

General Education Development (GED) Recipients' Life Course Experiences:

Humanizing the Findings

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Abstract

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This study examines a range of GED recipients' life course contexts and experiences and their relationship with long-term outcomes. Using descriptive comparisons, bivariate tests, and propensity-score matched regression models to analyze data from rounds 1-15 of the National Longitudinal Survey of Youth, 1997, analyses aim to examine: (1) differential adolescent experiences and contexts between GED recipients and high school graduates; (2) whether differences in adult outcomes between GED recipients and high school graduates can be minimized by accounting for these adolescent contexts and experiences; and (3) adolescent predictors of positive adult outcomes for GED recipients. Additional analyses examine differences in adolescence between GED recipients who went on to obtain a postsecondary

credential and those who did not and identify predictors of postsecondary attainment within the GED recipient group.

Findings revealed that GED recipients' contexts and experiences in adolescence were characterized by greater risk exposure (e.g., gang involvement, teen parenthood) in comparison to high school graduates. Collectively, these differences revealed that more risk factors were present in GED recipients' lives long before they dropped out of high school. Even after accounting for a range of factors from multiple ecological domains in adolescence, GED recipients still had significantly lower household income-to-poverty ratios and lower rates of postsecondary educational attainment than their high school graduate counterparts. However, their general and behavioral health (e.g., alcohol misuse, exercise behaviors) outcomes were either equivalent or better than high school graduates' outcomes. Looking within the GED recipient group, recipients who eventually completed a postsecondary credential differed in adolescence from those who did not on a number of factors, such as engagement in risky behavior and parental education.

Overall, findings suggest that differences between GED recipients and high school graduates existed in a range of ecological domains in adolescence and accounting for these differences attenuated differences in these two groups' outcomes in adulthood in some cases but not in others. Findings also suggest that GED recipients with a postsecondary credential had different adolescent experiences than recipients without a postsecondary credential. These results signal points for prevention, early intervention, and support for recipients post-GED receipt.

TABLE OF CONTENTS

List of Figures	x
List of Tables	xi
Chapter 1. General Education Development (GED) Credential Recipients	16
1.1 Background Note on High School Equivalencies	18
1.2 Overview	19
Chapter 2. Prior Research on GED Recipients and the High School Dropout Population	22
2.1 The GED in the United States: Changes Since Inception	23
2.2 Empirical Research on GED Recipients	25
2.2.1 “The Nonequivalence of High School Equivalents”	27
2.2.2 The Outliers	29
2.2.3 Limitations of the GED Outcomes Studies	31
2.2.4 Factors Affecting GED Attainment	32
2.2.5 Gaps in the GED Literature	33
2.3 Research on High School Dropouts in the United States	35
2.3.1 The Cumulative Process of Dropping Out	37
2.3.2 Predictors of High School Dropout: Individual and Contextual Factors	38
2.3.3 High School Dropouts: A Heterogeneous Population	39
2.3.4 Implications for a Study of GED Recipients	41
Chapter 3. Conceptual Framework	43
3.1 The Big Picture: Development over the Life Course	43

3.2	The Importance of Context to Development over the Life Course	45
3.3	Risk and Protection Through Multiple Domains over the Life Course	46
Chapter 4. Data, Hypotheses, and Methods		48
4.1	The Dataset: NLSY97.....	48
4.1.1	Variable Selection and Data Preparation	51
4.1.2	Cumulative Risk.....	53
4.1.3	Sample Weights	54
4.2	Hypotheses and Methods	54
4.2.1	Research Question 1	55
4.2.2	Research Question 2	56
4.2.3	Research Question 3	59
4.2.4	Research Question 4a.....	61
4.2.5	Research Question 4b	61
4.2.6	Research Question 5	62
Chapter 5. GED Recipients’ Life Course Experiences – Humanizing the Findings		64
5.1	Key Differences Between GED Recipients and High School Graduates in Adolescence	64
5.1.1	Sociodemographic Measures	65
5.1.2	Academic and School-Related Experiences	68
5.1.3	Contextual Risks	69
5.1.4	Other Adolescent Behaviors	70

5.1.5	Key Finding from Analysis 1: Eventual GED Recipients’ Adolescent Experiences/Contexts were Characterized by Greater Risk than High School Graduates’ Experiences/Contexts.....	71
5.2	Varied Persistence of Differential Outcomes	73
5.2.1	Health Outcomes in Adulthood	74
5.2.2	Differences that Persisted	75
5.2.3	Key Finding from Analysis 2: GED Recipients’ Health and Health-Related Behaviors in Adulthood were Slightly Better than High School Graduates, but their Postsecondary and Labor Market Outcomes were Remarkably Worse.....	78
5.3	GED Recipients and High School Graduates without Postsecondary Education still Differed in some Meaningful Ways.....	81
5.3.1	Statistical Differences Lacking Practical Meaning.....	82
5.3.2	Persistent Meaningful Differences.....	83
5.3.3	Key Finding from Analysis 3: GED Recipients and High School Graduates without Postsecondary Credentials still had Nonequivalent Outcomes, Particularly in the Labor Market.	84
5.4	GED Recipients Who Obtain a Postsecondary Credential Differ in Meaningful Ways from Those Who Do Not: Part 1.....	84
5.4.1	Indicators with no Significance	85
5.4.2	Statistically Non-Significant Differences that may have Practical Meaning.....	87
5.4.3	The Most Salient Predictors.....	88

5.4.4	Key Finding from Analysis 4a: Sociodemographic and Academic Factors are Statistically Predictive of Postsecondary Attainment for GED Recipients. Other Factors Require Further Exploration.	91
5.5	GED Recipients Who Obtain a Postsecondary Credential Differ in Meaningful Ways from Those Who Do Not: Part 2.....	91
5.5.1	Sociodemographic Differences.....	92
5.5.2	Comparing Factors from Other Ecological Domains	95
5.5.3	Less Meaningful Differences.....	97
5.5.4	Key Finding from Analysis 4b: The two GED Groups Differed on Some Measures from Adolescence and not on Others.....	98
5.6	GED Recipients Whose Life Course Outcomes are Equivalent to High School Graduates' Outcomes.....	99
5.6.1	Data Preparation: Creating New Outcome Measures	99
5.6.2	Analysis: Identifying GED Recipients with Positive Life Course Outcomes.	101
5.6.3	Key Finding from Analysis 5: Sociodemographic Factors were the Strongest Predictors of Positive Life Course Outcomes for GED Recipients.	106
Chapter 6. Summary, Implications for Research, Policy, & Practice, and Limitations.....		108
6.1	Summary of Findings.....	108
6.2	Implications for Research	110
6.2.1	Better Data	111
6.2.2	Focus on the Outliers, or the Positive Cases.....	113
6.2.3	Broaden Research Methods	114
6.3	Implications for Policy.....	115

6.3.1	Focus on Higher Education.....	115
6.3.2	HSE Recipients Likely have Unique Needs for Support	116
6.4	Implications for Practice	117
6.4.1	The Importance of College Counselors and Advisors	117
6.4.2	Identifying Best Practices	118
6.5	Limitations	118
	Bibliography	120

LIST OF FIGURES

Figure 3.1. Conceptual model for the proposed study.	44
Figure 4.1. Racial/ethnic composition of NLSY97 sample in round 1.....	49
Figure 5.1. Household income-to-poverty ratio in adolescence for eventual GED recipients and high school graduates.....	67
Figure 5.2. Status dropout rate for four demographic groups from 1993 to 2014.....	89
Figure 5.3. Comparing the two GED groups on binary sociodemographic measures.....	93
Figure 5.4. Comparing the two GED groups on continuous sociodemographic measures.....	94
Figure 5.5. Comparing the two GED groups on continuous measures.....	96
Figure 5.6. Comparing the two GED groups on binary measures.....	97
Figure 5.7. GED-without-postsecondary group’s prevalence for each created binary life course outcome.....	100

LIST OF TABLES

Table 4.1. Balancing of Covariates in the GED versus High School Propensity Score Matched Models.....	58
Table 4.2. Balancing of Covariates in the GED-without-Postsecondary versus High School-without-Postsecondary Propensity Score Matched Models.....	60
Table 5.1. Bivariate Relationships Between Adolescent (ages 12-17) Measures and High School Completion Status.....	66
Table 5.2. Descriptive Statistics on Outcomes Measured in Adulthood (ages 25+)	73
Table 5.3. Results for the Main Predictor (GED Status) from the Regression (Logistic or Linear) and Propensity-Score Matched Regression Models for each Outcome in Adulthood (ages 25+).....	76
Table 5.4. Results for the Main Predictor (GED Status, Excluding Respondents with a Postsecondary Credential) from the Regression (Logistic or Linear) and Propensity-Score Matched Regression Models for each Outcome in Adulthood (ages 25+).....	82
Table 5.5. Logistic Regression of Postsecondary Degree Attainment on Adolescent and Demographic Covariates within the GED Recipient Population (N=1045).....	85
Table 5.6. Statistically Significant Results for Logistic Regression of each Binary Life Course Outcome in Adulthood (ages 25+) on Demographic and other Covariates Measured in Adolescence	102

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DEDICATION

To my mum, for whom this—and everything—has always been.

Chapter 1. GENERAL EDUCATION DEVELOPMENT (GED) CREDENTIAL RECIPIENTS

The GED only exists to make me feel like it's my fault when I fail when the game is [expletive] rigged (Aleida Diaz, Orange is the New Black).

Throughout the test's history, the GED has been marketed as a “reliable and valuable pathway to a better life” (GEDTS, 2013b, para. 2) for high school dropouts.¹ However, research on GED recipients' outcomes rarely provides support for this claim. While some research findings are mixed, studies most commonly report that GED recipients' outcomes are worse than those of high school graduates', and findings vary as to whether the GED credential provides any benefit to individuals who drop out of high school. The disparities between GED recipients' and high school graduates' outcomes are so significant that many have declared that the GED is far from equivalent to a high school diploma (Heckman, Humphries, & Kautz, 2014). To address problems of nonequivalence, GED proprietors and reformers have changed the test over time, making it more difficult to pass and better aligning its content with updates to secondary school curricula. But despite the GED's demonstrated improvements in rigor and psychometric equivalence to content knowledge imparted through a traditional high school course of study (George-Ezzelle & Hsu, 2007), research has not shown the expected improvement in GED recipients' outcomes. Even in studies using recent data, the benefit to GED-receipt is often unapparent (e.g., Zajacova & Everett, 2014).

¹ A note on terminology: Throughout this paper I use the term “non-completer” to refer to a high school dropout who never obtains a credential (diploma or GED), “dropout” to refer to an individual who drops out of high school (regardless of eventual credentialing status), “GED recipient” to refer to an individual who completed his high school credential via the GED process, and “high school graduate” to refer to an individual who completed his high school credential by receiving a high school diploma.

Prior research has alluded to the fact that, while the general picture of GED recipients' outcomes is bleak, there are recipients who go on to have positive long-term outcomes. However, as I demonstrate in my literature review (Chapter Two), there are few existing studies that model this "positive" group—or any potential differential experiences within the GED recipient population. GED literature to date has focused almost entirely on individuals' skills and attributes, without accounting for the multiple contexts operating on these individuals' experiences (e.g., Heckman et al., 2014). I argue that focusing solely on these factors places the onus entirely on the individual, which in turn provides limited levers for intervention and ignores the situations and contexts that affect—or even cause—individuals' skills development and eventual functioning in adulthood. Given that research has substantiated the GED exam's rigor and psychometric equivalence (George-Ezzelle & Hsu, 2007), what factors might explain the majority of GED recipients' poor outcomes? And how do these factors differ from factors related to GED recipients' experiences that are associated with more positive outcomes?

In this dissertation, I address these overarching questions with a study examining GED recipients' experiences over the life course from adolescence into adulthood, explicitly modeling differential experiences within the GED recipient population. I argue that while the existing GED literature begins to examine explanations for GED recipients' poor outcomes, most studies focus narrowly on pre-test individual factors as main explanatory factors, such as cognitive skills (typically measured by standardized test performance) or the number of school years recipients completed pre-dropout. In actuality, GED recipients' realities—from pre-dropout to post-GED receipt—are likely far more complex than the explanatory studies to date have suggested. Additionally, focusing on pre-test individual factors has provided weak guidelines for practice and little information about how policymakers and practitioners might productively intervene

with GED-takers at some point in their academic careers to improve their eventual outcomes. My study sought to include a range of factors from multiple ecological domains, such as the community or family, which may influence GED recipients' experiences over the life course and eventual outcomes. Broader educational research has shown that factors from family, neighborhood, and school domains, for example, are related to an individual's educational success and eventual outcomes (e.g., Rumberger, 2011) and many of these factors are more amenable to policy intervention than individual factors. Examining a broader range of indicators helps to more fully explain GED recipients' life course experiences and eventual outcomes, providing practitioners and policymakers with identifiable and actionable prevention and intervention targets.

1.1 BACKGROUND NOTE ON HIGH SCHOOL EQUIVALENCIES

For those who drop out of high school in the United States, the General Education Development (GED[®]) certificate has historically been the most common alternative secondary school credential. GED recipients make up a large segment of the United States' potential higher education and labor force populations with just under 850,000 individuals sitting for the GED in 2013 (GED Testing Service [GEDTS], 2014), and over 20 million people earning a GED since 1942 (GEDTS, 2013). After major changes to the GED exam battery in 2014, some states exercised their options and adopted one (or both) of two new high school equivalency (HSE) exams: the HiSet[®] (High School Equivalency Test) and TASC[™] (Test Assessing Secondary Completion). While data is not yet available on these two new HSE exams' recipients' outcomes, it is reasonable to expect that their outcomes would be similar to the GED recipients' outcomes explored in the literature over the last 20-30 years. Certain states have adopted one of these new HSE exams as their new "official" HSE in place of the GED (e.g., Tennessee), while others offer

their residents a choice of HSE (e.g., Colorado), but the commonality remains: HSE seekers, for whatever reason, were unable to complete high school via the traditional secondary curricula. Given the timing of this research and the empirical studies available, my study examines and refers predominantly to GED recipients; however, I believe my findings are also relevant to the HSE population more generally.

1.2 OVERVIEW

In Chapter Two I examine the current empirical evidence on GED recipients. Overwhelmingly this literature concludes that GED recipients never catch back up to high school graduates after dropping out of high school. And, in some cases, they do not appear to have any better outcomes than individuals who dropped out of high school and did not obtain a GED. This dominant narrative about GED recipients has persisted since the 1990s, even after iterations of the test have increased its rigor and content alignment to contemporary education standards. Despite little evidence showing the GED provides the promised second chance, the number of GED and other HSE recipients continues to climb. My analysis of the literature brought me to two conclusions: (1) for students who drop out of high school, high school equivalencies act as the gatekeepers to postsecondary opportunities (jobs and postsecondary education) and therefore individuals will continue to pursue them, and (2) research needs to understand *why* these individuals cannot get back on track after dropping out if we are ever to break the trend.

To delve into this “why,” in addition to examining GED-specific studies, I turned to literature on another pertinent, but broader, population—high school dropouts. This body of research helped guide my research hypotheses regarding GED recipients’ experiences beyond what I learned from the GED-specific studies I reviewed, which often failed to dig deeply into the “why” and/or focused solely on pre-dropout individual characteristics, which can be difficult

to target with policy levers. Collectively, the GED and dropout literatures prompted me to pose the following more specific questions: *What are GED recipients' particular experiences and contexts over the life course?* and, *How do these varying experiences/contexts predict their outcomes later in life?*

In Chapter Three I describe my conceptual framework. To construct this framework, I applied concepts from the life course perspective, the ecological paradigm, and a risk and protective factor framework. Each of these perspectives offers concepts that link directly to the key themes I identified in the dropout literature and current gaps in research on GED recipients. Furthermore, these perspectives helped me solidify and refine my research questions and, in turn, select the best variables and measures for my analyses. I conclude Chapter Three with the final research questions I explored.

In Chapter Four I present my research design, methods, and hypotheses, linking them to my specific research questions and conceptual framework. I describe the dataset I selected and detail measures I included and created for my analyses, again linking these measures to my specific research questions, conceptual framework, and literature review (to explain variable selection). I conclude this chapter by discussing selected data and analysis limitations and how I addressed those that I could in my study.

In Chapter Five I present my findings by revisiting my hypothesis for each separate analysis. I also include discussion related to each analysis' findings. Overall, I found that GED and high school graduates' experiences and contexts differed in meaningful ways in their adolescence. Namely, GED recipients' experiences in adolescence were characterized by a riskier environment and greater involvement in risky behaviors when compared to high school graduates. The set of pre-existing differences that I included in my analyses accounted for some,

but not all, of the two groups' differential life course outcomes in adulthood. I also found that postsecondary attainment may play a significant role in persisting differences between GED recipients and high school graduates' long-term outcomes, particularly in the labor market.

I provide a summary of findings in Chapter Six as well as these findings' implications for future research, policy, and practice. I also discuss study limitations in this chapter. My study illuminates the importance of accounting for pre-existing differences between GED recipients and high school graduates and, importantly, accounting for differences that are not solely academic or related to individuals' skills or lack thereof. The key role that postsecondary completion appears to play in GED recipients' long-term outcomes implies that more efforts need to target postsecondary completion for this student group. The majority of GED recipients attempt some postsecondary education; however, relatively few of them complete a credential, certificate, or degree. This completion is the key to providing them the promised "second chance."

Chapter 2. PRIOR RESEARCH ON GED RECIPIENTS AND THE HIGH SCHOOL DROPOUT POPULATION

In this chapter, I summarize the existing empirical research on GED recipients, which predominantly focuses on their outcomes and collectively demonstrates that these outcomes are (1) rarely equivalent to high school graduates' outcomes and (2) only sometimes better than non-completers' outcomes. These findings prompted me to ask the question, "Are these poor outcomes due to an inadequate or poor assessment?" To answer this question, I examined literature on the history of the GED. I show how, throughout its 70-plus-year history, GED test-makers have modified the test to meet perceived changing needs, as well as in response to critiques regarding the test's rigor and psychometric equivalence to a high school diploma. This line of research led me to conclude that GED recipients' poor long term outcomes are not due to an inadequate assessment. In other words: it's not the test. In this account, I do not aim to provide a qualitative discussion of why the test has—or sometimes has not—changed (for these discussions see Quinn, 2002; Quigley, 1991), but rather to acknowledge and succinctly describe these substantive changes over time.

