summer after junior year, and college admissions applications and financial aid applications are completed in the fall of senior year. Having a formal timeline with specific tasks outlined in the TILP

will ensure that students do not miss critical deadlines that could affect their ability to gain admission to college or access financial aid. It is important that the TILP goals to be specific and actionable, such as ensuring that foster youth register for a FAFSA pin by the start of their senior year.

While the TILP is a tool to map out college planning goals, it is unrealistic to expect child welfare workers to provide college advising. Rather, case workers would more likely be responsible for ensuring that foster youth are connected to other professionals and resources to meet the college planning goals in the TILP. High school guidance counselors and other school personnel are one potential source of advising. For example, some foster youth will have good relationships with staff at their school, and these professionals may show a commitment to assisting the youth with gaining access to college. However, if it is determined that the support youth require is not available at their school, child welfare workers will need to rely on other professionals.

Youth-serving organizations that specialize in providing educational support for foster youth is one potential partner. On a systems level, child welfare departments could contract with local organizations to provide college advising to all high school-age youth on their caseloads who are interested in pursuing higher education, drawing on dollars from the Chafee independent living program funds received from the federal government. Alternatively, child welfare departments could develop a college advising capacity in-house. This would entail creating specialized workers who provide college planning to the high school-age foster youth within the local jurisdiction (see Table 49). This may require child welfare departments to recruit professionals with prior college advising experience, or to provide training on college advising to the specialized workers. Some

education specialists, whether they are contracted professionals or specialized child welfare workers, could be assigned to work with foster youth who remain in care after they enroll in college. In this role, responsibilities would include ensuring that foster youth are connected to the resources they need to succeed in college. Since one of the main targets of extended foster care is promoting college success, equipping young people with practical skills to make ends meet during college should be one of the independent living skills the child welfare department helps youth to develop.

Another set of recommendations pertains to the role that child welfare departments can play in collecting administrative data on college outcomes of foster youth. Administrative data from the National Student Clearinghouse or state postsecondary education data systems (if available) can be used to identify the institutions with critical masses of foster youth. Colleges with a large presence of foster youth would be targeted by the child welfare department to develop partnerships so that foster youth are better served by both institutions.

Administrative data on college outcomes (e.g., persistence and completion) could also be used to identify colleges where foster youth have particularly successful college outcomes. Updating these data every couple of years would provide child welfare departments with up-to-date information that could be used to inform the college advising with high school-age foster youth, directing them to colleges that have a track record of high success rates for foster youth. Importantly, these data could also be disaggregated to identify specific subgroups of foster youth. For instance, child welfare departments may be particularly concerned about college outcomes among parenting foster youth, young people with behavioral health problems, or youth with involvement with the criminal

justice system. Many of these data elements are available in existing child welfare administrative records. Administrative data would shed light on the colleges that are best able to serve young people with special circumstances and challenges. Ideally, child welfare administrative records would be supplemented by data on youths' educational history and performance (e.g., scores on state proficiency tests, placement into basic vs. regular vs. honors classes, cumulative GPA), which would child welfare departments to better match colleges to foster youths' academic qualifications.

To supplement the birds-eye view provided by administrative data, state child welfare agencies could use the ongoing National Youth in Transition Database (NYTD) surveys to gather information on early college experiences of foster youth. Under federal law, every three years states are required to interview a sample of 17 year-olds in foster care and then conduct follow-up interviews at ages 19 and 21. Since considerable time and resources are expended each year to locate and interview NYTD participants, states could exploit these efforts by adding a few supplemental questions specific to young people in college. These supplemental questions could be changed with each cohort based on the needs and interests of the child welfare agencies. In one cycle pregnant and parenting youth may be of interest, and in the following cycle perceptions of a change in the ETV policy may a pressing concern, for instance.

In addition to formalizing benchmarks in TILP planning, linking youth to high quality advising, and using administrative data to inform advising, another set of recommendations pertain to the college application process and are general in nature. First, foster youth should be encouraged to enter college soon after completing their secondary education (see Table 49). In this dissertation, early college entry significantly

increased youths' likelihood of persisting in college and earning a degree, in part because later life circumstances and demands were at play that pulled youth away from college. Moreover, and as discussed in more detail in the next section, the late teenage years and early 20s is a window of time when considerable supports are available to foster youth. These supports are age-limited and will not be available to foster youth who delay entry into college by a few of years. It is important to respect foster youths' agency as they are becoming adults, but it is equally important to provide them with a realistic view of advantages and obstacles that accompany beginning college at different ages.

Second, foster youth should be encouraged to apply to several colleges, and not just two-year schools, "safe" schools, and schools they are familiar with. A constrained college search may be selling foster youth short and ultimately hinder their ability to succeed in college. Instead, foster youth should be encouraged to apply to a few reach schools (colleges above their qualifications), a few match schools (colleges aligned with their qualifications), and a few safety net schools (colleges below their qualifications). They will qualify for tuition fee waivers at most institutions. While there are many factors at play in determining which college would be a good fit for a given foster youth, and this should be an integral part of the college advising discussed earlier, youths' pool of options should not be cut short.

### **Economic Hardships and Needing to Work**

Encountering economic hardships and needing to work full-time after enrolling in college each decreased the expected likelihood that study participants completed college. The self-report data tells us that these two factors were both reasons youth dropped out of college and barriers to returning to school. Thus, while extended foster care may help

foster youth to ease financial hardships while they are in care (Courtney et al., 2005, Courtney et al., 2016), this study finds that these exigencies interfere with college success after extended care is no longer available. Upon turning age 21 in states with extended care policies, several thousands of dollars each year that covers or subsidizes the cost of housing and living expenses is no longer available. Funding from education and training voucher (ETV) grants may still be available at this time, so long as there are adequate ETV funds, youth applied for an ETV before turning 21, and the young person was making satisfactory academic progress in college (i.e., enrolled at least part-time and maintain at least a 2.0 GPA). However, two years later ETV funding also expires as young people reach the age of 23. Together, expiration of extended care benefits and the ETV grant amounts to the loss of roughly \$10,000 to \$15,000 in aid. Importantly, if past trends hold, these losses occur as the price of college continues to rise each year.

Several recommendations are directed at equipping foster youth stave off or reduce the negative impact of economic hardships experienced during college. The first recommendation is intended to increase the proportion of foster youth who receive a Pell grant and/or an education and training voucher (ETV). Nontrivial proportions of foster youth do not receive these need-based grants that they would likely qualify for (CA College Pathways, 2015; Courtney et al., 2016). Connecting the ETV application to the FAFSA application may increase foster youths' access to aid for which they qualify. Currently, completing the FAFSA and applying for an ETV (through the state) are distinct application processes with different application windows. For example, in Washington State a foster youth could complete a FAFSA as early as October but must wait three months until the ETV application becomes available. Distinct application

windows and sets of applications increases the chances that foster youth may miss deadlines, neglect applying for aid, or be unaware of other types of available aid. Linking ETV applications to the FAFSA would require states to realign their application timeline to that of the federal aid timeline. It would also require the FAFSA to automatically direct applicants to their state's ETV application based on an existing question about the applicants' history of foster care involvement.<sup>67</sup> This synchronization would streamline and simplify the application process. For instance, child welfare workers, high school guidance counselors, and other professionals could be trained to direct youth to the FAFSA to apply for aid.

A second recommendation is to change the ETV maximum from a set amount of \$5000 to an amount that reflects changes in the cost of college attendance.<sup>68</sup> The buying power of the ETV grant has substantially decreased since it was first established nearly 15 years ago. Between 2003 and 2013, the cost of tuition, fees, and room and board that a \$5000 ETV covered went from 47 percent to 28 percent for public four-year colleges and from 83 percent to 54 percent for public two-year colleges (National Center for Education Statistics, 2016). Given the substantial depreciation in the buying power of the ETV, the time may be approaching when the federal allocation for the ETV program needs to be revisited by Congress. A formula similar to the one used to adjust the Pell

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<sup>67</sup> Question 53 on the FAFSA application is currently used to identify applicants who can file as an independent student when calculating the expected family contribution if they were in foster care on or after age 13. This item could be used as a pre-screening question that directs applicants who answer “yes” to state ETV webpages after finishing the FAFSA. One problem is that, in the electronic version of the FAFSA, if an applicant answers “yes” to one of the previous questions used to determine independent student status (q46-q52) are skipped over the subsequent questions in this section. Thus, question 53 would need to be moved to the beginning of the independent status section.

<sup>68</sup> For example, this could take place every two years when Congress reauthorizes funding for the ETV program.

grant award could be used for the ETV, and amounts could be established every two years when funding for the ETV program is reauthorized. With each passing year, the ETV becomes less powerful in meeting its objective of offsetting the cost of college for its recipients. Increasing the cost of the ETV grant would require Congress to allocate more than the roughly \$45 million that is appropriated each year.

A third recommendation is for Congress to increase the age limit of the ETV grant to age 26. The current age limit of 23 (if youth received an ETV by age 21) means financial support from the grant will expire in the middle of youths' college careers. This is true even if youth start college at an early age. For example, among Midwest Study participants who first entered college before their 19<sup>th</sup> birthday ( $n = 130$ ), only 11.5 percent had earned a postsecondary credential by their 24<sup>th</sup> birthday. The findings reported in this study indicate that not being able to afford college is a major barrier finishing college, and extending the age limit of the ETV grant could help stave off financial hardships. Since the average and median age of entry in this study is around age 20, it is recommended that the ETV grant be extended to age 26. This would give foster youth a reasonable amount of time to complete their credential.

In agreement with Day and colleagues (2011), a fourth recommendation is to encourage colleges to prioritize federally-funded work study positions for foster care youth. Work-study is a relatively small program; about one-in-ten college students who receive a Pell grant participate in the program (Goldrick-Rab, 2016). Work-study is an important program because jobs are located on-campus, it does not place unreasonable time or travel demands on students, offers a flexible work schedule, and can help youth feel more connected to the campus and more invested in the college. Importantly,

earnings from work study are not counted as income when calculating eligibility for federal financial aid. While work study jobs typically do not pay high hourly wages, they can provide enough income for foster youth to fill in the gaps of other sources of funding, and possibly save a little. Given the tenuous financial situation foster youth are in, work study employment can be a reliable, flexible source of income that continues beyond the expiration dates of extended care and ETV benefits. Some states, such as Washington, have already enacted laws that give current and former foster youth priority for work study employment (Washington House Bill, 2005). Other states can follow the lead.