The final part of my review turns to etiological studies focused on GED receipt. These were studies I located in my search for GED research that, rather than focusing on post-GED outcomes, focused on identifying factors that contributed to an individual completing high school via the GED. These studies begin to illuminate factors specific to the GED population that may affect their eventual outcomes. This body of literature answers questions about GED recipients' long-term outcomes as compared to non-completers and high school graduates, changes to the GED test over time, which subgroups may be more likely to benefit from GED receipt, and some individual factors related to completing high school via GED receipt. Missing

from this body of literature, however, is an examination of any differential experiences within the GED population. What factors contribute to those recipients that do have eventual success? Are there outcomes for which GED recipients have outcomes more like those of high school graduates, or are GED recipients' outcomes always worse than high school graduates'? What other measures, beyond individual factors, affect GED recipient's long-term outcomes? Finally, does the accumulation of risk (i.e., having multiple risk factors) affect GED recipients' long-term outcomes? These are all questions that my study seeks to answer.

2.1 THE GED IN THE UNITED STATES: CHANGES SINCE INCEPTION

Created in 1942, the GED (then called the Veterans Testing Service, VTS) provided veterans returning from World War II with an opportunity to earn the credential required for college enrollment and certain employment opportunities (Cameron & Heckman, 1993). Because military service interrupted these individuals' traditional high school paths, the United States Armed Forces Institute, partnering with the American Council on Education (ACE), sought to first offer credit for relevant military experience and later an alternative route to college and/or employment, instead of requiring veterans return to high school (Quinn, 2002). Key decision-makers argued that the veterans' military experience afforded them a skill set similar to that of a traditional high school graduate (Smith, 2003).

In 1952, after research was released touting a decade of VTS acceptance by private and public agencies, VTS began allowing civilians to take the exam. In 1963, ACE changed the name of the program from the VTS to the GED, representing a more civilian-dominated GED population—by this time all 50 states utilized the GED (Cameron & Heckman, 1993)—and began actively promoting the GED tests as a measurement of high school “equivalency” (Quinn, 2002).

To date, there have been five major iterations of the test: the original GED test released in 1942, the 1978 series, the 1988 series, the 2002 series, and the most recent version released in January, 2014 (GEDTS, 2015). The industrial era heavily influenced the 1942 tests, which sought to prepare GED recipients for employment, while the 1978 series transitioned into a focus on the “application of conceptual knowledge” (GEDTS, 2015, para. 3) rather than rote memorization and recall of facts. The 1988 series brought numerous other changes, including the addition of an essay question and a focus on general information, rather than industry. The 2002 series was again changed to align with “content standards developed at the national and jurisdictional level” (GEDTS, 2015, para. 5), consisting of a battery of five subject area tests (Language Arts: Reading, Language Arts: Writing, Mathematics, Science, and Social Studies). The newest version of the GED was released in 2014; however, I will not go into detail on this most recent iteration as none of the GED recipients in my data sample (described in Chapter 4) received their GED in or after 2014.²

According to GEDTS, each iteration of the test has sought to reflect changing educational content and priorities and to provide equivalence to a high school diploma. Each iteration has become increasingly more difficult through higher passing cut points and covering a greater breadth of material. In fact, research has shown that the GED test battery measures high school-level academic knowledge and skills comparatively well (e.g., George-Ezzelle & Hsu, 2007). In these “norming” studies, GED test-takers in a given year were compared to high school graduating seniors of the norming year (most recently 2001) and were given a percentile rank based on this comparison. The most recent norming study reported that GED “candidates who

² For more information on the most recent GED exam see <http://www.gedtestingservice.com/educators/2014test>.

passed the GED Tests met and, in many test areas, exceeded performance standards of the lower 40 percent of graduating high school seniors” (George-Ezzelle & Hsu, 2007, p. 33). Furthermore, ACE has acknowledged that GED passing score requirements are such that they are not so high as to represent levels of achievement far above that demonstrated by recent high school graduates... nor so low as to threaten the credibility of the GED Tests credential” (p. 10).

In sum, this brief historical review shows that the most-current GED instrument measures content knowledge equivalent to that imparted through a traditional high school curriculum. Therefore, my proposed study is not a study of test instrument equivalence nor does it assume that GED recipients’ poor outcomes are directly linked to an inadequate assessment. Instead, my study assumes that other factors unrelated to the actual test are responsible for GED recipients’ poor outcomes. I turn next to literature on GED recipients to see what is known about this often-overlooked aspect of GED outcome research.

2.2 EMPIRICAL RESEARCH ON GED RECIPIENTS

To familiarize myself with the current GED literature, I conducted a comprehensive literature search for “General Education Development” in numerous research databases. I began with the University of Washington library’s general search engine and located 14 sources that were predominantly GED test preparation materials. I then searched the following online education journal repositories for “General Education Development” (the number of sources located through each repository is in parentheses): JSTOR (209); ERIC (194); and EBSCO’s more general “education databases” (273; these included the 194 ERIC results). I crosschecked all sources and excluded those that did not allow for conclusions to be drawn about GED recipients (i.e. studies that grouped GED recipients with either non-completers or high school graduates instead of treating them as a separate group), which eliminated most of the sources

located. As an additional check, I searched Google Scholar for “General Education Development,” skimming the 2,670 results for sources not located through my other searches. I found no new sources through this last step. Finally, I reviewed the statistical and technical reports available on the GEDTS website.

My final compilation consisted of 42 peer reviewed sources that had GED-specific substantive findings. Most of these sources—33 out of the 42—focused on comparing GED recipients’ outcomes to non-completers’ and/or high school graduates’ outcomes. The other studies either uncovered factors related to GED-receipt (7 studies), tested hypotheses regarding whether GED availability induced students to dropout (Heckman, Humphries, LaFontaine, & Rodriguez, 2012), or discussed changes in the GED population’s demographics over time (Rachal & Bingham, 2004).

In reviewing these 42 sources I found that: (1) GED recipients’ outcomes were almost never equivalent to high school graduates’ outcomes, with a few exceptions; (2) researchers have primarily explained this nonequivalence by focusing on GED recipients’ individual factors and noting that specific groups (e.g., teen parents) are more likely to get a GED rather than graduate high school via the traditional pathway; and (3) embedded in some of these studies were subgroup comparisons that began to reveal possible differential experiences within the GED population but were under-explored.

This literature contains some overall limitations. First, I was unable to locate studies that explicitly modeled differential pathways within the GED population or studies that focused on contextual indicators from multiple ecological domains and their influence—both as discrete indicators and their accumulated influence—on GED recipients’ experiences pre- and post-receipt. Furthermore, as noted in a few of the studies I reviewed (e.g., Heckman & LaFontaine,

2006), studies comparing GED recipients' outcomes to high school graduates' outcomes or to non-completers' outcomes should account for selection bias, and many of the studies I reviewed did not.

2.2.1 *“The Nonequivalence of High School Equivalents”*³

The literature I reviewed that examined GED recipients' outcomes—what I will refer to as the GED outcomes literature—overwhelmingly concluded that GED recipients' outcomes are not equivalent to high school graduates' outcomes. These studies examined a range of outcomes, including postsecondary education/training, labor market outcomes, health, substance use/abuse, relationships and family formation, and incarceration and recidivism. Findings largely concluded that the GED did not provide dropouts with the pathway to a better life that it promised.

Almost every study that examined postsecondary education/training outcomes found that GED recipients' outcomes were statistically significantly worse than high school graduates' outcomes (Bozick & DeLuca, 2005; Cameron & Heckman, 1993; Cao, Stromsdorfer, & Weeks, 1996; Laurence, 2008; Tyler & Lofstrom, 2010). For example, Tyler and Lofstrom's 2010 study found that GED recipients had fewer college credits within three years and lower odds of having a degree within four years as compared to high school graduates.

Most studies I reviewed included some examination of labor market outcomes, such as annual earnings or income, hourly wages, number of hours worked, assets, on- and off-the-job training, and/or “economic wellbeing” (Boudett, Murnane, & Willett, 2000; Cameron & Heckman, 1993; Cao et al., 1996; Caputo, 2005; Clark & Jaeger, 2006; Heckman, Hsueh, & Rubinstein, 2000; Heckman & LaFontaine, 2006; Heckman, Stixrud, & Urzua, 2006; Murnane,

³ This section title is borrowed from the title of one of the seminal studies examining GED recipients' outcomes (Cameron & Heckman, 1993).

Willett, & Boudett, 1995; 1997; 1999; Murnane, Willett, & Tyler, 2000; Ou, 2008; Tyler, 2004; and Tyler, Murnane, & Willett, 2000a; 2000b; 2003). I found no evidence in this set of labor market studies to support the claim that GED recipients, as a group, ever attained equivalent income/wages to high school graduates. These studies instead found that, for example, most GED recipients make less money annually than the average high school graduate (Cameron & Heckman, 1993). Other studies also found that, after accounting for pre-credentialing factors such as cognitive skills and numbers of years of school completed, there was no benefit in the labor market from GED receipt on average (e.g., Murnane et al., 2000; Tyler, 2003).

Some studies also examined non-labor market outcomes. These outcomes included measures of physical and mental health (Caputo, 2005; Kenkel, Lillard, & Mathios, 2006; Liu, Chavan, & Glymour, 2012; Ou, 2008; Rogers, Everett, Zajacova, & Hummer, 2010; Zajacova, 2012; Zajacova & Everett, 2014), substance use or misuse (Heckman et al., 2006; Kenkel et al., 2006; Obot, Hubbard, & Anthony, 1999; Obot & Anthony, 2000; and Ou, 2008), relationship and family formation (Heckman, et al., 2006), and incarceration and recidivism (Heckman, et al., 2006; and Zgoba, Haugebrook, & Jenkins, 2008).

Collectively, these studies also found that the average GED recipient's non-labor market outcomes were statistically significantly worse than a high school graduate's outcomes. For example, Zajacova's (2012) study found that GED recipients had significantly more health problems in adulthood (ages 30-65) than high school graduates. Also, a study analyzing RAND's Healthy and Retirement Study data in which respondents were all at least 50 years of age, found that GED recipients had greater odds of having instrumental activities of daily living (IADL) limitations than high school graduates (Liu et al., 2012).

In sum, there was myriad evidence supporting the conclusion that the GED has not functioned as an equivalent degree to a high school diploma in terms of producing similar life course outcomes. While this was the dominant narrative, there were some studies in which the findings began to suggest differential experiences within the GED population, with certain GED recipients having more positive outcomes, diverging from the group.

2.2.2 *The Outliers*

Across the GED outcomes studies, one did find support for equivalence for GED recipients as a group (Maralani, 2011). This study examined postsecondary enrollment rates in a nationally representative longitudinal data set (the National Longitudinal Survey of Youth 1979, NLSY79) and found that measuring GED recipients' postsecondary enrollment rates at age 35, as opposed to age 25, resulted in an increased proportion of almost 40% more GED recipients enrolled in college than ten years prior. As Maralani (2011) stated, "Although GED recipients are less likely to enter college in their late teens (i.e. "on time"), they catch up to traditional graduates in their 20s, at least with regards to adjusted rates of first-time college entry" (p. 1060). Maralani's findings raise questions regarding the time frame necessary for analyzing GED recipients' outcomes. Her findings indicate that studies may need to examine GED recipients later in life to see any significant benefits to GED receipt.

Other GED studies identified a benefit to GED receipt for certain demographic subgroups. For example, comparing New York and Florida data on dropouts who took the GED exam in 1989 and 1990, Tyler and colleagues (2000a) found that higher GED scores resulted in

higher annual earnings four years later⁴ for white and minority⁵ females and for minority males, but not for white males in the sample. Conversely, in another study utilizing national data, this same group of researchers found that young (ages 16-21) white dropouts on the margin of passing earned 10-19% more annually when they were in a state in which their score qualified them to pass the GED assessments, but this same effect was not evident for non-white respondents in the sample (Tyler et al., 2000b). In a study examining foreign- versus US native-born individuals, Clark and Jaeger (2006) analyzed data from four years (1998 to 2001) of the Current Population Survey (CPS; sample ages 20-64) and found that wages for foreign-born individuals who received some schooling in the US and completed high school via the GED credential were not statistically significantly different from the wages of native-born individuals who completed a regular high school diploma. In yet another study, Cao et al. (1996) found that, for the low-income women in their sample, there was no statistically significant difference between GED recipients and high school graduates in an “hours of work” outcome. This finding held when they examined hourly wage rates in this sample as well.

These outlier studies begin to hint at some differential experiences within the GED recipient population. They suggest that there is the potential to build a better—or different—understanding of the population by not always treating the GED recipient population as a singular group.

⁴ This study (and a few other studies led by John Tyler) took advantage of the “natural experiment” created by states’ varying GED cut-scores, and compared prospective GED recipients whose scores qualified them to pass in some states and not in others.

⁵ In text, I use the demographic labels that the researchers used in each study for clarity and consistency. For example, in the Tyler et al. (2000a) study, their groups are “minority” and “white,” whereas in the same researchers’ (2000b) study, their groupings are “non-white” and “white.”

2.2.3 *Limitations of the GED Outcomes Studies*

The outcomes studies I reviewed painted a clear picture of GED recipients' and high school graduates' nonequivalent outcomes. But, there were some important limitations to these studies. For example, most of the outcomes studies analyzed older data such that the GED recipients in these studies would have received the credential by taking pre-2002 versions of the GED. Given marked improvements in content and rigor, the 2002 and more recent test iterations may yield recipients who have had greater success, particularly in postsecondary educational settings.⁶

Some of these studies may suffer from additional measurement, methodological, and/or other limitations. For example, some of the studies only included respondents who reported twelfth grade or less as their highest education level. Therefore, any respondent who attended college for any amount of time would be excluded from analyses. Given that current national statistics state that approximately 60% of GED recipients go on to attempt college, these samples may be biased from excluding individuals who attempted, but did not complete, postsecondary education. Also, as previously stated, many of these studies did not account for the selection bias present in analyses comparing GED recipients to high school graduates.

⁶ The one exception is Ou's 2008 study, which may include some individuals who received their GED under the most recent (2002) version. She used a variable measuring respondents' educational attainment in 2004. However, because the data analyzed only included information through 2004, this would be a maximum of two years post-GED receipt for any of the 2002 series GED recipients—not likely enough time to see any meaningful yield. Finally, this study suffers from other measurement problems, namely that the study's main outcomes and predictors may have occurred concurrently. For example, she determined respondents' earnings using a composite average income measure between January 1, 2002 and March 31, 2004, and educational attainment was measured in 2004. So, determining temporal order is not possible and therefore results should be interpreted as correlational rather than causal.

Despite some limitations and the general story of nonequivalence, the GED outcomes literature begins to suggest more than a singular “GED recipient story.” Understanding more fully how specific groups are either more or less likely to benefit from GED receipt and which factors lead to more favorable outcomes will aid in building understanding around GED recipients’ multiple life course pathways. To begin this work, I turned to the literature that sought to understand factors that affect GED attainment.

2.2.4 *Factors Affecting GED Attainment*

This group of studies focused on variables associated with GED attainment and tried to ascertain which individuals were more likely to get a GED credential as opposed to a high school diploma. These studies further illuminated possible pre-test factors that may be more likely to characterize GED recipients’ lives. Most of these studies focused on teen parenthood’s relationship with the likelihood of completing high school via the GED rather than with a high school diploma (Hotz, McElroy, & Sanders, 2005⁷ [teen mothers]; Marsiglio, 1987 [teen fathers]; and Mott & Marsiglio, 1985⁸ [teen mothers]) and collectively reported that teen parents who went on to obtain a high school degree/credential were more likely to do so via the GED as opposed to returning to school and obtaining a traditional high school diploma. Given the relationship between teen parenthood and dropping out of high school, these findings were not surprising.

⁷ Sample consisted entirely of pregnant teenagers. The study took advantage of a “natural experiment” by comparing women who miscarried to those that carried the pregnancy to term.

⁸ This study reported prevalence and therefore, did not make claims regarding teen pregnancy’s effect on type of credential received; however, given the extremely high prevalence of teen mothers in the GED category (as compared to those in the high school diploma category), this study supports the assertions made.

Outside of early family formation, three studies examined other factors that the researchers hypothesized were related to the type of high school credential a high school dropout chose to obtain. They found the following factors increased a dropout's odds of obtaining a GED rather than a high school diploma: binge drinking during senior year (Renna, 2006); higher pre-dropout test scores and academic performance (Wayman, 2001; Wayman, 2002); higher self-confidence (Wayman, 2002); and higher socioeconomic status (Wayman, 2001). This research demonstrates that these factors, along with teen parenthood, may play an important role in shaping GED recipients' life course experiences.

2.2.5 *Gaps in the GED Literature*

Overall, my review of the GED literature found that GED recipients' outcomes were, in general, worse than high school graduates' outcomes. Typically, when explored, this nonequivalence has been explained by pre-test individual and demographic factors but has not fully explored the possibility of distinct life course experiences *within* the GED population. Almost every study I reviewed examined the GED population as a singular group, hiding any possible variability within the population. When studies did examine different groups within the GED population, groups were based on demographic factors (e.g., gender, immigrant status) or on teen parenthood. While illustrative, demographic factors provide few actionable policy targets. Differential experiences within the GED population, if they exist, may uncover potential explanations, both for GED recipients' poor long-term outcomes and for those "success stories" that go on to have positive long-term outcomes.

Another gap in this literature is that it focuses entirely on individual skills, both cognitive and non-cognitive, to explain GED recipients' success, or lack thereof. The bulk of the aforementioned studies focus entirely on a narrow set of individuals' pre-test characteristics and

circumstances. Most commonly, they examine how cognitive skills—typically measured by standardized test scores—and non-cognitive skills such as self-confidence affect GED-recipients’ long-term outcomes.

Relying entirely on individual skills or characteristics as explanatory mechanisms provides little actionable guidance for interventions and/or policy targets. Given educational curricula’s focus on preparing students for both in-class and standardized assessments, the current educational system already targets cognitive skill-building, at least as it is operationalized in the current GED literature (i.e., every study I reviewed used either school grades or standardized test performance as the cognitive skills measure). Also, there are myriad evidence-based prevention and intervention efforts targeting youth who struggle academically attempting to increase academic achievement and persistence (e.g., Institute of Education Sciences, 2013). In sum, educators and others who work with youth are already focused on improving their academic performance.

Additionally, non-cognitive skills, when they were examined, were problematically conceptualized as being inherent to an individual such that some individuals were “naturally” more self-disciplined, more likely to persevere, or have greater self-confidence. However, these skills may have been indicative of—or at least informed by—other ecological contexts. For example, a student encountering multiple stumbling blocks in school who has strong family support may appear more perseverant and more self-confident, while a similar student encountering the same adversity on her own, without familial support, may seemingly struggle with self-confidence and perseverance. Attributing these characteristics entirely to an individual’s natural tendencies overlooks relevant contextual factors that prevention and intervention efforts could target.

One final gap I identified in this literature was a missing acknowledgement of the cumulative nature of life course events, including those related to schooling, dropping out, and other educational transitions. It is possible that GED recipients accumulate more adverse experiences over their life course than traditional high school graduates and that this accumulation affects their long-term outcomes.

Based on these limitations, I turned to the broader literature on high school dropouts in the US to inform my conceptual model for examining GED recipients' experiences over the life course, salient indicators of these experiences or pathways, and factors potentially related to the population's within-group heterogeneity examined in this study. All GED recipients were once high school dropouts. Importantly, the high school dropout literature addresses the gaps I identified in the GED literature above: (1) variability within the GED (or high school dropout) population; (2) the importance of contexts/experiences in addition to individual traits and skills; and (3) the cumulative nature of contexts/experiences and its effect on eventual outcomes. Given the sheer size of the literature encompassing high school dropouts, I narrowed my review to frequently cited studies and those that specifically elaborated the gaps above.

2.3 RESEARCH ON HIGH SCHOOL DROPOUTS IN THE UNITED STATES

Students who drop out of high school and later obtain a GED and those who drop out and never obtain a GED share an important life event: dropping out of high school. Because there are a vast number of studies examining high school dropouts, I focused my review on those that promised to help fill in the gaps I identified in my GED literature review above. These studies revealed information regarding the dropout population as a whole, regardless of eventual GED receipt. Throughout this review, I privileged studies that took a life course perspective and

examined individuals over time. In full, I reviewed approximately 20 books and studies for this review.⁹

The dropout literature I reviewed provided evidence for three main findings: 1) dropping out is not a singular event for most individuals; rather, it is the result of a series of cumulative events—or a *process* in which key transitional points may play a pivotal role; 2) salient predictors influencing high school dropout are not only individual- or behavior-related factors, but come from multiple ecological domains and contexts (e.g. family, school, neighborhood, peer); 3) the dropout population consists of a heterogeneous group of individuals, and while some common experiences or pathways are evident, there is not one singular dropout pathway or life course. I review these major findings in turn below. These findings provide direct support for my proposed research of the GED population that will focus on GED recipients over the life course, contextual factors from multiple domains that affect GED recipients' experiences over time, and differential experiences within the GED population. In addition to reinforcing my proposed focus on these three approaches for my GED recipient study, the dropout literature also provided guidance regarding measurement and analyses methods suited to answer the questions I seek to answer about the GED population.

⁹ I began by searching the ERIC and UW education journals online journal repositories for the key words/phrases “high school dropout” and “review.” ERIC returned approximately 50 results, while searching the UW education journals repositories (which includes Academic Search Complete, PsycInfo, and Education Source) for “high school dropout” resulted in over 3,000 articles. Given the number of existing studies on the dropout population, I sought to capitalize on existing syntheses of this research, so I privileged the most recent reviews (from 2000 to present) as well as those that were most often cited. Two works led by Russell Rumberger provided oft-cited comprehensive reviews of the dropout literature (Rumberger, 2011; Rumberger & Lim, 2008). Additionally, I went through the references of these seminal works and located additional relevant sources.

2.3.1 *The Cumulative Process of Dropping Out*

Numerous studies I reviewed suggested that dropping out of high school was the culmination of a series of events over an individual's life course rather than an isolated or singular event (e.g., Alexander, Entwisle, & Kabbani, 2001; Christenson & Thurlow, 2004; Ensminger & Slusarcick, 1992; Porche, Fortuna, Lin, & Alegria, 2011; Rumberger, 2011). These studies reveal the importance of looking at this population over time when trying to understand their experiences.

For example, according to Alexander and colleagues (2001), "the roots of dropout extend deep and broad" (p. 762). These roots extend both back in time to youth's earliest educational experiences as well as out to other domains that impact individuals' lives school, home, and community—which I discuss more fully in the next section. These researchers identified experiences in as early as first grade that they associated with eventual dropping out. Methodologically, they used a risk/resource framework, took a life course perspective, and sampled a group of high-risk students from Baltimore. Viewing dropping out as a cumulative process a priori, they sought to examine how factors from both home and school domains related to this process. They found support for multiple factors over time (measured in 1st, 2nd, 4th, 6th, 7th, 8th, and 9th grades) that they characterized as either risk or resource factors, such as parental attitudes and support for their children's education. One of their most striking findings was that school-engagement indicators from as early as first grade were just as predictive of eventual dropout as academic performance indicators. Furthermore, they found support for their hypothesis that both resources and risks accumulate over a youth's schooling trajectory to affect eventual dropout or persistence.

Similarly, Ensminger and Slusarcick (1992) utilized path models and examined interactions over multiple developmental periods to identify factors as early as the first grade that could be predictive of eventual dropout, concluding that the “processes leading to school dropout in this population were established early in the school career” (p. 110). This study focused on first grade academic performance and behavior’s relation to eventual dropout, while also examining the possible mediating and/or moderating effects family-related background measures (e.g., mother’s education level, family income above/below the poverty line, and being born to a teen mother), family environmental measures (e.g., family participation in and knowledge of the school, talking to the child about school, reading to the child), and educational aspirations and expectations had on this relationship.

Embedded in these life course studies were a range of contextual and individual experiences and factors. I next turned to the literature to explicitly examine which factors have been identified as the most salient predictors of high school dropout. These factors begin to paint a picture of high school dropouts’—and therefore eventual GED recipients’—life course experiences pre-dropout.

2.3.2 *Predictors of High School Dropout: Individual and Contextual Factors*

There are hundreds of studies that seek to explain why students drop out of high school (Rumberger, 2011, p. 159), many of which have roots in social science research informed by Urie Bronfenbrenner’s ecological paradigm (Bronfenbrenner 1997, 1994a, 1994b). The ecological paradigm stresses the importance of understanding broader ecological systems’ influence on human development and long-term outcomes. While these studies still include individual factors (e.g., test scores, grades, delinquent behaviors), they also include factors from other domains (e.g., the family or school) to capture the full range of influences that may

contribute to an individual dropping out (see Rumberger & Lim, 2008). Reporting on approximately 200 dropout studies he and colleagues reviewed, Rumberger (2011) categorized factors found to predict high school dropout into two broad categories: (1) individual factors and (2) familial, school, peer, and community-related factors—or, contextual factors.

This literature, then, broadly supports the hypothesis that factors from multiple domains collectively affect youth’s educational experiences and eventual outcomes. However, the research is less clear about which domains have the greatest effects. For example, one study examined five prevalent theories of what predicts early (i.e. before tenth grade) high school dropout and found that, while academic achievement was a consistently potent predictor of early school leaving, it did not fully explain early dropout. Neither did any of the other theories that included factors such as deviant or sexual behavior, bonding to antisocial peers, school bonding, parents’ education and educational expectations, or structural strain factors (e.g., race/ethnicity, gender, SES) (Battin-Pearson et al., 2000). As these researchers stated, “none of the theories tested was fully adequate to explain the data, although partial support was obtained for each theory” (p. 568). It may be the case that disentangling the separate effects—and effect sizes—of these domains is not possible due to how interrelated and overlapping they are. It also may be the case that the effect of each domain varies depending on the individual and other acting factors.

2.3.3 *High School Dropouts: A Heterogeneous Population*

A final theme of the high school dropout literature relevant to my study of GED recipients is foreshadowed by the above findings: high school dropouts are a heterogeneous population (e.g., Bloom, 2010; Bowers & Sprott, 2012; Cairns, Cairns, & Neckerman, 1989; Fagan & Pabon, 1990; Fortin, Marcotte, Potvin, Royer, & Joly, 2006; Janosz, LeBlanc, Boulerice, & Tremblay, 2000; Rumberger 1983). This finding, which has been reiterated since

the inception of dropout research (e.g. Rumberger, 1983), suggests that a singular dropout experience does not exist.

Acknowledging that a singular dropout experience may not exist, researchers have still sought to identify some common pathways—or typologies—within the dropout population. If every dropout’s experience is entirely unique, designing an intervention effort that can be taken to scale becomes impossible. So, researchers have sought to identify homogeneous pathways—or shared experiences—within the larger heterogeneous high school dropout group. One such study identified four typologies (Janosz et al., 2000); however, a separate study conducted by a different group of researchers found four substantively different typologies (Fortin et al., 2006). These studies also differed in theoretical approach, with the former focusing on individual factors’ relation to typology and the latter including family, individual, and school-related factors.

In their 2012 study, Bowers and Sprott set out to identify typologies of high school dropouts—in terms of risk factors present in these dropouts’ lives—in what they considered a more methodologically rigorous way. They were critical of the existing dropout typology research, stating that it had “been fraught with methodological problems and lack[ed] evidence of the number of dropout types that may exist in the population” (p. 130). Utilizing a latent class analysis approach and analyzing data from the nationally representative Education Longitudinal Study of 2002 (ELS:2002), they identified three dropout typologies based on a range of factors from multiple ecological domains. They presented various indices of model fit to substantiate their findings and employed other validation strategies.

While jointly these dropout typology studies suffer from some shortcomings and discrepancies, overall this body of research consistently supports the notion that the dropout

population is comprised of a heterogeneous group of individuals in terms of individual and other contextual factors. Given that GED recipients hail from this population, these lessons are directly applicable to GED research as well. In failing to address the GED population's potential heterogeneity, existing studies fail to fully understand GED recipients' differing experiences. Furthermore, without acknowledging differential pathways and experiences, it is possible that the big picture—or the majority's experience—is clouding any view of the less common, but existent, success stories. It is these success stories that may hold the key to successful intervention and supports-development for GED recipients.

2.3.4 *Implications for a Study of GED Recipients*

In sum, this review surfaced three main takeaways from the dropout literature that are directly applicable to studying GED recipients. First, dropping out and other key educational transitions are often an accumulated result, rather than isolated singular events. Secondly, factors related to the dropout process come from multiple ecological domains or contexts, and such factors must be included when analyzing educational events' etiology. Finally, the dropout population is heterogeneous in terms of both the sets of experiences and factors that contributed to their dropping out and their other educational transitions. In other words, the process of dropping out does not occur in the same way for all dropouts. Collectively, these three main takeaways underscore how important it is when studying any dropout population to examine the accumulation of potential factors, include influences from multiple ecological contexts, and to understand that the population is a heterogeneous group.

Informed by my reviews of the literature on both the GED and dropout populations and the gaps I identified, I sought to answer the following five research questions in this dissertation:

1. What differences existed between eventual GED recipients and high school graduates in adolescence, before their secondary educational pathways diverged?
2. When using statistical modeling techniques to account for the range of factors in adolescence that were found to differentiate between the eventual GED recipients and high school graduates, were differences in these two groups' life course outcomes in adulthood fully attenuated?
3. When limiting the comparison to only those GED recipients without a postsecondary credential and high school graduates without a postsecondary credential, does controlling for the same set of significantly-differentiating measures (measured in adolescence), fully attenuate the differences in the two groups' life course outcomes in adulthood?
4. A very small number of GED recipients in the sample (N=62, ~5.9% of all GED recipients in the sample) went on to obtain a postsecondary credential; what can be learned about their experiences? Specifically:
 - a. Given the potential impact of postsecondary education or training on long-term outcomes, is it possible to identify predictors (from the pool of measures from adolescence) of postsecondary attainment within the GED population?
 - b. Given the limited power to detect statistically significant predictors of postsecondary attainment within the GED population, what can be learned from examining the two groups' (GED recipients-with-postsecondary and GED recipients-without-postsecondary) adolescent experiences/contexts and characteristics descriptively?
5. In addition to examining potential antecedents to postsecondary degree completion—one positive life course outcome—can I identify adolescent antecedents for other positive life course outcomes in adulthood (particularly outcomes that may have a greater prevalence within the GED population than postsecondary completion)?

Chapter 3. CONCEPTUAL FRAMEWORK

To address these research questions, I needed a conceptual model with three main characteristics. First, the model needed to acknowledge the interconnectedness and cumulative nature of experiences over time. Secondly, it had to account for the multiple contexts that operate on an individual. Third, the model needed to provide a framework for identifying factors within each context most likely to affect an individual's trajectory. To build this model, I adopted tenets from three theories/perspectives: Life course perspective, the ecological model of human development, and a risk/protective factor framework. Figure 3.1 below displays the conceptual model I built using tenets from each of these perspectives to inform my study.

3.1 THE BIG PICTURE: DEVELOPMENT OVER THE LIFE COURSE

According to the life course perspective (e.g. Elder, Johnson, & Crosnoe, 2003), human development is a lifelong process through which experiences accumulate and collectively affect future experiences. An individual's developmental experiences form a trajectory linking the past, present, and future. Traditionally, this theory has focused on how the timing and ordering of life events collectively form the life course (for a historical account of the life course theory, see Elder, 1997). However, contemporary research has challenged the notion of a normative, singular life course and is "confronting debates over the restructuring of the life course" (Macmillan, 2005, p. 4). High school dropouts and GED recipients certainly do not follow a traditional educational trajectory. Additionally, many of them experience other life events outside of the normative pathway, such as teen parenthood or entry into the full-time workforce before secondary school completion. So, adopting a theory of rigid timing and order of key life

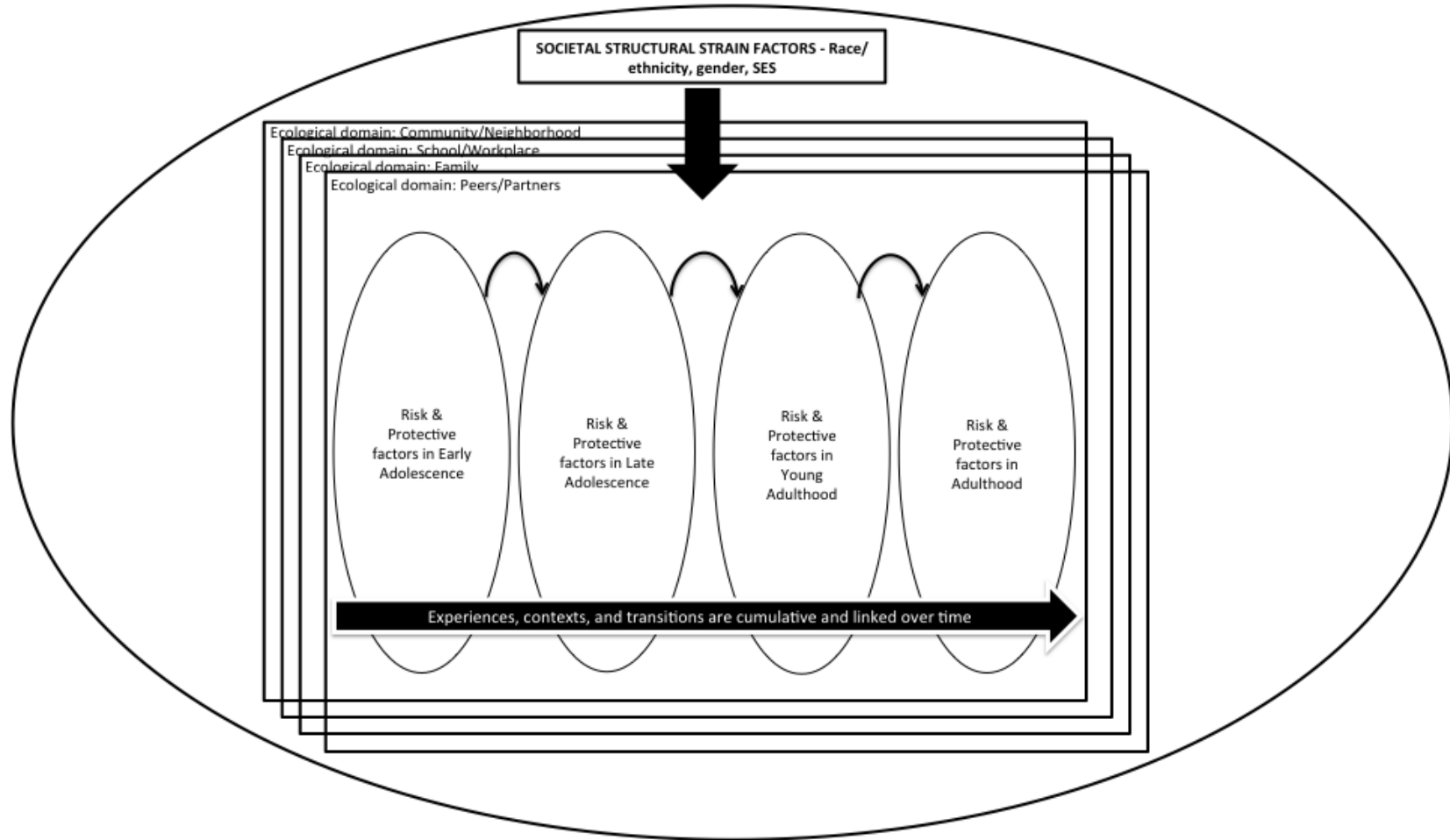


Figure 3.1. Conceptual model for the proposed study.

transitions would not serve this population—nor this study—well. However, other tenets of the life course tradition lend themselves very well to the study of this population.

Life course theory explicitly acknowledges the interconnectedness of key life events (or transitions) and the dynamic nature of individuals' longitudinal pathways (Elder, 1985). This dynamic accumulation, specific to each individual, directly suggests heterogeneity within a larger population, which I argue likely exists within the GED population.

Another important tenet of life course theory that I use to guide my analyses is that of multiple contexts operating concurrently on individuals—and individuals' various attributes acting in concert on their experiences. For example, the work of Anderson and Collins (2001) discusses how individuals' multiple attributes, such as gender, race, and class, intersect and place individuals into different strata and combinations of strata.

While indicating the importance of longitudinal examination and the accumulation and intersected nature of life experiences, this perspective lacks specificity regarding potential influential factors from a range of domains. Because research has shown strong support for the linkages between multiple ecological contexts and educational experiences, I turned to the ecological model of human development to provide more guidance in this area.

3.2 THE IMPORTANCE OF CONTEXT TO DEVELOPMENT OVER THE LIFE COURSE

Bronfenbrenner's ecological paradigm (1979; 1986) portrays human development as nested in multiple contexts. These multiple ecological contexts consistently exert influence on an individual's educational and larger life course trajectories. Factors from these contexts, coupled with individuals' behaviors and choices, contribute to life pathways and eventual outcomes.