A final tool to help alleviate financial difficulties that interfere with foster youths' college success in an individual development account (IDA). IDAs are matched savings accounts used to help low-income individuals and families build assets and increase their financial literacy. In this plan, contributions made by foster youth would be matched by public and/or private funds<sup>69</sup> at a pre-specified rate, age limit, and maximum match limit. For example, a \$3 match for every \$1 deposit would leave foster youth with \$1500 if they deposited \$500. The purpose of the IDAs would not be for long-term asset accumulation, but would rather serve as emergency funds when unexpected expenses arise (e.g., car repairs, health care costs, computer damage) that would otherwise derail foster youth from continuing in college. The accounts could be set up so that the funds could be limited to certain types of eligible expenses. Having backup money could also reduce stress about finances so that students can focus on their studies (Mukherjee et al., 2016). IDA accounts typically require participants to take part in financial literacy

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<sup>69</sup> Potential sources of federal funding include the Chafee Foster Care Independence Program, TANF grants, and Assets for Independence Act funds (Torres Flores & Hasvold, 2014). States funds and contributions from local private companies interested in directing philanthropic investments in foster youth could also be used to share costs of the IDAs.

classes. Ideally, this training would provide a mix of general information (e.g., how credit card debt works) and hands-on budgeting guidance that is specific to youths' individual financial circumstances. Communities in over a dozen states take part in the Jim Casey Youth Opportunity Initiative's Opportunity Passport program, which has funded IDAs for over 5000 foster youth since it was started in 2001. Other states (e.g., Washington, New York, and Texas) have either administered IDA programs for foster youth or introduced legislation to create accounts (Torres Flores & Hasvold, 2014).

Campus support programs can complement the abovementioned strategies to easing financial hardships that foster youth encounter in college. These programs can orient participants' to the different sources of financial aid, provide assistance with completing applications, and help youth to monitoring progress on meeting aid eligibility requirements so that their continued receipt of aid is not put in jeopardy. If IDA accounts are established, campus support programs could administer the program and tie it in to the existing trainings they offer in financial literacy and money management. If feasible, work-study positions could be created within the program (e.g., office manager, upperclass students developing and facilitating workshops for younger participants, outreach programs to foster youth in high school). Beyond complimenting the recommendations made above, some campus support programs offer additional forms of financial assistance. For example, some programs administer scholarships for participants, provide housing in schools that close during academic breaks, coordinate paid summer internships with local employers (Dworsky & Perez, 2010; Fostering Success Michigan, 2017).

The strategies for linking foster youth to financial resources may be particularly important for students with children. Parenting responsibilities decrease the time students have to spend on campus and to study. Having children also taxes financial resources, and difficulties also arise in making childcare and transportation arrangements so parents can go to college (Duquaine-Watson, 2007). One study of college students who are parents found that extra funding for child care and basic needs expenses helps them remain in college, even when the grants are a modest amount (Brock & Richburg-Hayes, 2006).

### **Academic Underpreparedness**

In addition to being able to afford college, this study finds that academic underpreparedness is a third formidable obstacle to college success for foster youth. Even if the financial aid that is available to foster youth initially covers all of their college costs, they are required to make satisfactory academic progress in order to continue receiving the aid. Failing to meet the GPA and credit completion standards could lead to the loss of Pell grants, ETVs, state need-based grants, and other forms of financial aid (e.g., work-study, loans, scholarships). Thus, not doing well in school can precipitate a cascade of financial problems for foster youth that make it even harder to remain in college.

A large proportion of foster youth will likely struggle with college-level work. At age 17, nearly three-quarters of youth in this study were reading below the level of their peers who were the same age. We also saw that youth in the toe-in-the-water group, who enrolled for a few semesters and never returned, had significantly lower reading scores and were more likely to have repeated a grade than youth in the other three groups. In a

recent study of foster youth in California, 88 percent of first-time students in two-year colleges had to take a basic skills course in math, English, or English as a Second Language (CA College Pathways, 2015).

Three recommendations are offered to address academic underpreparedness among foster youth entering college, particularly in two-year colleges and less selective four-year colleges. The recommendations are based on recent research findings and initiatives intended to improve the accuracy of identifying students in need of remediation, improve the instruction that is provided to these students, and using real-time data to track students' progress over time.

The first suggestion is for two-year colleges and four-year colleges to use multiple measures of students' academic preparedness instead of relying just on scores from placement tests. College placement tests are administered by the college and taken before students enroll. These tests offer brief assessments<sup>70</sup> of proficiency in math, reading comprehension, expository writing, and English as a second language. These are high stakes tests in that the results determine whether and how many remedial courses students must take (and pay for) in a given subject area. However, until recently, few studies have rigorously evaluated the predictive validity of these tests except for studies carried out by the companies that develop the tests.<sup>71</sup> Two important findings have come out of recent

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<sup>70</sup> This is particularly true for the computer adaptive tests in reading comprehension and different areas of math, in which difficulty level and total number of questions asked is based on students' correct responses to prior questions. For example, students' algebra placement scores can be determined by fewer than 10 questions (ACT, 2006). Overall, the entire battery of placement tests are designed to be completed in no more than two hours.

<sup>71</sup> As of 2008, the two most commonly used placement tests in two-year colleges are the ACCUPLACER (published by the College Board) and the COMPASS (published by ACT). They were used in 62 percent and 46 percent of community colleges, respectively, with some schools using both (e.g., mixing and matching tests for different subjects) (Hughes & Scott-Clayton, 2011).

evaluations conducted by independent investigators. First, underplacement is more of a problem than overplacement, leading to students who do not need remediation to be placed in basic skills classes (for review see Scott-Clayton & Stacey, 2015). One large study found that about one in four students required to take developmental education courses were misassigned (Scott-Clayton, Crosta, & Belfield, 2014). Second, other measures of students' academic proficiency (e.g., high school cumulative GPA, number of completed courses in English and math) are as good as or better at predicting students' need for remediation than are placement scores (Scott-Clayton & Stacey, 2015). Moreover, most studies find that when information from both placement tests and students' academic history ("multiple measures") are used, the predictive validity is even greater than when using individual measures (Kingston & Anderson, 2013; Ngo & Kwon, 2015; Scott-Clayton, 2012).<sup>72</sup> Given the limited utility of placement tests alone and the severe costs on students' college success, it is recommended that colleges use a multiple sources of information instead of just results from brief placement tests.