Other studies have used an ecological systems perspective to help understand the relationship of poverty and educational outcomes, such as high school dropout research. For

example, Jozefowicz-Simbeni and Allen-Meares (2002) used this perspective to examine factors from school, family, and students' communities and their relationship to high school dropout. Guided by such examples, I used the ecological paradigm and related educational studies to identify the following ecological domains for my model: community/neighborhood; school/workplace; family; and peers/partners (see Figure 3.1).

While the ecological paradigm provides a framework that identifies relevant contexts affecting development, I needed more guidance regarding specific variable selection for my study. With the broad goal of understanding the full range of factors acting on GED recipients' trajectories from multiple contexts, there were a vast number of indicators that I could have examined. To create a manageable, but still theoretically grounded, model, I turned to the risk and protective factors framework to aid in specific variable selection.

3.3 RISK AND PROTECTION THROUGH MULTIPLE DOMAINS OVER THE LIFE COURSE

While commonly used within the dropout literature, no GED study to-date has utilized a risk/protective¹⁰ framework as a lens for understanding factors affecting this specific population. This framework provided me with the most detailed guidance in choosing indicators for GED recipients' experiences. The term *risk factor* refers to individual characteristics and family-, school-, and community-related characteristics that have been shown to be associated with adverse outcomes (e.g., substance misuse). Some educational-specific examples would be poor early academic performance (e.g. Alexander et al., 2001) or low parental involvement and expectations (e.g. Englund, Luckner, Whaley, & Egeland, 2004). *Protective factors*, on the other

¹⁰ Some researchers refer to protective factors as "resources" (e.g., Alexander et al., 2001).

hand, often diminish some or all of the risk factors' effects evident in an individual's life (e.g., Bynner, 2001; Hawkins, Catalano, Kosterman, Abbott, & Hill, 1999; Hawkins, Catalano, & Miller, 1992; Jessor, Van Den Bos, Vanderryn, Costa, & Turbin, 1995; Lagana, 2004; Rutter, 1987). I employed a risk/protective factor framework, along with studies using this framework to understand high school dropout and other educational attainment outcomes, to identify the variables from each ecological domain to include in my analyses.

Chapter 4. DATA, HYPOTHESES, AND METHODS

The conceptual model and literature reviews I presented in the preceding chapters directly inform the research design and analysis plan I detail in this chapter. In line with my framework in Figure 3.1, I included risk and protective factors from multiple ecological domains measured in adolescence (ages 12-17) and examined outcomes in adulthood (ages 25+) to cover the largest available span of respondents' life courses. The larger context rectangles shown in Figure 3.1 are those ecological domains that the literature identifies as important to life course outcomes, and educational outcomes (e.g., Hallinan, 2000). The rectangles are presented as overlapping in the picture; however, no inherent order or nesting is assumed for these domains. I began this study with no specific hypotheses regarding the relative importance of the contexts, so all domains' indicators were entered into the model simultaneously. Additionally, I created a cumulative risk measure, detailed below, to model the accumulation of negative experiences in individuals' lives and how this accumulation may affect long-term outcomes above and beyond any single risk factor. In this chapter, I will describe my dataset, data preparations, methods, and hypotheses in turn.

4.1 THE DATASET: NLSY97

To address my research questions, I needed a dataset that included data on respondents spanning multiple developmental periods across the life course, that included measures from a range of ecological domains across these periods, and in which high school completion status was differentiable (i.e., GED recipients and high school graduates were not lumped into one category).

For these reasons, I chose the National Longitudinal Survey of Youth 1997 (NLSY97, rounds 1-15) for my secondary data analysis. NLSY97 is a longitudinal study, originally consisting of almost 9,000 individuals who were 12 to 18 years old as of the last day of 1996. The original round 1 sample included 6,748 respondents from the cross-sectional sample “designed to be representative of people living in the United States during the initial survey round and born between January 1, 1980 and December 31, 1984,” (National Longitudinal Surveys, n.d.) as well as “a supplemental sample of 2,236 respondents designed to oversample Hispanic or Latino and black people living in the United States during the initial survey round and born during the same period as the cross-sectional sample” (see Figure 4.1).

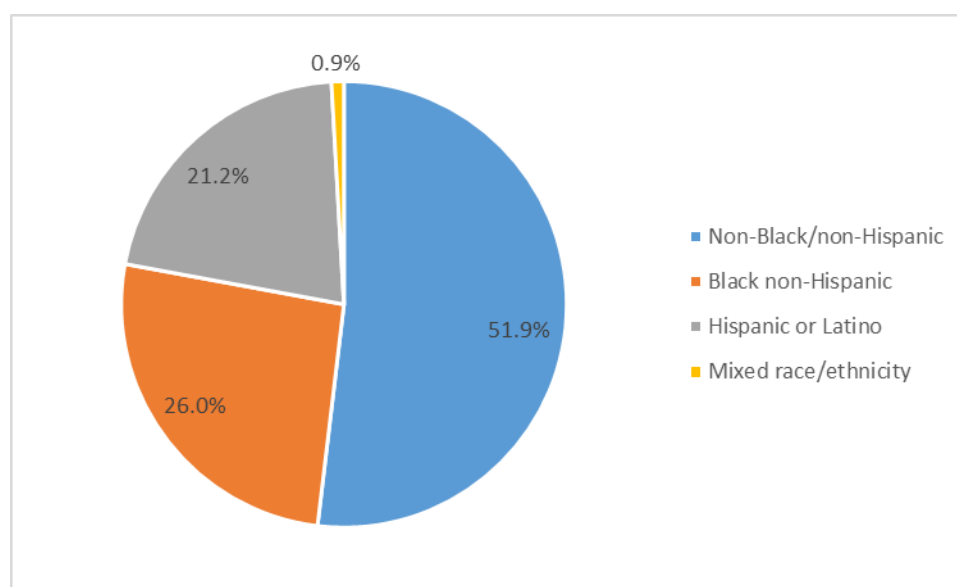


Figure 4.1. Racial/ethnic composition of NLSY97 sample in round 1.

Recipients were initially interviewed in 1997 (round 1) and interviewed annually thereafter. Round 1 also included a parental survey of one parent or guardian for each youth respondent. When I conducted my study, data were available through round 15. Round 15 data were collected in 2012-13, in which respondents were approximately between 27 and 33 years old. NLSY97 has a high retention rate (~83% as of round 15), which limits potential bias due to

longitudinal sample attrition (Madow, Olkin, & Rubin, 1983). In round 1, about half (51%) of respondents were male; this remained consistent through round 15 in which 50.4% of respondents were male. This demographic balance across genders and racial/ethnic groups was important to my study given findings in extant research (see chapter 2) regarding possible differential experiences and outcomes for GED recipients from varying demographic subgroups. Having a demographically-balanced sample for my analysis allowed me to appropriately account for these potential differences.

The NLSY97 was designed to focus on individuals' trajectories through school and work and into adulthood. Specifically, many of its questions center around labor market participation and outcomes and educational participation, performance, and attainment. The survey also asks questions about a range of other experiences, such as personal relationships, family/life transitions (e.g., having children, getting married/divorced), involvement in criminal activities and the criminal justice system, and substance use. Of note, respondents self-administered potentially sensitive survey sections (e.g., criminal involvement, sexual activity). Accordingly, this data set allowed me to incorporate factors from multiple ecological domains to examine GED recipients' range of life course experiences and outcomes.

Overall, the NLSY97 sample has been deemed "demographically and substantively balanced" (Moore, Pedlow, Krishnamurty, & Wolter, 2000), while also covering a large span of respondents' lives (20+ years), two qualities that were very important to my study based on my literature reviews and conceptual framework. Additionally, unlike many other National longitudinal samples, the NLSY97 survey differentiates between educational completion statuses at every attainment level. In some other samples, individuals are categorized by their highest level of education; in others, respondents who complete high school via either GED or high

school diploma are treated as one group. Given my population of interest, the importance of including data from different developmental periods, and the range of contexts/behaviors I sought to analyze, I deemed the NLSY97 the most appropriate option for my analyses.

4.1.1 *Variable Selection and Data Preparation*

The NLSY97 dataset includes thousands of variables.¹¹ After reviewing all available variables and selecting those that fit within the ecological domains I described in my literature review and conceptual framework, as well as sociodemographic and educational attainment measures, I pulled a comprehensive dataset (approximately 4,000 variables) that included all potentially useful measures.

With each NLSY97 survey administration (or round), many questions were repeated; however, many were not.¹² When selecting variables to include in my analyses, I had to consider question coverage across rounds, coupled with age restrictions for specific questions within rounds (e.g., some questions were only asked of respondents who were at least 15 years of age as of the survey date). For questions that measured substantively similar behaviors or contexts I privileged those questions that were available across a greater number of rounds or ages. Given my specific group of interest and their relatively modest representation within the sample (N=1048, less than 15% of the full sample), I privileged variables with greater data coverage for the age spans and individuals included in my analysis when there was a choice between two

¹¹ In addition to the direct question responses provided by recipients and their families, the dataset also includes variables that have been created and checked by NLSY97 researchers and added to the NLSY97 dataset, such as created variables based on data from non-NLS (National Longitudinal Survey) data (e.g., transcripts obtained from respondents' schools) and variables obtained from other outside organizations, such as the National Opinion Research Center.

¹² For tables detailing question availability by round within substantive area, see the NLSY97 asterisk tables (<https://www.nlsinfo.org/content/cohorts/nlsy97/topical-guide/asterisk>).

variables measuring similar experiences or behaviors. While the variables and results I present in the following chapters focus on the variables I included in final models, I ran sensitivity analyses with alternate potential variable choices for many of the final indicators to ensure substantive changes did not occur.

The NLSY97 dataset is organized by survey rounds (from the round 1 survey in 1997 to the round 15 survey in 2013) with each round including a span of ages. For example, in round 1, respondents ranged in age from 12 to 18. Because my study is focused on examining indicators from earlier life—adolescence, in this case—and their relationship to outcomes in later life—adulthood—it was important for me to have data by respondent’s age, rather than round. Additionally, because certain behaviors (e.g., alcohol use) have different implications and potential consequences across ages (e.g., alcohol use before age 21 is illegal and at 21 becomes legal), keeping the data in rounds with large age spans that covered multiple developmental periods was inappropriate for my analyses. Therefore, one of my first data preparations consisted of creating separate age-specific datasets for each wave. For example, from the round 1 data I created age 12, 13, 14, 15, 16, 17, and 18 datasets. I repeated this process for all fifteen rounds. I then appended all the age-specific datasets with their corresponding age-specific datasets from all rounds to create one master dataset per age (e.g., I appended all the age 18 datasets which came from rounds 1 through 7). The result was a respondent-level dataset for each age.

For my study, I was interested in examining measures from adolescence, defined as ages 12-17, and their potential impact on outcomes in adulthood, defined as ages 25 and older. For some respondents, I had multiple answers to the same question for questions that were asked across rounds. For example, a question inquiring about respondents’ self-reported general health (rated on a scale from 1 to 5) was asked in each round and of all ages. Additionally, “ever”

questions (e.g., have you ever been arrested; answer options yes or no) were also asked across all rounds and of all ages. To capitalize on all available data, when I created the developmental periods datasets (ages 12 to 17, ages 18 to 24, and ages 25+) I included all available data for each respondent. After merging the age-specific datasets into the three development period datasets listed above, I created variables as follows. For continuous measures, I averaged available data across ages within each of the three developmental periods. For binary measures, I took the maximum value across ages within each development period. This meant that if a respondent answered “yes” to an “ever” question within that age range (e.g., ever arrested?), they were coded as 1 on the final created “ever arrested in adolescence” variable.

4.1.2 *Cumulative Risk*

In addition to including a range of risk factors from adolescence, my literature review and conceptual model led me to conclude that a measure of cumulative risk might also influence long-term outcomes. The cumulative risk model assumes that factors work collectively to affect outcomes and that individuals with more risk factors have worse outcomes (e.g., Lee et al., 2014; Rutter, 1979; Sameroff, 2000).

To create my cumulative risk measure:

1. I took the six risk factors variables from the final variable set (Table 5.1) and assigned individuals a 1 if they: (a) had a value of 1 (for binary indicators), or (b) had a value above or below the mean value, whichever indicated more risk, for other individuals in the same high school attainment group (for continuous indicators). For example, for the variable that measured the number of times absent from school, GED recipients with higher than average absences when compared to the mean GED recipient in the sample were coded as 1 on this created variable.
2. After completing this for all six risk factors and for both high school attainment groups, I created an overall proportion of risk variable. This proportion of risk variable was calculated by taking the sum of ones from the prior step and dividing it by the total number of potential data points for each respondent. For example, if

an individual was missing data on one of the risk factors, this denominator would be 5 rather than 6. I did this instead of simply summing risk factors so that individuals with data on all risk factors were not more likely than those with missing data to appear to have more risk.

3. For the last step, I created a new overall cumulative risk variable in which individuals in the riskiest quartile from the prior step's created variable were coded as 1 and individuals in the lowest risk quartile were coded as 0.

4.1.3 *Sample Weights*

The NLSY97 dataset includes an oversampling of Black and Hispanic individuals and so also includes sampling weights to maintain the data's representativeness of the population. NLS recommends using the provided sampling weights for descriptive statistics (e.g., means, medians) but not for more complicated analyses (National Longitudinal Surveys, n.d.). NLSY97 provides custom sample weights when using data from multiple rounds.¹³ As recommended, for descriptive statistics I used weighted data and did not use weighted data in more complicated statistical models. When I present the results in chapter 5, I include a note on results tables that are based on the weighted data.

4.2 HYPOTHESES AND METHODS

In this section, I restate each research question, present my accompanying hypothesis, and describe the analytical method I used to answer each question/test each hypothesis. I also

¹³ For more detailed information on how NLSY97 weights are created, see <https://www.nlsinfo.org/content/cohorts/nlsy97/using-and-understanding-the-data/sample-weights-design-effects/page/0/1>.

detail the statistical software I used in each analysis and procedures I used to handle missing data.¹⁴

4.2.1 *Research Question 1*

What differences existed between eventual GED recipients and high school graduates in adolescence, before their secondary educational pathways diverged?

Hypothesis: GED recipients and high school graduates differed in significant ways in adolescence, before they either graduated high school or completed via GED. Additionally, they did not only differ on academic- or skills-related measures, but also on a broader group of life course experiences and contexts.

Method of analysis: To answer this research question, I used the NLSY97 weighted dataset I created and examined descriptive statistics on the final set of variables measured in adolescence that I include in subsequent analyses. For this analysis, I compared values for the two high school attainment groups (GED recipients versus high school graduates) on each of the measures. I conducted a separate t-test (for continuous measures) or a chi-square test of independence (for categorical measures) for each of the twenty-three measures and high school completion status to identify statistically significant differences at the bivariate level between GED recipients (N=1,048) and high school graduates (N=6,705) in the NLSY97 sample. Identifying which variables significantly differentiated eventual GED recipients from eventual high school graduates in adolescence formed the basis for all subsequent analyses.

¹⁴ This research did not require UW IRB approval because this research involved only the analysis of data from NLSY97, a publicly available data set for which no IRB is required (University of Washington Human Subjects Division, n.d.).

4.2.2 *Research Question 2*

When using statistical modeling techniques to account for the range of factors in adolescence that were found to differentiate between eventual GED recipients and high school graduates, were differences in these two groups' life course outcomes in adulthood fully attenuated?

Hypothesis: Accounting for a broad range of experiences in adolescence, in addition to sociodemographic characteristics and academic performance, will attenuate the differences in GED recipients and high school graduates' eventual outcomes in adulthood.

Method of analysis: To answer this question, I used propensity score matched (PSM) regression models, matching on the indicators identified as significantly differentiating between high school graduates and GED recipients (see Table 5.1). For this analysis, I set out to compare outcomes for two distinct groups: GED recipients and high school graduates. However, individuals were not randomly assigned to these groups, and, given the research on high school dropout/completion/GED receipt I presented in Chapter 2, I had strong reason to expect that these two groups differed in systematic ways such that other variables would confound the relationship between high school attainment status and outcomes in adulthood. Because of this, I needed an analytical approach that would help account for the lack of random assignment and the resulting selection bias. Propensity score methods do just that (e.g., Guo & Fraser, 2010; Rosenbaum & Rubin, 1983; Yanovitzky, Hornik, & Zanutto, 2008).

My analytical sample consisted of all GED recipients (N=1,048) and high school graduates (N=6,705) in the NLSY97 sample (non-completers were excluded from the dataset). I first ran a multiple imputation using chained equations (MICE; see Rubin, 1987) in Stata 14.2 (StataCorp LP, College Station, TX) with the "mi impute chained" command. I created 20

imputed datasets to deal with missing data values in the sample. Across all indicators measured in adolescence I included in the model (see Table 5.1), the average proportion of missing data was 6.9%, with the highest proportion of missing data on “family monitoring” (39.8% missing), “ever carry a gun” (30.0%), “average household income-to-poverty ratio” (23.8%), and “father’s highest grade completed” (14.8%).

Using the imputed data, in Stata 14.2, I first ran a separate regression model for each outcome of interest (see Table 5.1) controlling for the 23 adolescent and demographic indicators (see Table 5.1) included in all models. I then ran a propensity score matched regression model for each of the outcomes of interest (see Table 5.1) using GED status as my “treatment.” I created this treatment variable such that a value of one (1) indicated GED receipt and a value of zero (0) indicated high school diploma receipt. For the matching variables (or covariates) in these models, I included the same set of 23 adolescent and demographic indicators as well as the additional cumulative risk measure I created. For each analysis, I ran a nearest neighbor without replacement propensity score matched regression model using the “teffects psmatch” command, specifying the “atet” option,¹⁵ followed by “tebalance summarize” to ensure good balance on covariates. Before deciding on this final model specification, I tested other covariates and other matching strategies. The final modeling strategy described above resulted in the best balance among all covariates between the treatment/non-treatment groups (see Table 4.1) and the greatest reduction in bias in the final models.

¹⁵ For these analyses, I am interested in the effects of GED receipt for the GED-recipient population, which is why I included the “atet” option. This option estimates the average treatment effect on the treated as opposed to the other option (“ate”), which estimates the average treatment effect at the population level. I am not seeking to understand the benefit of GED at the population level but instead want to understand its potential benefit to those that ultimately received this credential.