Once it has been determined that students require supplemental preparation to complete college-level work, a second issue pertains to how best to prepare students without having an inadvertent negative effect on their likelihood of remaining in college. The standard model requires students to take one or more remedial courses that they must pay for, that do not count for credit, and that oftentimes must be completed before credit-bearing courses in that subject can be taken. Overall, developmental education has been found to negatively impact the likelihood of advancing to credit-bearing courses, the

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<sup>72</sup> Scott-Clayton, Crosta, & Belfield (2014) found that high school grades was more accurate than placement test scores, and adding placement scores to high school grades did not improve the predictive validity.

number of completed credits, and the attainment of a credential (Valentine, Konstantopoulos, & Goldrick-Rab, 2016). A growing body of research suggests that alternative course structures are more effective in ensuring that students pass credit-bearing courses and persist in college than traditional remediation (for review see Bettinger et al., 2013). One promising alternative approach is the co-requisite course model, in which students enroll in a credit-bearing class in tandem with a non-credit class that provides them with extra instruction and support. This approach allows students to start taking courses that count right when they start college while building basic skills that will allow them to be successful in the credit-bearing course. Although more research is needed, existing evaluations of co-curricular model has shown to positively impact credit-bearing course completion and college persistence (e.g., Hern & Edgecombe, 2012; Hu et al., 2016; Jenkins, Zeidenberg, & Gregory, 2009; Jenkins et al., 2010). This model may be particularly beneficial for foster care youth who enroll in college before age 21, and who have a limited window of time before age-limited benefits expire.

A third target area involves early identification of foster youth who are struggling academically. The first time students typically appear on college radars is when they fail to meet the satisfactory academic progress requirement for financial aid (Bailey, Jaggars, & Jenkins, 2015). By this time, students may already have one foot (or both feet) out the door. Bailey and colleagues (2015) recommend that colleges set up early warning tools that provide feedback to students early enough to effectively intervene. For example, student-friendly software programs can be created that provide roadmaps for students on their path to achieving their college objectives, and automated messages can be sent to students when faculty notices students are falling off track (e.g., missed class, missed

assignments). Colleges can also exploit data collected on student progress over the years to develop predictive analytic models that can aid advising students in the programs and courses they select. For instance, information on students' academic background and performance can be used to predict how well they will do in courses they plan on taking, and if they are not expected to do well they may want to select a different course or adequate support can be put in place by the college if the student does decide to take the course (Bailey, Jagers, & Jenkins, 2015).

The three systemic recommendations just described will likely benefit low-income college students in general. As a compliment to these systemic changes, or in schools that operate with traditional means of assessment, remediation, and tracking, campus support programs can play a significant role in supporting the academic success of foster youth in these schools. Some campus support programs offer in-house study skills and time management training, course planning and advising, referrals to tutoring, study groups, and other programs. Campus support programs can also play an important role in identifying early signs that students are struggling. The regular contact that program staff have with youth can recognizing problems before they become insurmountable, and staff can leverage their relationships with other college units to connect participants to services on campus (e.g., academic support, psychological counseling, advising). In addition to early identification, staff maintain ongoing relationships with students so that they receive regular and personalized follow-up. Foster youth will benefit when individuals at the college take a proactive approach to identifying early signs of academic difficulties, and having someone who they feel cares about their experience at college and is invested in finding solutions when problems arise. This may

be particularly true for young people who are reluctant to proactively seek help when needed.

### **Avoidant Attachment**

One of the striking findings in this dissertation was the relationship between avoidant attachment and college outcomes. Indeed, this was one of the only covariates measured at baseline that predicted the odds of persisting in college and completing college. It was not found that avoidant attachment levels differed by gender, or race and ethnicity.

However, youths' level of avoidant attachment was related to other characteristics measured at baseline. Youth higher in avoidant attachment were more likely to display signs of mental health problems, alcohol/substance use problems, and behavioral problems (psycho-behavioral functioning for the remainder of this paragraph). These findings raise questions about the developmental sequelae of maltreatment and mobility, psycho-behavioral functioning, and avoidant attachment. For example, might youths' attachment style formed in early childhood (possibly in the context of maltreatment) increase the likelihood of later maltreatment/mobility and psycho-behavioral functioning? Might experiences of heightened maltreatment and mobility have precipitated avoidance in relationships and problems in psycho-behavioral functioning? Might there be other complex sequences of interactions involving attachment, maltreatment/mobility, and psycho-behavioral functioning?

Examining these different etiological explanations is beyond the scope of this study. In this dissertation, an individual's attachment style is viewed more as an evolving organization of behaviors and expectations than as a fixed trait. As Sroufe (2005)

explains, “Development is best characterized as change in behavioral organization, not simply the addition of behaviors...[S]alient individual differences, those with significance for subsequent functioning, are best defined in terms of differences in the organization of behavior with regard to the developmental challenges of the particular era” (p.352). From this perspective, early attachment experiences are formative in that they establish a working model of relationships that children bring with them to future relationships. However, working models can be thought of more as thick clay than as granite, which shape and are shaped by future relationships throughout periods of life (Caspi, Bem, & Elder, 1989). When children are placed in contexts in which relationships are unpredictable and dangerous, a reorganization of behavior occurs in response to these threats.