Table 4.1. Balancing of Covariates in the GED versus High School Propensity Score Matched Models

Demographic & Adolescent Covariates (sample values range)	Standardized Difference		Variance Ratio	
	Before Matching	After Matching	Before Matching	After Matching
<i>Sociodemographic measures</i>				
Non-Black/non-Hispanic (0,1)	-0.27	0.06	0.99	1.02
Black (0,1)	0.25	-0.06	1.26	0.97
Hispanic (0,1)	0.05	-0.01	1.07	0.99
Male (0,1)	0.21	0.02	0.97	0.99
Household income-to-poverty ratio (0-32.3)	-0.44	0.07	0.73	1.42
Teen parent (0,1)	0.59	0.00	3.02	1.00
Born to teen mother (0,1)	0.30	-0.02	1.74	0.98
Highest grade completed by father (1-20)	-0.48	0.03	0.77	0.89
Highest grade completed by mother (1-20)	-0.40	0.06	0.79	0.83
<i>Academic and school behaviors</i>				
Overall grades (1-8)	-1.08	-0.05	1.03	1.08
Number of times absent in fall semester (0-200)	0.40	-0.03	4.41	0.97
Number of times fought at school (0-50)	0.29	-0.02	3.78	0.56
<i>Peer/neighborhood contexts</i>				
Gangs in neighborhood/school (0-100)	0.22	-0.06	1.00	0.93
Pct. of peers involved in delinquent activities scale (1-5)	0.39	-0.14	1.28	1.10
Peers in gangs (0,1)	0.39	0.02	1.29	1.01
<i>Family contexts</i>				
Family monitoring index (0-16) *>25% missing	-0.32	0.05	1.15	1.09
<i>Individual behaviors/experiences</i>				
Arrested in adolescence (0,1)	0.64	0.03	2.32	1.01
R in gang in adolescence (0,1)	0.45	0.04	3.01	1.06
R attack someone in adolescence (0,1)	0.49	0.03	1.47	1.01
R carry gun in adolescence (0,1) *>25% missing	0.39	0.08	1.96	1.10
General health scale (1-5)	-0.32	0.00	1.16	0.89
Substance use index (0-3)	0.41	-0.06	1.07	0.90

Notes: Pct. = percent; R = respondent. Note that while balance statistics differed slightly for each outcome I examined, overall the statistics presented in this table represent the balance achieved on these covariates in each model (there were no outcomes for which balance was worrisome/not achieved).

4.2.3 *Research Question 3*

When limiting the comparison to only those GED recipients without a postsecondary credential and high school graduates without a postsecondary credential, does controlling for the same set of significantly-differentiating measures (measured in adolescence), fully attenuate the differences in the two groups' life course outcomes in adulthood?

Hypothesis: Postsecondary attainment may play a role in the persisting differences between GED recipients and high school graduates I identified in the last analysis, particularly given how few GED recipients in this sample obtained a postsecondary credential. Removing individuals who obtained a postsecondary credential and re-running the analyses on only those GED recipients and high school graduates without further education may diminish the differences between GED recipients and high school graduates' outcomes in adulthood.

Method of analysis: I repeated the same propensity score matched regression analyses I used in my analysis for research question two; however, I limited the analytical sample to those respondents whose terminal degree (as of their most recent survey participation) was either a GED credential (N=983) or a high school diploma (N=3,851). Before running the propensity models, I imputed 20 new datasets for this limited population, again using MICE in Stata 14.2. I then used this imputed dataset to repeat each regression and propensity score matched regression analysis as detailed in the analysis description for research question two. See Table 4.2 for balancing statistics for the same set of covariates for the sample of GED recipients and high school graduates without a postsecondary credential.

Table 4.2. Balancing of Covariates in the GED-without-Postsecondary versus High School-without-Postsecondary Propensity Score Matched Models

Demographic & Adolescent Covariates (sample values range)	Standardized Difference		Variance Ratio	
	Before Matching	After Matching	Before Matching	After Matching
<i>Sociodemographic measures</i>				
Non-Black/non-Hispanic (0,1)	-0.09	0.04	0.98	1.02
Black (0,1)	0.14	-0.06	1.11	0.97
Hispanic (0,1)	-0.06	0.01	0.93	1.02
Male (0,1)	0.13	-0.01	0.97	1.00
Household income-to-poverty ratio (0-32.3)	-0.24	0.03	1.06	1.60
Teen parent (0,1)	0.47	0.00	2.11	1.00
Born to teen mother (0,1)	0.18	0.01	1.32	1.02
Highest grade completed by father (1-20)	-0.23	0.02	0.89	0.98
Highest grade completed by mother (1-20)	-0.16	0.01	0.89	0.97
<i>Academic and school behaviors</i>				
Overall grades (1-8)	-0.77	-0.03	1.17	1.17
Number of times absent in fall semester (0-200)	0.35	0.02	3.75	1.23
Number of times fought at school (0-50)	0.23	-0.02	2.96	0.80
<i>Peer/neighborhood contexts</i>				
Gangs in neighborhood/school (0-100)	0.10	-0.08	0.98	0.94
Pct. of peers involved in delinquent activities scale (1-5)	0.27	-0.13	1.21	1.10
Peers in gangs (0,1)	0.27	-0.04	1.13	0.99
<i>Family contexts</i>				
Family monitoring index (0-16) *>25% missing	-0.21	0.06	1.10	1.04
<i>Individual behaviors/experiences</i>				
Arrested in adolescence (0,1)	0.53	0.00	1.78	1.00
R in gang in adolescence (0,1)	0.36	0.01	2.13	1.01
R attack someone in adolescence (0,1)	0.34	-0.01	1.24	1.00
R carry gun in adolescence (0,1) *>25% missing	0.31	0.05	1.60	1.06
General health scale (1-5)	-0.15	-0.05	1.07	0.92
Substance use index (0-3)	0.34	-0.04	1.01	0.88

Notes: Pct. = percent; R = respondent. Note that while balance statistics differed slightly for each outcome I examined, overall the statistics presented in this table represent the balance achieved on these covariates in each model (there were no outcomes for which balance was worrisome/not achieved).

4.2.4 *Research Question 4a*

A very small number of GED recipients in the sample (N=62, ~5.9% of all GED recipients in the sample) went on to obtain a postsecondary credential; what can be learned about their experiences? Specifically, given the potential impact of postsecondary education or training on long-term outcomes, is it possible to identify predictors (from the pool of measures from adolescence) of postsecondary attainment within the GED population?

Hypothesis: Within the GED recipient population, there are specific factors in adolescence from the examined ecological domains (school, peer/neighborhood, family, and individual) that predict recipients' eventual postsecondary attainment.

Method of analysis: To answer this question I first limited my sample to only GED recipients (N=1,048). For this analysis, I used Mplus 6 (Muthén and Muthén, 1998–2010). To handle missing data, I specified a Monte Carlo integration method with the maximum likelihood estimator in the logistic regression model regressing postsecondary degree status (for which 1=recipient has some sort of postsecondary credential and 0=recipient has no postsecondary credential) on the set of sociodemographic and other indicators measured in adolescence (see Table 5.1).

4.2.5 *Research Question 4b*

A very small number of GED recipients in the sample (N=62, ~5.9% of all GED recipients in the sample) went on to obtain a postsecondary credential; what can be learned about their experiences? Specifically, given the limited power to detect statistically significant predictors of postsecondary attainment within the GED population, what can be learned from

examining the two groups' (GED recipients-with-postsecondary and GED recipients-without-postsecondary) adolescent experiences/contexts and characteristics descriptively?

Hypothesis: While there may have not been enough power to identify statistically significant differences between the two GED recipient groups (recipients with postsecondary and recipients without postsecondary) on the indicators I included, learning more about their contexts and behaviors, descriptively, could reveal potential differing points for further exploration.

Method of analysis: Because this analysis was purely descriptive, I again used the NLSY97 weighted dataset and examined the set of variables measured in adolescence (see Table 5.3) for the two GED recipient groups: GED recipients without postsecondary (N=983) and GED recipients with postsecondary (N=62).

4.2.6 *Research Question 5*

In addition to examining potential antecedents to postsecondary degree completion—one positive life course outcome—can I identify adolescent antecedents for other positive life course outcomes in adulthood (particularly outcomes that may have a greater prevalence within the GED population than postsecondary completion)?

Hypothesis: While finding statistically significant predictors of postsecondary completion within the GED population was difficult, in part due to the extremely low prevalence of GED recipients with postsecondary degree, descriptive differences between the two GED groups lead me to believe that there are, indeed, different experiences within the GED recipient population. If I examine a broader range of life course outcomes, I might be able to more clearly identify differential experiences in adolescence within the GED recipient population.

Method of analysis: For this analysis, I continued to focus on GED recipients only and excluded those recipients with a postsecondary degree, given that they do appear to differ from

GED recipients without postsecondary (N=983). While postsecondary completion is a clear marker of a positive outcome, the other outcomes measures I had available (e.g., life satisfaction, general health) were continuous measures for which I had no theoretically-based cut point to define as achieving “success.” Because the GED and other alternative credentialing exams are generically referred to as high school equivalencies (HSEs), I decided to use the sample’s high school graduates’ mean values to determine the cut point for each outcome such that values at or above the mean high school graduate’s value would indicate equivalency, generally speaking. For undesirable outcomes, such as binge drinking, I still used the high school graduates’ mean value as the cut point, but coded it so that values at or *below* the cut point would indicate equivalency (coded as 1).

I used the same analytical procedure as in analysis 4a, running a separate logistic regression for each newly created binary outcome in Mplus 6 (specifying a Monte Carlo integration method with the maximum likelihood estimator to deal with missing data). In each regression model, I regressed the binary outcome of interest (e.g., general health greater than or equal to that of the sample’s mean high school graduate) on the same set of demographic measures and indicators measured in adolescence as used in all other analyses.

Chapter 5. GED RECIPIENTS' LIFE COURSE EXPERIENCES – HUMANIZING THE FINDINGS

In this chapter, I describe my findings for each research question and accompanying analysis I presented in the preceding chapter. For each analysis strain I briefly revisit my goal for the analysis and my hypothesis. I then organize my findings for each into three subsections (when applicable): no significant findings, potentially-meaningful findings, and my main, significant findings. I conclude each section with a discussion of these findings.

5.1 KEY DIFFERENCES BETWEEN GED RECIPIENTS AND HIGH SCHOOL GRADUATES IN ADOLESCENCE

For the first analysis, I sought to understand what differences, if any, existed between the GED and high school graduate populations before their pathways through secondary diverged. My hypothesis was that these two populations likely differed in significant ways before they either graduated high school or completed via GED and therefore, GED recipients' risk of poor long-term outcomes originated even before they dropped out of high school. Recipients' GED receipt typically represented another point on an already-rocky trajectory, rather than the turning point some have purported it to be. Additionally, I hypothesized that the differences between GED recipients and high school graduates were not strictly academic nor skills-related and that their life course experiences and contexts also varied in meaningful ways.

At the bivariate level, all the variables in this analysis were associated ($p < .001$) with high school completion status except for the Hispanic dummy variable which was significantly associated, but at the $p < .05$ level (see Table 5.1). Because all variables had significant

associations, for this section I discuss the measures in substantive grouping (following Table 5.1).

5.1.1 *Sociodemographic Measures*

Eventual GED recipients were significantly different than eventual high school graduates in adolescence on sociodemographic measures. Results from my analysis were consistent with extant research on racial and gender differences in secondary completion outcomes. As I show in Table 5.1, the GED group was comprised of significantly fewer non-Black/non-Hispanic respondents than the high school graduate group (62.9% and 73.2%, respectively), had larger proportions of Black respondents than the high school graduate group (21.8% and 13.7%, respectively), and had more Hispanic respondents than the high school graduate group (13.9% and 11.9%, respectively). GED recipients were also more likely to be male (58.8%) than high school graduates (49.6%). And, in line with findings previously reported in the high school completion literature, I found that almost one-third of GED recipients had been teen parents, while this was the case for only 5.8% of high school graduates (e.g., Heckman et al., 2014).

When I examined parental sociodemographic measures, I also found stark differences between GED recipients and high school graduates in the NLSY97 sample. High school graduates' mean income-to-poverty ratio in adolescence was 3.5 while GED recipients' was only 2.3. A value of 1.0 on this scale means that the respondent's family was living at the federally-

Table 5.1. Bivariate Relationships Between Adolescent (ages 12-17) Measures and High School Completion Status

Demographic & Adolescent Covariates (sample values range)	GED Recipients		HS Graduates
	<i>% or mean</i>	<i>SS diff</i>	<i>% or mean</i>
<i>Sociodemographic measures</i>			
Non-Black/non-Hispanic (0,1)	62.9%	***	73.2%
Black (0,1)	21.8%	***	13.7%
Hispanic (0,1)	13.9%	*	11.9%
Male (0,1)	58.8%	***	49.6%
Household income-to-poverty ratio (0-32.3)	2.3	***	3.5
Teen parent (0,1)	26.2%	***	5.8%
Born to teen mother (0,1)	20.5%	***	9.6%
Highest grade completed by father (1-20)	11.9	***	13.5
Highest grade completed by mother (1-20)	12.1	***	13.3
<i>Academic and school factors</i>			
Overall grades (1-8)	4.6	***	6.1
Number of times absent in fall semester (0-200)	7.4	***	3.9
Number of times fought at school (0-50)	0.8	***	0.2
<i>Peer/neighborhood contexts</i>			
Gangs in neighborhood/school (0-100)	47.3	***	35.7
Pct. of peers involved in delinquent activities scale (1-5)	2.5	***	2.1
Peers in gangs (0,1)	40.6%	***	22.2%
<i>Family contexts</i>			
Family monitoring index (0-16) >25% missing	7.9	***	8.9
<i>Individual factors/experiences</i>			
Arrested in adolescence (0,1)	39.0%	***	11.6%
R in gang in adolescence (0,1)	19.0%	***	5.0%
R attack someone in adolescence (0,1)	44.5%	***	20.9%
R carry gun in adolescence (0,1) >25% missing	26.8%	***	11.7%
General health scale (1-5)	3.9	***	4.1
Substance use index (0-3)	1.6	***	1.1

Notes: SS diff=statistically significant difference; HS=high school; Pct.=percent; R=respondent; * $p < .05$, ** $p < .01$, *** $p < .001$

determined poverty level.¹⁶ A difference of 1.2 on this scale ($3.5 - 2.3 = 1.2$; high school graduates' mean minus GED recipients' mean) means that the average high school graduate's household to income-to-poverty ratio was 120 percentage points greater than the average GED recipient's household income-to-poverty ratio. Another way to think about this data is that, given the federally-determined threshold for free or reduced lunch (1.30 and 1.85 respectively), over half of GED recipients (about 58%) would have qualified for free or reduced lunch based on qualifying criteria at the time. This proportion (approximately 34%) was much smaller in the high school graduate population (see Figure 5.1).

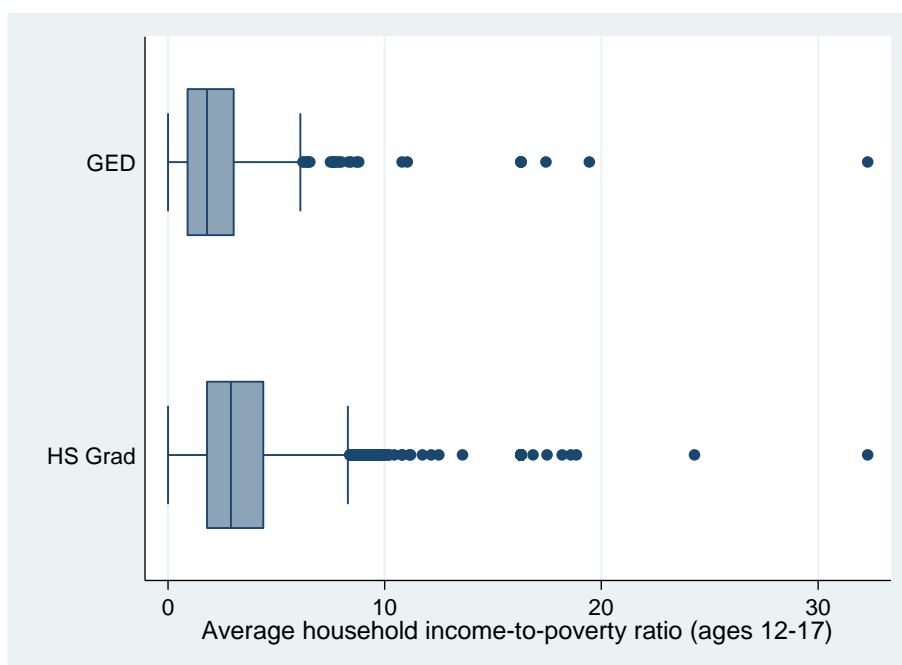


Figure 5.1. Household income-to-poverty ratio in adolescence for eventual GED recipients and high school graduates.

¹⁶ For example, in 1999 (when respondents were approximately ages 14 to 17), the poverty threshold for a family of four was approximately \$17,000. Many federal and state programs use a multiple of this threshold to determine eligibility for assistance. For instance, individuals at or below 1.38 (or 138%) of the federal poverty level are eligible for Medicaid (United States Census Bureau, 2017).

Given the dissimilarities between GED recipients and high school graduates on the sociodemographic variables described above, differences in the other three parental sociodemographic variables were unsurprising. GED recipients were two times more likely than high school graduates to be born to a teen mother (20.5% and 9.6%, respectively), and high school graduates' parents (both mother and father) were more likely than GED recipients' parents to have completed at least one year of postsecondary education. These four variables present a clear picture: eventual GED recipients' and high school graduates' socioeconomic situations were different even before their secondary educational pathways diverged.

5.1.2 *Academic and School-Related Experiences*

GED recipients and high school graduates had different academic and school-related experiences in adolescence: they differed on the three academic/school-related measures I examined. Eventual GED recipients had markedly lower overall grades in school than high school graduates. On the eight point NLSY97 scale (on which the spectrum ranges from failing, 1=Fs, to the highest grades, 8=As), the GED recipients' mean value was a 4.6 (representing a mix of Bs and Cs), while the high school graduates' mean was 6.1 (representing mostly Bs).

In the NLSY97 sample, GED recipients were also much more likely than high school graduates to show physical disengagement from school in adolescence, with the average eventual GED recipient missing approximately eight days on average—or almost two full weeks—of instruction in each fall semester in which they were surveyed. Eventual high school graduates missed about four days of classes on average, or less than one full week of school over the course of the semester. Both groups' prevalence of fighting at school was very low, so, although the GED recipients' mean value was higher than the high school graduates' mean value (0.8 and

0.2, respectively), the typical respondent (regardless of high school completion status) fought at school less than one time per year.