The working hypothesis for this dissertation is that high amounts of maltreatment and relational instability experienced in later childhood and adolescence negatively impacted youths’ working models of attachment. That is, for youth who entered early childhood/adolescence with attachment styles that fell the securely attached range, experiences of extensive maltreatment and/or relational instability would introduce and instantiate attachment insecurities. For youth entering early childhood/adolescents with attachment styles in the insecurely attached range, these experiences amplify and reinforce attachment insecurities. As Mikulincer and colleagues (2015) highlight, “The constant mental reactivation of a trauma, particularly man-made trauma that shatters one’s trust in others’ goodwill and one’s sense of personal value and lovability, can gradually increase the strength of negative working models of self and other, thereby heightening attachment insecurities and reducing the likelihood of attaining a calmer,

more secure mental state" (p. 86). This is consistent with the findings of several scholars who have interviewed youth about how their experiences of unpredictability, instability, and loss in the foster care system impacted their approach to managing relationships with others (Kools, 1999; Lee & Whiting, 2007; Perry, 2006; Riebschleger, Day, & Damashek, 2015; Samuels, 2009; Samuels and Pryce 2008; Unrau, Sieto, & Putney, 2008). In these accounts, study participants described a process of adopting a self-protective orientation *in response to* the profound and repeated fractures in relational trust they experienced while in care, which are often experienced as rejections or abandonments (Curry, 2014).

It is important to underscore that the "reorganization of behavior" is an adaptive move that originally protected youth when they were in the line of fire. My contention is that problems arise when youth maintain a high level of avoidant attachment in the absence of threat, and in situations when it is beneficial to acknowledge one's need for help and to be receptive to available support. In this study, it was suspected that participants higher in avoidant attachment were reluctant to let down their guards and to rely on others for help in college. It was suspected that the social networks were less dense for these youth, and they were less inclined to draw on their social resources or seek new resources when obstacles arose. As a result, they were more likely to be overrun by problems they encountered as college students, which made it difficult to continue and finish. In this study, it was not possible to directly test these specific mechanisms. However, it was observed that youth high in avoidant attachment were lower in their levels of perceived social support before and after entering college, and

these social support differences explained some of the relationship between avoidant attachment and college persistence and completion.

Although these mechanisms cannot be tested in this study, two important observations can be made. First, even after controlling for youths' history of maltreatment, placement mobility, and psycho-behavioral functioning, avoidant attachment was a robust predictor of college persistence and college completion. This suggests that, whatever its etiological origins, avoidant attachment has an association with college outcomes in its own right even after accounting for these other factors. Second, avoidant attachment was measured at age 17, which was about 3 or 4 years before most participants even started college. This suggests that youths' attachment insecurities measured in late adolescence may be a fairly durable characteristic that persists over time.

If it is the case that avoidant attachment is durable over time and that it is related to their chances of making it through college, a critical question is whether avoidant attachment is responsive to intervention. Can youth high in avoidant attachment become less emotionally guarded and less staunchly self-reliant? If we think this is possible, what are some intervention strategies that may facilitate this?

These are difficult questions. There are likely many factors at play, and youth will differ in the extent to which they are ready for and receptive to changing their customary approach to relationships that has provided them with a sense of safety and protection. Psychotherapy for trauma and loss is one type of intervention that may be helpful. Youth high in avoidant attachment have grown accustomed to inhabiting a world of relationships in limbo, and they have learned to detach themselves from feelings of

sadness, fear, shame, and anger associated with fractured relationships. When these feelings are not processed, individuals remain suspended in the trance of frozen grief that keeps them perpetually on-guard (Boss, 2006). There are treatment models with strong evidentiary support for treating adolescents and adults with histories of trauma, such as trauma-focused cognitive-behavioral therapy (Lancaster, Teeters, Gros, & Back, 2016; Silverman et al., 2008). Psychotherapy may help foster youth find meaning in past trauma, reconstruct beliefs about their identity and relationships, regulate affect, and provide opportunities to practice and build skills in connecting with others. Mikulincer and associates (2015) point out that, “trauma victims are implicitly searching for a security provider when they experience threats and face painful memories. It is possible that providing experiences of security within the therapeutic setting can counteract the regulatory deficits reviewed here and reestablished the healing role of attachment security. To this end, therapists should also identify and foster other sources of security in the client’s life (e.g., family members, friends, a religious community) that can facilitate and support the healing process” (p. 92).

Campus support programs can be a source of security for former and current foster youth. These programs generally have low student-staff ratios so that program staff are able to develop close relationship with participants and check in with youth on a fairly regular basis. As part of the curriculum, many programs offer well-being workshops that focus on topics such as managing stress, mindfulness, and developing habits of self-care. The programs also have a strong peer component that is cultivated through group events and activities. In some programs, foster youth form close bonds

with one another that is sometimes described as a family-like bond.<sup>73</sup> Youth provide emotional support and encouragement during tough times, and they hold each other accountable for working toward their academic goals. These peer groups may be effective models for engaging youth high in avoidant attachment because of the horizontal nature of the relationships. It may be easier for youth high in avoidant attachment to let down their guard in relationships with peers who have also grown up in the system and who have shared experiences of loss and trauma. This can be a powerful alternative for youth who have developed a distrust of professionals who have cycled in and out of their lives and are perceived as just “doing their job” rather than having a genuine interest in the well-being of the youth (Greeson, Thompson, Ali, & Wenger, 2015). Peer support groups may be an important onramp for youth with a high degree of emotional guardedness.