5.1.3 *Contextual Risks*

GED recipients' peer/neighborhood contexts were characterized by greater risk than high school graduates' contexts. GED recipients spent more of their adolescences in neighborhoods with gang activity than high school graduates. The average GED recipient spent almost half of his/her adolescence in neighborhoods or schools with a gang presence (47.3%), while the average high school graduate spent just over a third (35.7%) of his/her adolescence in neighborhoods or schools with a gang presence. The difference between the two groups' answers regarding the percent of their peers involved in general delinquent activities was small: on the five-point scale GED recipients' mean value was 2.5 and high school graduates' value was 2.1. Yet GED recipients were much more likely than high school graduates to report their peers' involvement in gang activity. It may be the case that, while most adolescents' peers engage in delinquent activities (e.g., experimenting with substances and otherwise testing boundaries or limits), eventual GED recipients' peers are engaging in much more serious delinquent activities, such as gang involvement.

On average, GED recipients reported lower values than high school graduates on the family monitoring index in adolescence (7.9 and 8.9, respectively). This index was compiled from four questions in which youth reported the degree of parental monitoring for each parent available (residential mother and/or father and non-residential mother and/or father). For example, youth were asked "How much does he/she [father/mother] know about your close friends, that is, who they are?" and "How much does he/she know about who you are with when

you are not at home?” Given the small magnitude of the difference between the two groups on this 16-point scale, this may not be a practically meaningful difference.

5.1.4 *Other Adolescent Behaviors*

GED recipients also fared worse than high school graduates on a range of other individual behaviors and experiences in adolescence. When I examined a range of other risk-related behaviors in adolescence, the average GED recipient’s adolescence was characterized by greater risk involvement than that of the average high school graduate. Eventual GED recipients were much more likely to be arrested (39% compared to 11.6% of eventual high school graduates); be in a gang (19% of recipients; 5% of graduates); attack someone (44.5% of recipients; 20.9% of graduates); and carry a gun (26.8% of recipients; 11.7% of graduates). The proportion of GED recipients involved in each of these risk behaviors in adolescence was *more than two times greater* than the proportion of high school graduates involved.

GED recipients also had a slightly higher average level of substance use involvement, according to the NLSY97’s substance use index. This index was created by NLSY97 researchers by summing the number of substances (out of alcohol, cigarettes, and marijuana) that youth reporting ever having tried. GED recipients’ mean value was 1.6, compared to 1.1 for high school graduates. Given the substance use index’s small range (0-3), this 0.5 difference—while numerically small—may have practical significance.

The last measure I examined was respondents’ general health, which was measured by a 5-point scale, in which respondents rated their general health from “poor” (1) to “excellent” (5). Both groups had demonstrably high levels of general health in adolescence. While statistically significant, GED recipients’ mean value (3.9) was only slightly lower than high school graduates’ mean value (4.1). This may or may not reflect a practically meaningful difference.

5.1.5 *Key Finding from Analysis 1: Eventual GED Recipients' Adolescent Experiences/Contexts were Characterized by Greater Risk than High School Graduates' Experiences/Contexts.*

Overall, this analysis confirmed extant research on differences between GED recipients and high school graduates, while adding a more-detailed account of these differences by including factors that have not been previously examined within this population. While the overall story was one of differential experiences, a few of these differences were not as large as I expected them to be.

For example, eventual GED recipients had statistically significantly lower overall grades in school; however, the average recipient's grades were not failing grades such as Ds or Fs. On the overall grades scale, a 4.6 (the GED recipients' mean value) represents a mix of Bs and Cs, which are both passing marks. When I looked closer at the GED recipients' data, I found that less than 20% of them reported overall failing grades. This may indicate that many eventual GED recipients may have had the academic abilities to complete high school with a traditional diploma, but other obstacles in their lives prevented them from doing so.

On the other hand, some differences were strikingly large. Twenty-six percent of GED recipients had been teen parents. This was *more than four times* the proportion of high school graduates (5.8%) who had been teen parents. Teen parenthood has been linked to poor long-term health (e.g., Patel & Sen, 2012) and educational outcomes (e.g., Hoffman & Maynard, 2008), for example. While being a teen parent does not necessarily condemn someone to poor long-term outcomes (Lee et al., 2017), it does represent an interruption in the life course that may take someone "off track." This factor may play an important contributing role in the differences between high school graduates and GED recipients previous analyses have found.

GED recipients were also more than twice as likely as high school graduates to have been born to a teen mother (20.5% compared to 9.6%), the consequences of which have been researched extensively. The children of teen mothers have been found to experience a range of adverse outcomes, such as a higher likelihood of behavioral and health problems, greater involvement with the juvenile justice system, and lower academic achievement (e.g., Hoffman & Maynard, 2008). Again, this will be important to consider when examining GED recipients' life course experiences.

There were four additional measures—all measures of risk-related behaviors/experiences in adolescence—for which the proportion of GED recipients experiencing the risk was *more than two times greater* than the proportion of high school graduates experiencing the risk. Eventual GED recipients were much more likely to be arrested (39% compared to only 11.6% of eventual high school graduates); be in a gang (19% of recipients, 5% of graduates); attack someone (44.5% of recipients, 20.9% of graduates); and carry a gun (26.8% of recipients; 11.7% of graduates). These factors have been shown to be predictive of undesirable outcomes, such as gang membership (e.g., Hill, Howell, Hawkins, & Battin-Pearson, 1999), and to likely also negatively impact respondents' educational trajectories and other life course outcomes. I found the magnitude of the difference between GED recipients and high school graduates who had attacked someone particularly surprising given the extremely low incidence of fighting at school both groups reported. If eventual GED recipients are more likely to be involved in aggressive behaviors, but only outside of school, this may make identification of this risk factor particularly challenging for educators seeking to intervene early with this group.

In sum, I found that eventual GED recipients and high school graduates in the NLSY97 sample differed on an array of factors from multiple ecological domains in adolescence before

they took separate secondary educational pathways. These differences likely not only affected their educational trajectories, but also affected other long-term outcomes in adulthood. While existing studies comparing GED recipients and high school graduates typically control for individual characteristics and academic performance, this analysis confirms that it is also necessary to control for recipients' previous contextual factors and experiences. Given that GED recipients were much more likely than high school graduates to live in riskier adolescent contexts and engage in high-risk behaviors, any comparisons of the two groups must consider these differences to control for their possible effects on outcomes of interest. In addition to these implications for research and analyses of this population, these findings have practical significance. Collectively, they reveal that significant risk factors were present in eventual GED recipients' lives long before they dropped out of high school; however, these red flags were found outside of strictly academic measures and instead were present in recipients' contexts.

5.2 VARIED PERSISTENCE OF DIFFERENTIAL OUTCOMES

For my second analysis, my goal was to examine whether accounting, statistically, for differences in the measures from adolescence I detailed in my first analysis (see Table 5.1) would fully attenuate differences between GED recipients' and high school graduates' long-term outcomes. I hypothesized that differences in outcomes may be attenuated if I accounted for a range of life contexts and experiences in addition to individual characteristics, a departure from previous research. My analyses further departed from the bulk of the GED outcomes research in moving beyond economic outcomes as a proxy for positive results and examined a range of eight life course measures in adulthood ranging from labor market to general health outcomes (see Table 5.2). I examined outcomes in adulthood (defined as age 25 and older) to allow the

maximum amount of time for GED recipients to “catch up” to high school graduates, per the Maralani (2011) study cited earlier which found that, by age 35 GED recipients in the sample caught up to high school graduates in terms of adjusted rates of first-time college entry.

Table 5.2. Descriptive Statistics on Outcomes Measured in Adulthood (ages 25+)

Outcome Measures in Adulthood (possible values range)	Full Sample		GED Recipients		HS Graduates	
	n	% or mean	n	% or mean	n	% or mean
General health (1-5)	7214	3.8	1008	3.6	6206	3.8
# days binge drank past 30 days (0-30)	7196	1.4	1005	1.5	6191	1.4
# days drank before school/work past 30 days (0-30)	7209	0.3	1007	0.4	6202	0.3
# times exercise per week (0-7)	4055	2.5	580	2.6	3475	2.5
Average civic engagement (0-100)	6873	43.7	959	30.6	5914	45.8
Life satisfaction (1-10)	5295	7.7	753	7.2	4542	7.8
Household income-to-poverty ratio (0-7.6)	7066	3.7	983	2.4	6083	3.9
Obtained postsecondary degree (0,1)	7746	37.6%	1045	5.9%	6701	43.0%

Notes: HS=high school.

5.2.1 Health Outcomes in Adulthood

GED recipients and high school graduates did not have different general health or binge drinking behavior in adulthood. As I show in Table 5.3, the preliminary regression model¹⁷ showed only a marginally statistically significant difference between GED recipients and high school graduates on the general health scale in adulthood. This difference was fully attenuated in the propensity-score matched regression model. In both regression models (the preliminary and the propensity-matched), the coefficient was almost zero ($\beta = 0.01$) indicating that the

¹⁷ As noted in Table 5.3, all regression models controlled for the full set of covariates from Table 4.1. I refer to the non-propensity models as “preliminary regression models” for clarity.

populations did not differ on their self-reported general health in adulthood after accounting for pre-existing adolescent factors and experiences. The overall reported general health in adulthood in both GED recipients and high school graduates was relatively high, with mean values of 3.6 and 3.8, respectively. So, finding no statistically significant difference was unsurprising.

While in the preliminary regression model there was a statistically significant difference ($p < .001$) between the two groups on the binge drinking (past 30 days) outcome, the propensity model fully attenuated this difference ($\beta = -0.10, p > .05$). This was also unsurprising given the very small difference between the two groups' mean values on this outcome, which were 1.5 days for GED recipients and 1.4 days for high school graduates.

5.2.2 *Differences that Persisted*

Differences between GED recipients and high school graduates persisted for a range of life course outcomes. After controlling for selection bias in the propensity-matched models, the two groups still differed in a statistically significant way on the remaining six life course outcomes. Unlike the other substance use related outcome, the drinking before school or work outcome's significant difference persisted in the propensity-matched model ($\beta = -0.13, p < .001$). The GED recipient group reported lower instances of drinking before school or work than the high school graduate group. Results from my propensity-matched model for drinking before school or work ($\beta = -0.13, p < 0.001$) translated into GED recipients drinking before school or work, on average, 1.5 fewer times per year than high school graduates. The prevalence of drinking before school or work in the past 30 days was very low in both groups in the sample with mean values of 0.4 and 0.3 for GED recipients and high school graduates, respectively.

Table 5.3. Results for the Main Predictor (GED Status) from the Regression (Logistic or Linear) and Propensity-Score Matched Regression Models for each Outcome in Adulthood (ages 25+)

<i>Adult Life Course Outcome (ages 25)</i>	<i>Regression Coefficient (SE) and statistical significance(1)</i>	<i>Propensity-score matched models: Regression coefficient (SE) and statistical significance(2)</i>
General health	0.01(0.01)+	-0.01(0.02) ns
# days binge drank (past 30 days)	-0.20(0.02)***	-0.10(0.07) ns
# days drank before school/work (past 30 days)	-0.05(0.01)***	-0.13(0.03)***
# times exercise per week	0.24(0.03)***	0.24(0.06)***
Civic engagement	-6.24(0.35)***	-8.60(0.78)***
Life satisfaction	-0.33(0.02)***	-0.38(0.04)***
Household income-to-poverty ratio	-0.67(0.02)***	-0.64(0.04)***
Obtained postsecondary degree	OR = 0.29***	OR = 0.89***

*Notes: Odds ratios (OR)/coefficients shown are for main predictor variable, GED status (coded 1=GED recipient and 0=high school graduate). (1) Each regression model included controls for all covariates listed in Table 5.1(2) Propensity models were balanced on all covariates listed in Table 5.1. SE=standard error; + $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$.*

These values translate into averages of 4.8 and 3.6 days per year. While these numbers seem relatively low, they may indicate problematic drinking behavior. For example, one symptom of alcohol use disorder according to the Diagnostic and Statistical Manual of Mental Disorders is an individual's drinking causing problems with his job or school (American Psychiatric Association, 2013). Therefore, drinking before school or work, even once, may indicate problematic drinking behavior. After controlling for selection bias based on the included confounders, GED recipients were less likely to engage in this behavior in adulthood than high school graduates.

In addition to engaging in potentially-problematic drinking behavior fewer times than high school graduates, GED recipients also reported exercising more frequently than high school

graduates, with a statistically significant difference in both the preliminary regression and propensity-matched models ($\beta = 0.24, p < .001$ for both models). This difference equates to GED recipients exercising, on average, about one additional day per month than high school graduates, which may or may not be a practically meaningful difference.

The next two life course outcomes I examined for this set of analyses were civic engagement and life satisfaction. In preliminary regression models comparing GED recipients' and high school graduates' civic engagement in adulthood, GED recipients were significantly less likely to report being civically engaged ($\beta = -6.24, p < .001$). The civic engagement variable reflects the proportion of time points (based on how often a respondent participated in the survey) for which a respondent indicated that s/he was registered to vote, participated in community meetings, and/or donated to a cause. In the full propensity-matched model, GED recipients were civically engaged almost 9% less than high school graduates ($\beta = -8.60, p < .001$).

GED recipients also reported a lower life satisfaction than high school graduates in the preliminary regression model ($\beta = -0.33, p < .001$). After accounting for selection bias based on the covariates described in Table 5.1, the gap between GED recipients and high school graduates' average life satisfaction widened slightly ($\beta = -0.38, p < .001$). However, while statistically significant, this coefficient reflects a small difference. GED recipients were only 0.38 points lower than high school graduates on the life satisfaction scale, which ranges from 1 to 10. This is likely not a practically meaningful difference.

Both the preliminary and propensity-matched regression models revealed that GED recipients had a significantly lower household income-to-poverty ratio than high school graduates ($\beta = -0.67, p < .001$ and $\beta = -0.64, p < .001$, respectively) in adulthood. There

was practically no change in the coefficient comparing GED recipients' and high school graduates' household income-to-poverty ratios in adulthood, meaning that, even after accounting for all included covariates and selection bias through propensity-score matching, GED recipients still had a significantly lower household income-to-poverty ratio than high school graduates in adulthood.

The final outcome I examined was postsecondary educational attainment. In the preliminary regression model, GED recipients were one-third as likely—or about 70% less likely—as high school graduates to have obtained a postsecondary degree ($OR = 0.27, p < .001$). In the propensity-matched model, GED recipients remained less likely than high school graduates to have obtained a postsecondary degree; however, in this model, GED recipients were about 20% less likely. Given the extremely disparate postsecondary completion rates between GED recipients and high school graduates, minimizing this difference was an encouraging result. While my model did not fully attenuate the differences between GED recipients and high school graduates regarding postsecondary attainment, the contextual and individual covariates in the model explained a large portion of this differential outcome, such that the effect of completing high school via GED on postsecondary attainment shrunk.

5.2.3 *Key Finding from Analysis 2: GED Recipients' Health and Health-Related Behaviors in Adulthood were Slightly Better than High School Graduates, but their Postsecondary and Labor Market Outcomes were Remarkably Worse.*

For all four of the health-related outcome measures (general health, binge drinking, drinking before school/work, exercise per week), GED recipients' outcomes were better than those of high school graduates. For each of these outcomes, the coefficient in the final model was relatively small and therefore, may or may not represent a practically meaningful difference.

However, I argue that finding no difference when comparing GED recipients' outcomes to high school graduates' outcomes is a meaningful finding. Given the plethora of research showing GED recipients nonequivalent outcomes (when compared to high school graduates), the fact that GED recipients in this analysis did at least as well as high school graduates on these four outcomes may indicate that, even though GED recipients are not able (by their late 20s/early 30s) to catch up to high school graduates in postsecondary attainment and the labor market, all aspects of their lives are not worse.

Unlike the health-related outcome measures, I found a relatively large difference between GED recipients and high school graduates in the final propensity-matched regression model that examined civic engagement. When I went back to the data to examine this outcome measure, I found that there was a large difference in civic engagement between respondents who had a postsecondary degree and those that did not (regardless of how they completed their secondary education). The average involvement reported for respondents with a postsecondary degree was 56%, compared to 36% for those without a postsecondary degree. Because I did not account for postsecondary education in these propensity models (because it was a primary outcome of interest), it may be the case that the difference in this outcome measure is a function of respondents' education beyond high school.

It is also likely that the persistent difference between GED recipients and high school graduates on the household income-to-poverty ratio outcome was related to respondents' postsecondary education rather than their high school completion status. *Less than six percent* of GED recipients (62 out of the 1,048 GED recipients) in this sample had obtained a postsecondary credential by their late 20s or early 30s, compared to 43% (2,850 out of 6,705) of high school graduates (see Table 5.2). When I examined the data further, I found stark differences between

respondents with and without a postsecondary degree. Individuals in the sample who had a postsecondary degree had an average household income-to-poverty ratio of 4.75 in adulthood. Those who did not have a postsecondary degree had an average household income-to-poverty ratio of 3.06. Given the strong positive relationship between education and income (e.g., De Gregorio & Lee, 2002), the difference in income in adulthood still present in the propensity-matched regression analysis may be due to respondents' postsecondary degrees, rather than their high school credential.

In sum, I found that some differences in outcomes in adulthood between GED recipients and high school graduates persisted even after accounting for pre-existing differences in sociodemographic attributes, contextual factors, and experiences in adolescence. These differences largely remained in the labor market outcomes (household income-to-poverty ratio and postsecondary degree attainment) as well as in civic engagement. I did not control for postsecondary educational attainment in these analyses because postsecondary attainment was a primary outcome of interest. However, when I descriptively investigated postsecondary attainment and its relationship with, in particular, the two outcomes for which large differences persisted, I found that respondents with a postsecondary degree had much better outcomes than those without a degree. This led me to believe that postsecondary attainment was likely inflating the differences between GED recipients' and high school graduates' outcomes in adulthood and that these differential outcomes may in fact be a function of their differential rates of postsecondary completion, rather than their high school completion type. I examine this more fully in the following analyses.

5.3 GED RECIPIENTS AND HIGH SCHOOL GRADUATES WITHOUT POSTSECONDARY EDUCATION STILL DIFFERED IN SOME MEANINGFUL WAYS

Findings from my previous analyses described above, as well as a wealth of research supporting a link between postsecondary education and positive outcomes in adulthood (e.g., National Center for Education Statistics, 2016), led me to hypothesize that postsecondary educational attainment may play a role in the persisting differences I found between GED recipients' and high school graduates' outcomes in adulthood in this sample.

Therefore, for the next set of analyses, I compared GED recipients and high school graduates who did *not* have a postsecondary degree (N=983 and N=3851, respectively), excluding from the sample anyone who obtained any type of postsecondary credential. My hypothesis was that removing individuals with a postsecondary degree from the groups would result in their differential outcomes becoming insignificant in models that account for selection bias. Overall, my hypothesis was not confirmed statistically, as I show in Table 5.4, as all statistically significant differences persisted in the preliminary and propensity-score matched regression models. However, when I examined the coefficients in the final propensity-matched models, I found that, while statistically significant, many of the differences may not be practically meaningful. Below I present the findings (from the propensity-matched models) that I argue likely do not differ in a practically meaningful way and then discuss those that I argue differ both statistically and practically.

Table 5.4. Results for the Main Predictor (GED Status, Excluding Respondents with a Postsecondary Credential) from the Regression (Logistic or Linear) and Propensity-Score Matched Regression Models for each Outcome in Adulthood (ages 25+)

<i>Adult Life Course Outcome (ages 25+)</i>	<i>Regression Coefficient (SE) and statistical significance(1)</i>	<i>Propensity-score matched models: Regression coefficient (SE) and statistical significance(2)</i>
General health	0.04(0.01)***	0.05(0.02)**
# days binge drank (past 30 days)	-0.23(0.03)***	-0.31(0.08)***
# days drank before school/work (past 30 days)	-0.08(0.01)***	-0.22(0.04)***
# times exercise per week	0.22(0.03)***	0.27(0.06)***
Civic engagement	-4.68(0.36)***	-4.16(1.04)***
Life satisfaction	-0.31(0.02)***	-0.24(0.06)***
Average household income-to-poverty ratio	-0.51(0.02)***	-0.47(0.04)***

Notes: Odds ratios (OR)/coefficients shown are for main predictor variable: GED status, coded as 1=GED recipient without postsecondary and 0=high school graduate without postsecondary. (1) Each regression model included controls for all covariates listed in Table 5.1. (2) Propensity models were balanced on all covariates listed in Table 5.1=5.1. SE=standard error; + $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$.

5.3.1 Statistical Differences Lacking Practical Meaning

On the five-point general health scale, GED recipients were slightly higher than high school graduates ($\beta = 0.05, p < .01$); however, this difference was one-twentieth of a point, a difference that likely lacks practical significance. Likewise, GED recipient also exercised slightly more per week ($\beta = 0.27, p < .001$); however, this difference would accumulate to about one more day of exercise per month, which does not seem to be a large enough difference to be practically meaningful. Finally, on the life satisfaction scale, which ranges from 1-10, the difference between GED recipients and high school graduates was less than one-fourth of a point ($\beta = -0.24, p < .001$). This likely does not represent a practically meaningful difference.

5.3.2 *Persistent Meaningful Differences*

However, differences between GED recipients and high school graduates in substance use, civic engagement, and poverty persisted regardless of postsecondary status. As in the previous analysis, significant differences persisted between GED recipients and high school graduates on both substance use outcomes: number of days binge drank ($\beta = -0.31, p < .001$) and number of days drank before school/work ($\beta = -0.22, p < .001$), with GED recipients engaging in these behaviors significantly less than high school graduates. GED recipients binge drank, on average, approximately 3.7 fewer days per year than high school graduates and drank before school or work approximately 2.6 fewer days per year. It is difficult to state with certainty whether these are practically meaningful differences; however, these behaviors in adulthood may be indicative of an underlying alcohol misuse problem.

The two groups also still significantly differed on the civic engagement outcome ($\beta = -4.16, p < .001$). When I investigated this measure further, descriptively, I found that the average high school graduate (with no postsecondary) was civically engaged about 38% of the time, while GED recipients (with no postsecondary) reported being engaged about 31% of the time. It is notable that both engagement levels are low, demonstrating that respondents from this sample without a postsecondary degree were only civically engaged on average about a third of the time in adulthood.

The final outcome for which differences persisted was the average household income-to-poverty ratio ($\beta = -0.47, p < .001$). Even after accounting for the range of variables from adolescence and removing postsecondary education from the equation, GED recipients were still unable to “catch up” to high school graduates in the labor market, at least by the time of the

survey's round 15 data collection. This may make the role of postsecondary education even *more* important for GED recipients, as it really may be their only way to get back on track.

5.3.3 *Key Finding from Analysis 3: GED Recipients and High School Graduates without Postsecondary Credentials still had Nonequivalent Outcomes, Particularly in the Labor Market.*

These persistent differences, even after removing a potential impact from postsecondary attainment, led me to hypothesize that maybe the only chance GED recipients have at catching up to high school graduates is through postsecondary attainment. This led me to my next analyses, which focused on GED recipients who go on to obtain a postsecondary credential. Out of the 1045 GED recipients for whom there was information on postsecondary attainment¹⁸ in the NLSY97 dataset, only 62 obtained a postsecondary credential by the round 15 survey date. Given how few recipients obtained a postsecondary degree, I had limited power to detect statistically significant differences; therefore, in addition to regression models, I also focused on examining this group descriptively.

5.4 GED RECIPIENTS WHO OBTAIN A POSTSECONDARY CREDENTIAL DIFFER IN MEANINGFUL WAYS FROM THOSE WHO DO NOT: PART 1

My goal for this analysis was to better understand the 62 GED recipients who went on to obtain a postsecondary credential. Because only six percent of the GED recipients in the NLSY97 sample obtained a postsecondary credential, I hypothesized that this group's life course experiences would be unique and differ significantly from those of GED recipients who did not complete postsecondary (see Table 5.5).

¹⁸ There were three GED recipients who were missing data on the postsecondary attainment measure.

With such a low prevalence on the postsecondary attainment outcome measure, most of the indicators I examined did not statistically significantly predict postsecondary attainment in the full regression model. However, some of the relationships still may have practical significance and, at the least, indicate potential areas for further exploration. I also argue that understanding the ways in which these two groups do not differ is helpful to building understanding about the GED population and about what factors may be the greatest contributors or hindrances to their eventual educational success. I present my findings for this analysis in the following order: indicators for which there was neither statistical nor practical significance; indicators for which statistical significance was not proven but for which there may still be practical significance; and indicators that were statistically significantly predictive of postsecondary attainment.

5.4.1 *Indicators with no Significance*

There were indicators within almost every domain that were statistically and practically indistinguishable for GED recipients without postsecondary and GED recipients with postsecondary. The first of these factors was household income-to-poverty ratio in adolescence ($OR = 0.99, ns^{19}$). This was unexpected, as I thought GED recipients from higher socioeconomic backgrounds would be more likely to go on to complete postsecondary because they might not have the same economic barriers as students from lower socioeconomic backgrounds.

Table 5.5. Logistic Regression of Postsecondary Degree Attainment on Adolescent and Demographic Covariates within the GED Recipient Population (N=1045)

Postsecondary degree attainment

¹⁹ ns = not statistically significant

	(ORs reported)
<i>Sociodemographic measures</i>	
n=680	
Non-Black/non-Hispanic (referent group)	
Black	0.63
Hispanic	3.18 *
Male	0.50 +
Household income-to-poverty ratio	0.99
Teen Parent	1.13
Born to teen mother	0.62
Highest grade completed by father	1.21 *
Highest grade completed by mother	1.17 *
<i>Academic and school factors</i>	
Overall grades	1.51 **
Number of times absent in fall semester	1.00
Number of times fought at school	0.77
<i>Peer/neighborhood contexts</i>	
Gangs in neighborhood/school	1.00
Pct. of peers involved in delinquent activities scale	1.22
Peers in gangs	1.01
<i>Family contexts</i>	
Family monitoring index	0.88
<i>Individual factors/experiences</i>	
Arrested in adolescence	0.69
R in gang in adolescence	0.53
R attack someone in adolescence	0.89
R carry gun in adolescence	0.79
General health scale	0.77
Substance use index	1.32

Notes: OR=odds ratio; Pct.=percent; R=respondent; + $p < .10$, * $p < .05$, ** $p < .01$,

*** $p < .001$.

There was also no difference between the two GED groups on the average number of school absences ($OR = 1.00$, ns); the presence of gangs in respondents' neighborhoods or schools ($OR = 1.00$, ns), and the percentage of respondents' peers involved in gangs ($OR = 1.01$, ns). Again, these findings were counter to what I expected to see. In the next analysis, I examine each factor descriptively to better understand the two groups' experiences. It is possible that the

indicators in the model that are statistically significantly predictive of postsecondary attainment are overshadowing the smaller differences between the two GED groups on the other indicators.

5.4.2 *Statistically Non-Significant Differences that may have Practical Meaning*

GED recipients who went on to obtain a postsecondary degree were slightly more likely to have been a teen parent ($OR = 1.13$, *ns*). While teen parenthood has been linked to poor educational outcomes (e.g., Hoffman & Maynard, 2008), it is important to keep in mind that these teen parents all obtained a GED and, therefore, represent relatively high achievers within this group. According to one national estimate, approximately one-third of teen mothers do not obtain a GED or high school diploma (Perper, Peterson, & Manlove, 2010). It is possible that the factors that support teen mothers in obtaining their GED—whether individual characteristics or contextual supports—persist in supporting them through completing postsecondary.

GED recipients who obtained a postsecondary degree were less likely to have been born to a teen mother ($OR = 0.62$, *ns*). This was in line with extant research demonstrating increased risk for adverse educational effects for children born to teen mothers (e.g., Jaffee, Caspi, Moffitt, & Belsky, 2001). While not statistically significant, GED recipients who had been born to teen mothers were 40% less likely to obtain a postsecondary degree than GED recipients who had not been born to teen mothers.

Unsurprisingly, many of the risk behaviors in adolescence were negatively associated with postsecondary degree attainment. Greater number of times fighting at school ($OR = 0.77$, *ns*), getting arrested ($OR = 0.69$, *ns*), being in a gang ($OR = 0.53$, *ns*), attacking someone ($OR = 0.89$, *ns*), and carrying a gun ($OR = 0.79$, *ns*) were all related to lower postsecondary degree attainment within the GED recipient population.

On the other hand, there were four factors for which the relationships were in an unexpected direction: percent of peers involved in delinquent activities, family monitoring, general health, and substance use. For instance, higher levels of substance use in adolescence were positively related to postsecondary attainment ($OR = 1.32$, ns). I examine each of these measures descriptively outside of the regression model in my next analysis with the goal of better understanding these findings.

5.4.3 *The Most Salient Predictors*

Within the GED population, the strongest predictors of postsecondary attainment were sociodemographic and academic factors: in the full logistic regression model, the statistically significant predictors were measures in one of these two categories. GED recipients who attained a postsecondary degree were statistically significantly more likely to be Hispanic ($OR = 3.18$, $p < .05$), have had fathers and/or mothers with greater education levels ($OR = 1.18$, $p < .05$ and $OR = 1.18$, $p < .05$, respectively), and have had better overall grades in school pre-dropout ($OR = 1.48$, $p < .01$). They were also marginally less likely to be male ($OR = 0.50$, $p < .10$). I explore these factors in turn below.

Hispanic students: Educational attainment statistics for the United States Hispanic population have been consistently improving over the past 15 years (e.g., Fry & Taylor, 2013), with increasing proportions of Hispanic individuals completing high school (see Figure 5.2 below) and enrolling in postsecondary. However, Hispanic individuals still represent the largest proportion of high school dropouts and the smallest proportion of GED recipients when compared to the United States' other two largest racial/ethnic groups, White and Black (e.g., Krogstad, 2016). Hispanic individuals also constituted the smallest racial/ethnic group within the

NLSY97 GED recipient population, with approximately 20% of GED recipients identifying as Hispanic, compared to approximately 42% non-Black/non-Hispanic and 35% Black.

In the full regression model, Hispanic GED recipients in the NLSY97 sample were about three times more likely than non-Black/non-Hispanic recipients to complete a postsecondary credential, holding the model's other sociodemographic and adolescent covariates constant. Research conducted by the Pew Research Center's Hispanic Center presents some factors that may be contributing to these educational metrics' improvement within the Hispanic population. For example, they cite Hispanic 16- to 24-year-olds' rising unemployment rate—brought on by the recession beginning at the end of 2007—as a potential impetus for more Hispanic students pursuing further education (Fry & Taylor, 2013). They also discuss the self-reported importance

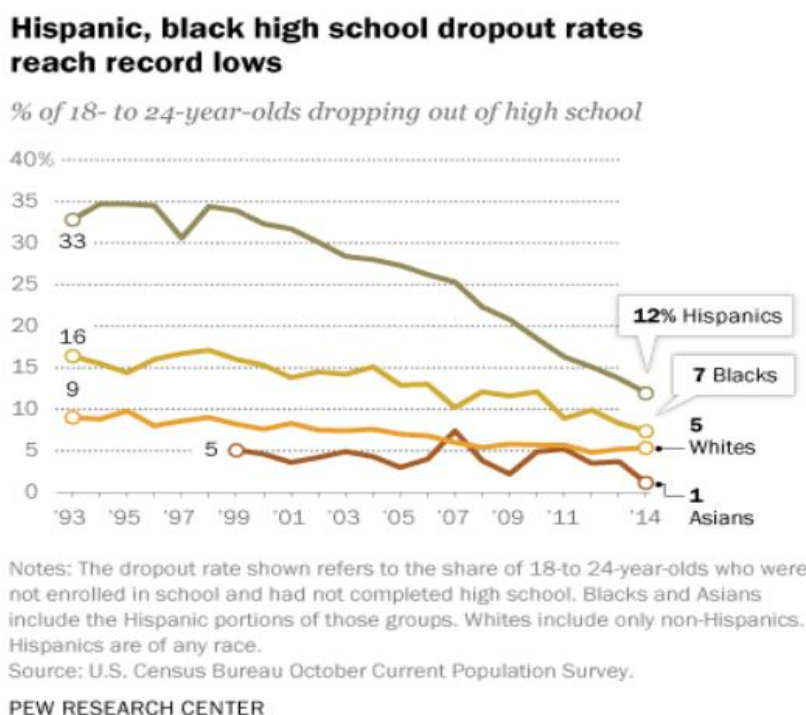


Figure 5.2. Status dropout rate for four demographic groups from 1993 to 2014 (reprinted from Krogstad, 2016).

of education within Hispanic families. According to a 2009 Pew Hispanic Center survey, “88% of Latinos ages 16 and older agreed that a college degree is necessary to get ahead in life today” (Pew Hispanic Center, 2009); another Pew-conducted survey found that only 74% of Americans aged 16+ agreed with that statement (Pew Research Social & Demographic Trends, 2009).

Parental education: GED recipients who completed a postsecondary credential also significantly differed from GED recipients without a postsecondary credential in terms of parental education. Holding all other variables in the model constant, for each additional year of parental schooling (mother or father), there was an 18% increase in the odds of a GED recipient completing a postsecondary credential. There is much research linking parental education to positive outcomes for their children via mechanisms such as higher income or socioeconomic status and cultural capital surrounding education (e.g., Duncan & Murnane, 2011). GED recipients with more-educated parents likely benefited from their parents’ cultural capital surrounding postsecondary educational systems and were in turn more likely to complete a postsecondary credential themselves.

Pre-dropout academic performance: The only non-demographic statistically significant predictor in the full regression model predicting GED recipients’ postsecondary completion was the measure of GED recipients’ average overall grades in school pre-dropout ($OR = 1.48, p < .01$). For GED recipients in the NLSY97 sample, for each additional unit on the overall grades measure (a scale from 1 to 8, ranging from mostly Fs to mostly As), there was a 48% increase in the odds of a GED recipient completing a postsecondary credential. This finding is in line with other research studies that have demonstrated the effects of a student’s GPA on eventual educational attainment (e.g., French, Home, & Robins, 2010).

5.4.4 *Key Finding from Analysis 4a: Sociodemographic and Academic Factors are Statistically Predictive of Postsecondary Attainment for GED Recipients. Other Factors Require Further Exploration.*

Unfortunately, these findings collectively reveal little in the way of malleable predictors of postsecondary completion for GED recipients. While the statistically significant sociodemographic indicators support arguments for systematic improvements and equitable access to high quality education for all individuals, regardless of race and/or socioeconomic status, they provide little information into targeted interventions and supports for GED recipients specifically. This may be due to the modeling strategy, given such a small number of GED recipients having completed a postsecondary credential. Therefore, for my next analysis, I focused my examination on exploring each factor in adolescence separately, comparing the 62 GED recipients with postsecondary descriptively to the GED recipients who did not complete postsecondary to learn as much as I could from these 62 individuals.

5.5 **GED RECIPIENTS WHO OBTAIN A POSTSECONDARY CREDENTIAL DIFFER IN MEANINGFUL WAYS FROM THOSE WHO DO NOT: PART 2**

My goals for this analysis were to paint a descriptive portrait of the 62 GED recipients who obtained a postsecondary degree and to better understand how their adolescent contexts and factors differed from the rest of the GED group. I hypothesized that the 62 GED recipients who completed a postsecondary credential would differ descriptively from the GED recipients who did not complete a postsecondary credential (N=983) on the adolescent measures examined in this study, regardless of whether not these adolescent measures were statistically predictive of postsecondary attainment in the models I ran. I also hypothesized that GED recipients with postsecondary would have higher values on the potentially-positive measures (e.g., general

health) and lower values on the potentially-negative measures (e.g., substance use) when compared to GED recipients without a postsecondary credential. For this section, I present my findings below grouped by substantive area, examining differences within each domain in adolescence.

5.5.1 *Sociodemographic Differences*

As I show in Figure 5.3 and Figure 5.4, I found descriptive evidence for differences between the GED recipients with postsecondary credentials and those without on every sociodemographic measure I examined. Individuals in the GED-with-postsecondary group were less likely to be Black and more likely to be non-Black/non-Hispanic or Hispanic than individuals in the GED-without-postsecondary group. Male GED recipients were also less likely than female recipients to go on to complete a postsecondary degree (see Figure 5.3). As I stated previously, differences between male and female GED recipients' outcomes have been identified in the GED literature on numerous occasions (e.g., Heckman et al., 2014). Studies have also shown that men are less likely than women to complete a postsecondary degree (e.g., Dwyer, Hodson, & McCloud, 2012).