### **Limitations**

The Midwest Study presented a valuable opportunity to investigate long-term college outcomes of a representative sample of foster youth. The findings presented in this dissertation are not without limitations and caveats, and several will be discussed here. The first limitation pertains to the generalizability of the findings. The study included a representative sample of young people in three Midwestern States during a specific time in history. The composition of youth in these three States reflect foster care youth in other parts of the nation better than others. There was also regional variation in the way child welfare systems are administered, and in other characteristics that are pertinent to this study (e.g., concentration of colleges, postsecondary education outcomes,

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<sup>73</sup> This is based on several conversations I have had with directors and staff members of several campus-support programs for foster youth.

resources available to foster youth). In terms of historical time, the study straddled one of the worst economic downturns in the nation's history that impacted higher education and the job market. Fortunately, the recession did not occur until several years after participants first enrolled in college. However, the downturn may have led some youth who were making adequate progress in college to drop out, and may also have led some youth who had not enrolled in college to enter. The recession also accelerated the rising cost of college attendance. Simply put, college was more affordable for youth in the Midwest Study ten years ago than it is for foster youth entering college today.

Importantly, in the early 2000s Illinois was an outlier in their extended care policy; only a small handful of other states had a policy on the books that allowed youth to stay in care up to age 21. Beginning in 2010, over two dozen states have taken advantage of the federal law that funds the extension of the foster care age limit. There are some aspects of Illinois' extended care program that differ from the policies in play today. For instance, youth in Illinois could not return to care if they left after age 18, while youth are allowed to reenter in most states today. There was also no eligibility requirements that youth had to meet in order to remain in extended care in Illinois; current federal policy does have eligibility requirements. Aside from extended care, over the last 15 years we have seen an increasing amount of attention devoted to improving college outcomes for foster youth.

As of 2013, about half of the U.S. states offer a state grant that waives part or all of the tuition costs for foster youth in public colleges (Simmel, Shpiegel, & Murshid, 2013). A growing number of colleges have campus-based support programs for foster youth, or at least a liaison that serves as a point-of-contact for foster youth.

Despite these and other differences, there are also striking similarities between findings from this study and findings of more recent studies of foster youth in different locations. For example, several measures of youths' academic history (e.g., reading proficiency scores, proportion of youth who have been expelled or in special education), college enrollment patterns (i.e., proportion of youth entering two-year versus four-year colleges), and the proportion of youth electing to remain in extended care that were reported in the Midwest Study bear striking resemblance to findings from a 2014 study of foster youth in California (Courtney et al., 2014; Courtney et al., 2016; Okpych & Courtney, under review). Thus, despite the fact that the Midwest Study offered a moving snapshot of foster youth in a particular place and at a particular time, there are recognizable similarities with foster youth in different contexts.

A second set of limitations pertains to features of the NSC data. Undercoverage and blocked records led to the inability to identify some youth who were verily enrolled in college but who did not appear in NSC records. While comparative analyses between the 331 youth identified as college entrants in NSC data and the 71 youth identified by self-report in the Midwest Study did not suggest systematic differences, there was nonetheless data missing on the specific colleges, semesters, and dates of degree attainment for the latter group. A more substantial limitation of NSC data is that it does not contain information on the specific courses that youth enrolled in and their credit accumulation over time. This would be a more precise measure of progression toward a credential than simply enrollment across semesters. Had this information been available, it would have been possible to examine the extent to which youth enrolled in basic education classes, as well as the proportion of youth who made it past these

developmental prerequisites. For example, it would have been interesting to overlay this information on the four enrollment groups to assess the extent to which the number of remedial courses youth had to take played a role in their enrollment patterns.

In addition to data that were available, some of the outcome events were rare and thus limited the statistical power to detect significant differences. This was particularly the case for college credentials. Ideally, college certificates, two-year degrees, and four-year degrees would have been modeled as separate outcomes, but few youth in the sample earned each of these credentials.

A fourth limitation pertains to measurement timing of the pre-entry and post-entry predictors in relation to the outcome events (i.e., entry into college, completion of three semesters, and attainment of a postsecondary credential). Precise information was not available for many of the covariates, and the timing of the covariates relative to the outcome events is not clear. Ideally, there would have been specific month-by-month, or even week-by-week data, that lined up with youths' enrollment status. This would have allowed us to see, for example, if a major economic hardship one week was followed by a departure from college in the week(s) that followed. Thus, for some of the post-entry predictors, it was not possible to determine whether a significant predictor was a reason youth left college, a consequence of youth leaving college, and/or a barrier to them returning to college. Fortunately, self-report data from a later Midwest Study interview was able to shed light on three of the main significant predictors of college completion—employment status, economic hardships, and parental status. It turns out that all three appear to be both reasons for departure and barriers to returning to college.

Another set of limitations pertain to the variables used as exogenous predictors in the bivariate probit models for college persistence and completion, and in the instrumental variable models to evaluate extended care. A main assumption of these models is the exclusion restriction, which states that the exogenous predictor is only related to the outcome through its effect on the instrumented variable. While partaking in college preparatory activities (e.g., college fairs, SAT prep) will likely have a negligible impact on persisting in or completing college, there may be other youth characteristics (e.g., work ethic, motivation) that are associated with both participation in these activities and the two college outcomes.

In the IV models, the instrumental variable is a measure of place. In the previous chapter, we saw that there were some differences between states other than the amount of time youth spent in care past age 18 that could plausibly be related to college outcomes. There were several factors that disfavored college students in Illinois relative to the other two states. Illinois had lower retention rates in four-year colleges and lower rates of degree completion in two-year colleges. Additionally, unemployment rates were higher in Illinois and the state was particularly hard hit by the Great Recession. The availability of extended care could have also led some youth in Illinois with low chances of succeeding in postsecondary education to enroll in college, which creates an uneven college entry pool in Illinois versus the other two states. The culmination of these and other factors (e.g., higher cost of living in Illinois) could have led to an underestimation of the benefit of extended care on college persistence and completion. Future analyses are needed to build on the findings reported here that are not limited by a strict dependence on location when finding a suitable instrument for extended care. For example, as many states have

begun to implement extended care in the early to mid-2010s, analyses can use the change in policy over time within the same state to evaluate college outcomes.

The policy analysis of college persistence and degree completion among college entrants did not take into account a possible selection effect into college impelled by extended care. Illinois' extended care policy and state tuition grants may have induced some young people to go to college who were not academically prepared for college or who were less inclined to persist. The counterparts of these youth in Iowa and Wisconsin would have never enrolled. Indeed, findings from this dissertation and in the study by Courtney & Hook (2017) found that extended care had a significant effect on getting youth to finish high school and to enter and complete a year of college. If it was the case that extended care ushered a wave of students into college who were not likely to succeed, the effect of extended care on students who were likely to succeed would be downwardly biased. Thus, future analyses should address a possible selection effect when assessing postsecondary outcomes among college entrants.

Most, but not all, of the items from the original avoidant attachment scale were administered at baseline. Had all 18 items been administered, the internal consistency of the scale may have approached reliability levels reported in other studies. Avoidant attachment was measured at age 17, but it was not measured at later ages. Had these measures been available, we would have been able to assess the durability of this psychosocial characteristic over time as well as relationships of avoidant attachment measures that were closer to when youth first entered college. Importantly, it was not possible to observe the proposed mechanisms that are believed to account for the observed decrease in the likelihood of persisting in and completing college. The general

measure of social support explained some of the association between avoidant attachment and the outcomes, but more specific information about the social connectedness of youth (especially at college) and their utilization of their networks when facing difficulties would have more squarely tested the mediation hypotheses.

Another limitation pertains to the creation of the enrollment groups. The decision rules used to create the groups were described in detail, however, there is a degree of subjectivity in creating the rules. Another researcher given the same task and data may have selected different criteria (e.g., age of first entry) or decision rules to identify the groups. Since few recent studies have classified enrollment groups, and since available data elements vary between studies, there are not established parameters for creating the groups. As described below, a next step is to implement a statistical approach to creating enrollment groups (e.g., latent class analysis) and assessing the extent to which these groups align with my classification.

A final set of limitations pertains to covariates included in the regression models. Ideally, information of youths' academic history (e.g., number and types of schools attended, cumulative high school GPA, timing and reason for involvement in special education) would have been available from administrative records. Similarly, administrative data on past maltreatment and aspects of youths' foster care histories (e.g., age of entry, number of years in care) would overcome potential issues with self-reported data such as misremembering and social desirability biases. For example, the number of foster care homes youth were in may have counted trivial placement changes that would not have been counted had administrative data been available. Additionally, my two measures of "relational instability" are indirect at best. Placement and school changes

vary in the extent to which relationships are severed, and they also vary in the extent to which youth had close, personal relationships with the individuals involved. These qualitative characteristics, as well as the degree to which the transitions were emotionally processed with the youth, likely matter in measuring relational instability. The parental status variables used in these analyses did not distinguish between custodial and non-custodial parents. Demands and benefits may differ for males and females. For example, females in this study were much more likely than males to have been living with their child. For males, having a nonresident child means that they were more likely than females to have to pay child support, either formally or informally, which could hinder their ability to finish college. Conversely, females with resident children may be faced with greater child care responsibilities than males, but they might also be more likely to benefit from receiving public benefits and college financial aid.

### **Future Research**

One immediate next step for the present analyses includes using a more formal approach to identifying enrollment patterns with the existing data, such as latent class analysis (if statistical power permits). This would provide a more rigorous approach to identifying latent enrollment groups. Another immediate step involves disaggregating social support to examine whether certain types of support are driving the increase in the likelihood of college completion. A third step for the current analyses involves addressing possible bias in the estimated impact of extended care on postsecondary outcomes for college entrants.

Beyond this study, several findings draw attention to questions for future research. First, this study identified distinct groups of youth based on their enrollment

patterns, with one group in particular displaying a high need for support. Future research is needed to more rigorously evaluate and to better understand the different enrollment patterns for foster youth. One line of research would involve conducting more rigorous quantitative analyses (e.g., latent trajectory analysis, repeated measures latent class analysis) to identify latent enrollment groups. These analyses will require large datasets. Ideally, these data would have specific information on course taking and credit accumulation across semesters, rather than just information on semester enrollment status. It would be important to see if different patterns or frequencies of enrollment trends arise when there is a good match between youths' academic qualifications and the selectivity of the institution versus cases when youth attend colleges that undermatch their qualifications. Additionally, it would also be valuable to assess whether foster youth fare better in terms of consistency of enrollment and credential completion when they attend colleges that overmatch their qualifications. These schools may provide the right balance of rigor and support to enable foster youth to succeed at rates similar to or higher than at schools that match their qualifications.

Second, more research is needed that captures specific information over time on the college events and experiences of foster youth. For example, these studies would collect data on youths' perception of campus culture, engagement in college activities, and utilization of campus resources. Ideally, these studies would start with a representative cohort of college entrants who are tracked through their college career, including youth who dropped out of college. Findings from this dissertation suggest that many of the extant qualitative studies of foster youth in college are missing students who dropped out (e.g., toe-in-the-water youth) and may be missing foster youth high in

avoidant attachment. If feasible, future studies would include a comparison group of other students similar in demographic and background characteristics but who were not involved in foster care. One of the stark findings reported in this dissertation was that foster youth were significantly less likely to persist in and complete college than were low-income, first generation students. However, these findings provide the view from 10,000 feet high. We need to unpack exactly which factors and circumstances are driving such divergent outcomes. This line of research is important not only for college administrators who are tasked with addressing the diverse needs of its student body, but also for advocates and policy makers so that appropriate policy levers can be implemented.

Third, further research is needed on avoidant attachment and college outcomes. To my knowledge, this was the first study that examined the role of avoidant attachment and college persistence and completion among foster youth. Given the strong association that was found, it is critical to assess whether these findings are replicated in other studies with foster youth. Future studies could elaborate on and test the proposed mechanisms of how avoidant attachment is expected impact college outcomes. Ideally, these studies would include a comparison group of non-foster youth to examine both differences in level of avoidant attachment as well as differences in the relationship between avoidant attachment and college outcomes. If it turns out that findings reported here are replicated in other studies, then work would be needed that examines the extent to which avoidant attachment is a malleable characteristic and to identify and evaluate interventions aimed at engaging youth who tend to disavow dependence on others.

Fourth, as more states consider adopting extended foster care, research is needed to evaluate the extent to which the policy affects postsecondary education outcomes. This research would shed light on which youth and under what circumstances extended care is likely to benefit its recipients.

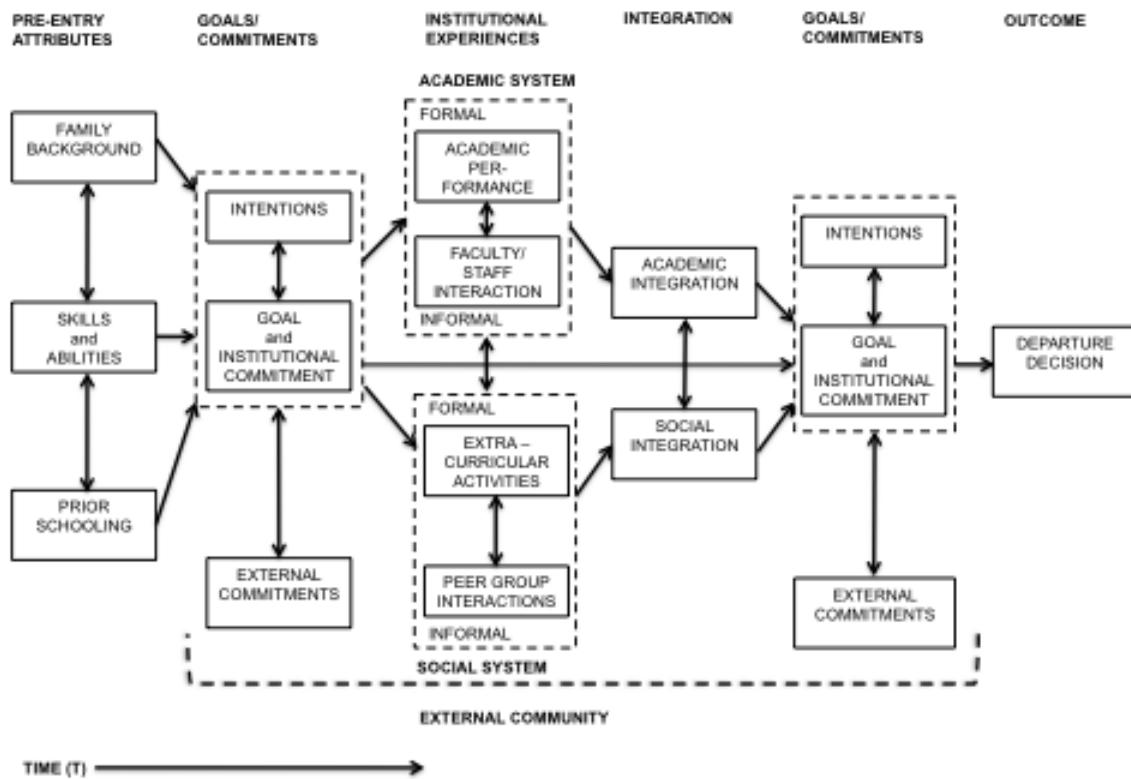
Finally, more evaluation is needed of campus support programs. The number of these programs have multiplied over the past decade, but relatively little evaluation work has been conducted. Work is especially needed in the area of developing program models intended to support foster youth in two-year colleges. Program models identified as efficacious in four-year institutions may not translate to campus cultures, environments, and, resource constraints of two-year colleges.

### **CONCLUDING REMARKS**

This study found that about half of foster youth who enter college never made it past the first few semesters, and several formidable barriers hampered their college success. There will be no quick fix and no magic bullet to increasing college completion rates among foster youth. Continued investment from public and private stakeholders in combination with early, targeted interventions that remain in place as other foster care supports phase out will be needed to support foster youth through college.

## APPENDIX A: TINTO'S MODEL OF COLLEGE DEPARTURE

**Figure 1. Tinto's Theory of College Departure**



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