GED recipients that went on to complete a postsecondary credential were also less likely to have been born to a teen mother (14.3%) than individuals from the GED-without-postsecondary group (21.0%). However, individuals in the GED-with-postsecondary group were *more* likely than those in the GED-without-postsecondary group to have been a teen parent themselves (29.5% and 26.0%, respectively). While this may seem somewhat counterintuitive given the vast body of literature on poor long-term outcomes for teen parents (e.g., Hoffman & Maynard, 2008), evidence within the GED-specific literature has pointed to teen mothers benefiting more from GED receipt than their non-childbearing peers (i.e., female GED recipients

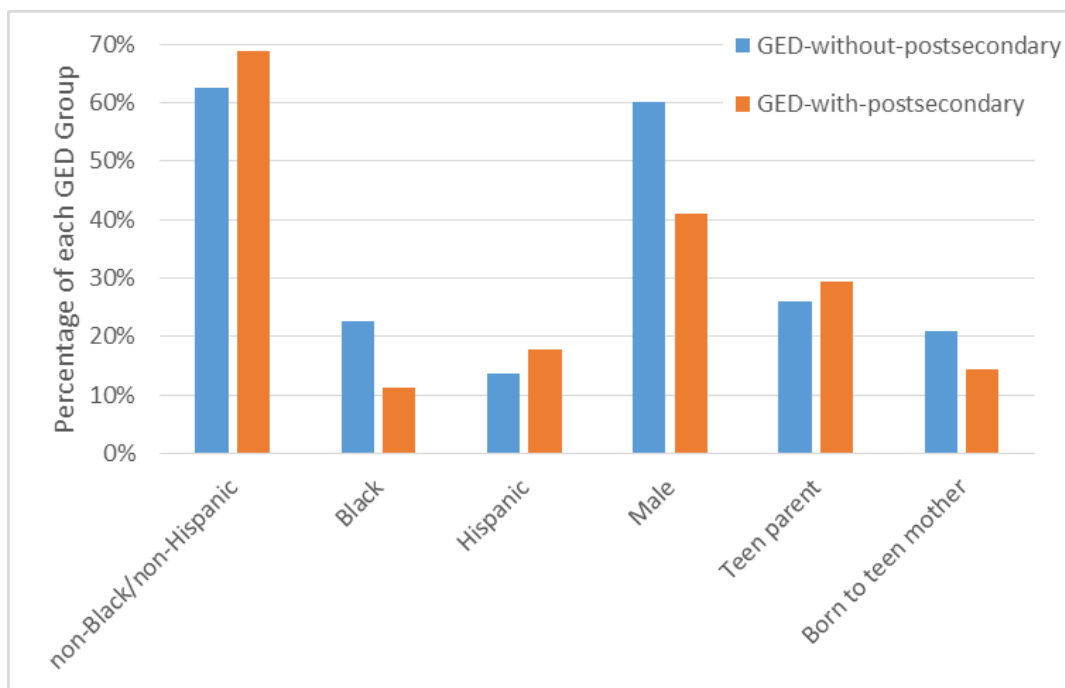


Figure 5.3. Comparing the two GED groups on binary sociodemographic measures.

who were not teen mothers). For example, as Heckman and colleagues (2014) state, “women who drop out due to pregnancy and later earn a GED are relatively more successful in the labor market compared to other female GED recipients and dropouts” (p. 156).

For each of the three continuous sociodemographic measures I examined (household income-to-poverty ratio in adolescence, father’s highest grade completed, and mother’s highest grade completed), GED recipients with a postsecondary credential had more positive values than GED recipients without a postsecondary credential (see Figure 5.4). Individuals in the GED-with-postsecondary group had an average household income-to-poverty ratio of 2.7, which means their households were at 2.7 times the federally-determined poverty line, while members of the GED-without-postsecondary group’s household average in adolescence was 2.3.

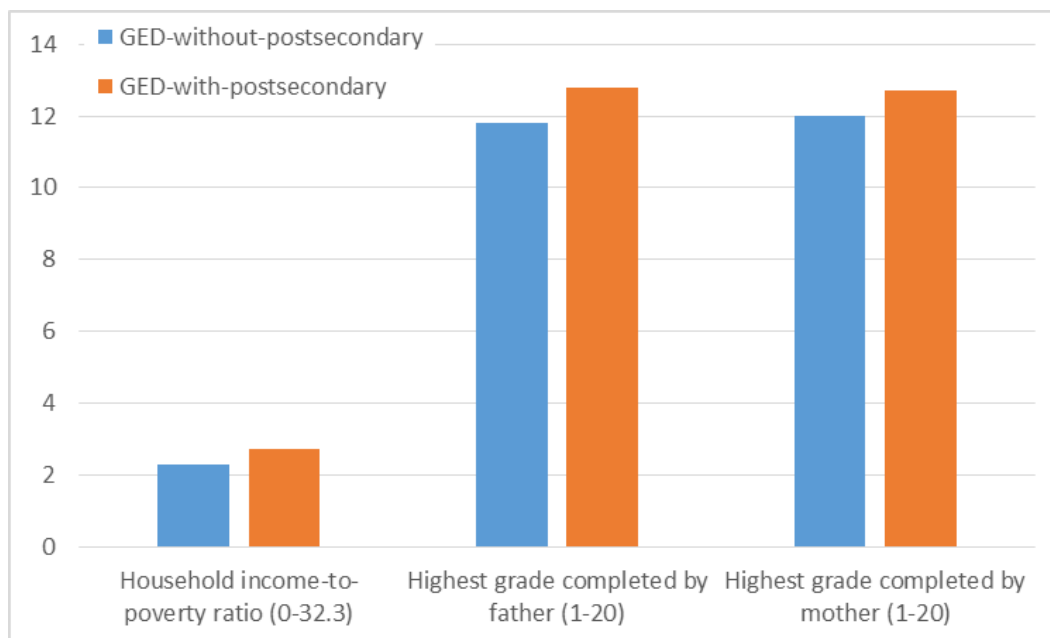


Figure 5.4. Comparing the two GED groups on continuous sociodemographic measures. (Note: Numbers in parentheses represent the sample values' range for each measure).

Individuals in the GED-with-postsecondary group also, on average, had more highly-educated mothers and fathers than those in the GED-without-postsecondary group. This measure ranged from 1 to 20, with values 1 through 12 corresponding to elementary/secondary grade levels, first through twelfth grade, and values 13 and up representing ascending years of postsecondary completion (e.g., a value of 13 means that the parent completed one year of postsecondary). The mean value for both fathers and mothers of individuals in the GED-with-postsecondary group was over 12, which means that, on average, both respondents' parents were high school graduates, while the mean value for parents of the GED recipients without postsecondary was just under 12—at 11.8—for fathers and exactly 12 for mothers. In other words, the average GED-without-postsecondary individual's father did not complete high school. This finding provides support for two possible conclusions: (1) dropping out of high school not only adversely affects the person who dropped out, but may also have intergenerational effects

on that individual's offspring (e.g., Kjersti, 2011) and, (2) for students who get off track—in this case, those who drop out of high school—having a parent who had at least a high school education may have increased their likelihood of regaining their academic footing and completing postsecondary.

5.5.2 *Comparing Factors from Other Ecological Domains*

When I examined measures from other domains, I found a mix of differences and similarities between the GED-with-postsecondary and GED-without-postsecondary groups (see Figure 5.5 and Figure 5.6). One difference that seemed like it might have practical significance was on the measure of respondents' overall grades in school pre-dropout, with a mean value of 5.3 on the eight-point scale (representing a mix of As to Cs) for the GED-with-postsecondary group and an average of 4.6 (representing mostly Cs with some Bs) for the GED-without-postsecondary group. Recipients that had better grades in school before they dropped out may have had more academic confidence and been more likely to attempt postsecondary, and therefore more likely to complete (e.g., Lotkowski, Robbins, & Noeth, 2004). It is also possible that these recipients were more adequately prepared for the rigors of postsecondary-level coursework due to their higher performance or mastery of content during their secondary education. Academic performance is a strong predictor of postsecondary success (Lotkowski et al., 2004), so it was not surprising that GED recipients with a postsecondary credential had higher grades in high school pre-dropout.

One difference I was not expecting was on the “gangs in neighborhood/school” measure: individuals from the GED-with-postsecondary group reported, on average, a more persistent gang presence in their neighborhoods or schools in adolescence than those from the GED-without-postsecondary group (53.3 and 46.7, respectively). Individuals from the GED-with-

postsecondary group reported living with a gang presence for, on average, over half of their adolescence. Interestingly, GED-with-postsecondary group members were *less* likely than GED-without-postsecondary group members to report having been in a gang themselves during adolescence (10.8 and 19.5%, respectively) or to report having peers in gangs (36.4% and 40.7% respectively). It also appeared to be the case that fewer individuals from the GED-with-postsecondary than the GED-without-postsecondary group engaged in delinquent acts such as carrying a gun (17.3% compared to 27.5%) or attacking someone (39.0% and 44.9%). GED-with-postsecondary members were also less likely to have been arrested in adolescence (28.4%) than GED-without-postsecondary members (40.0%).

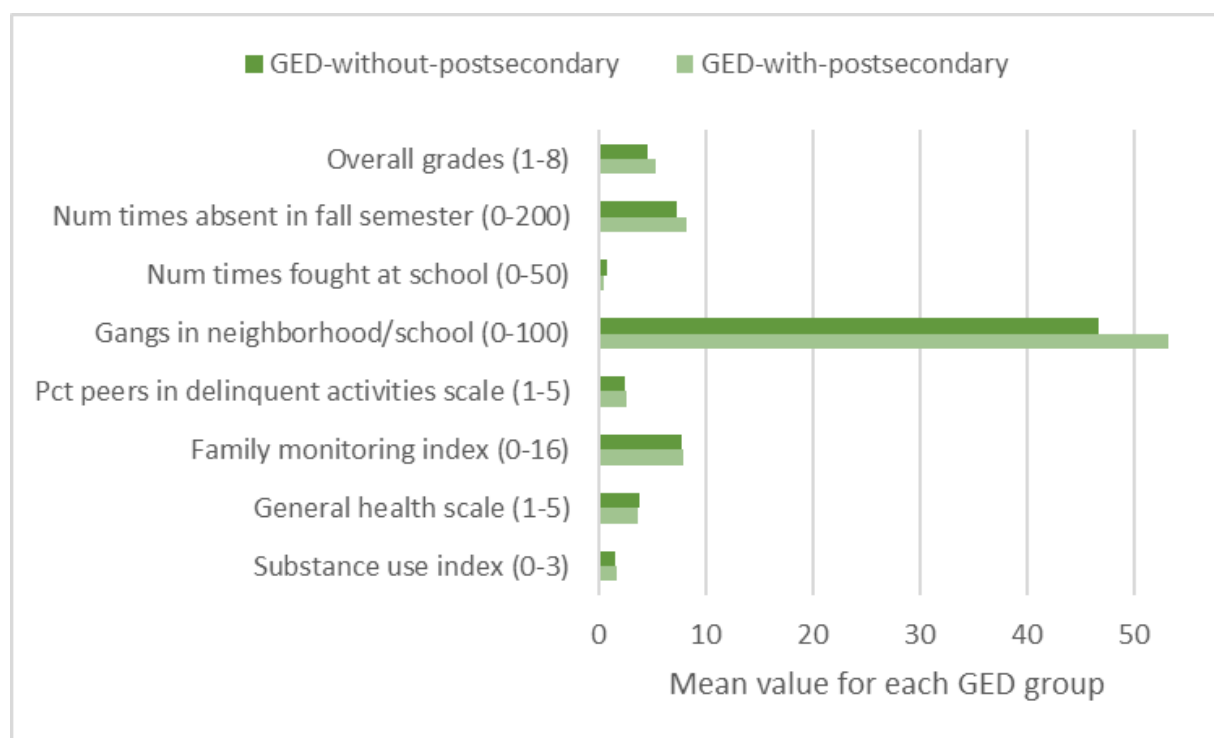


Figure 5.5. Comparing the two GED groups on continuous measures.

(Notes: R=respondent; Num=number; Pct=percent. Numbers in parentheses represent the sample values' range for each measure).

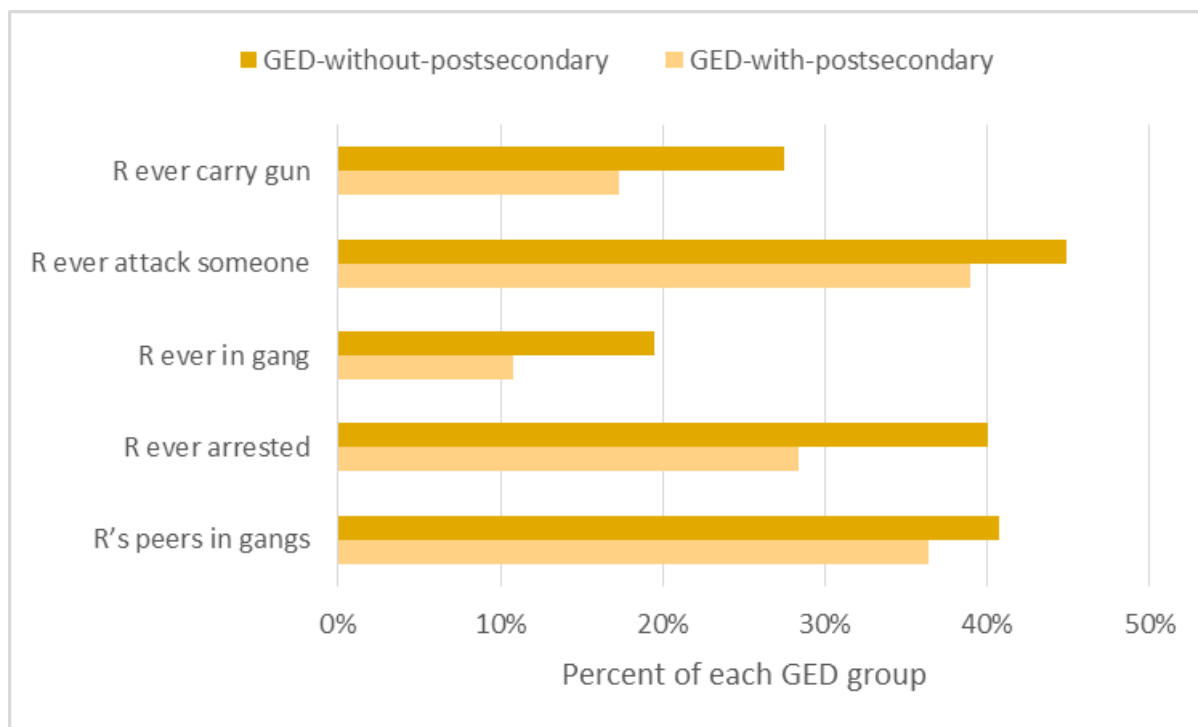


Figure 5.6. Comparing the two GED groups on binary measures.

(Notes: R=respondent).

Collectively, these descriptive statistics suggest a few possible conclusions and points for further exploration. It is possible that individuals from the GED-with-postsecondary group were better at resisting or avoiding the negative influences in their neighborhood and/or schools, potentially due to better friend groups, given the finding regarding peers in gangs reported above. So, even though their neighborhood and school contexts were categorized by a greater gang presence, they were able to avoid becoming involved in the gang's activities due to their prosocial peers. It is also possible that some other protective factors, whether intrinsic or extrinsic, existed in these kids' other adolescent contexts but weren't measured in this dataset.

5.5.3 *Less Meaningful Differences*

For the following measures the differences between the GED-without-postsecondary and GED-with-postsecondary groups' means were small and likely not practically meaningful:

number of times absent in fall semester (7.4 and 8.2 respectively); number of times fought at school (0.8 and 0.5); percent of peers involved in delinquent activities scale (2.5 and 2.7); family monitoring index (7.8 and 7.9); general health scale (3.9 and 3.7); and substance use index (1.6 and 1.7).

5.5.4 *Key Finding from Analysis 4b: The two GED Groups Differed on Some Measures from Adolescence and not on Others.*

My hypothesis was partially confirmed as the GED-with-postsecondary group differed in a seemingly practically-significant way from the GED-without-postsecondary group on about half of the measures I examined. My secondary hypothesis was also partially confirmed; in most cases, when a difference existed, the GED-with-postsecondary group had higher values on the positive measures (e.g., socioeconomic measures) and lower values on the negative measure (e.g., arrests) when compared to the GED-without-postsecondary group.

Individuals from the GED-with-postsecondary group had more educated parents and a higher household income-to-poverty ratio in adolescence than members from the GED-without-postsecondary group. The GED-with-postsecondary group also had higher grades, more schooling pre-dropout, and were much less likely to engage in serious delinquent behaviors (e.g., fighting, gangs, carrying a gun) than the GED-without-postsecondary group.

These descriptive findings paint a picture of differences between these two groups of GED recipients, revealing potential intervention focal points for further research. These results, collectively, illustrate the intergenerational effects of education and socioeconomic status and highlight the dangers of delinquent involvement in youth. Interventions aimed at preventing youth involvement in gangs and other delinquent activities might serve to dramatically improve

the circumstances of youth at-risk of dropping out and youth who have already dropped out (e.g., Pyrooz, 2014).

5.6 GED RECIPIENTS WHOSE LIFE COURSE OUTCOMES ARE EQUIVALENT TO HIGH SCHOOL GRADUATES' OUTCOMES

Extant research on the GED population has reported that, as a group, GED recipients' outcomes in adulthood are typically worse than those of high school graduates. However, there are individual recipients who do go on to have more positive outcomes, as though they had graduated high school, such as the 62 students in this sample who obtained a postsecondary degree. In the previous analyses, I tried to identify factors that predicted recipients' postsecondary attainment; however, I did not examine these factors as predictors of other life course outcomes. For this last analysis, my goal was to identify adolescent factors that might account for other positive life course outcomes, defined as GED recipients whose outcomes were as though they did get a high school diploma. Given the low prevalence of postsecondary attainment in the GED recipient population, examining other life course outcomes with greater prevalence in the population will allow greater power to identify whether the measures I included did influence GED recipients' eventual outcomes. This knowledge will further help target supports for students at-risk of dropping out, as well as those who have already dropped out.

5.6.1 *Data Preparation: Creating New Outcome Measures*

For this analysis, I examined the same topical range of life course outcomes in adulthood (age 25 and up) that I examined in analysis number two, however I created the outcomes for this analysis by establishing binary variables for each life course outcome. I limit my sample to respondents without a postsecondary credential to avoid postsecondary education's potential

effect on other life course outcomes. For the binary variables I created, a one (1) indicated values greater than or equal to the sample's mean high school graduate without postsecondary value on that variable and a zero (0) indicated values less than the mean high school graduate without postsecondary value on that variable. For the two undesirable outcomes (binge drinking and substance use), a one indicated values *less* than or equal to the sample's mean high school graduate without postsecondary value on that variable. Variables were created this way so that, for each, a value of one indicates the desirable—or similar-to-high-school graduate—outcome.

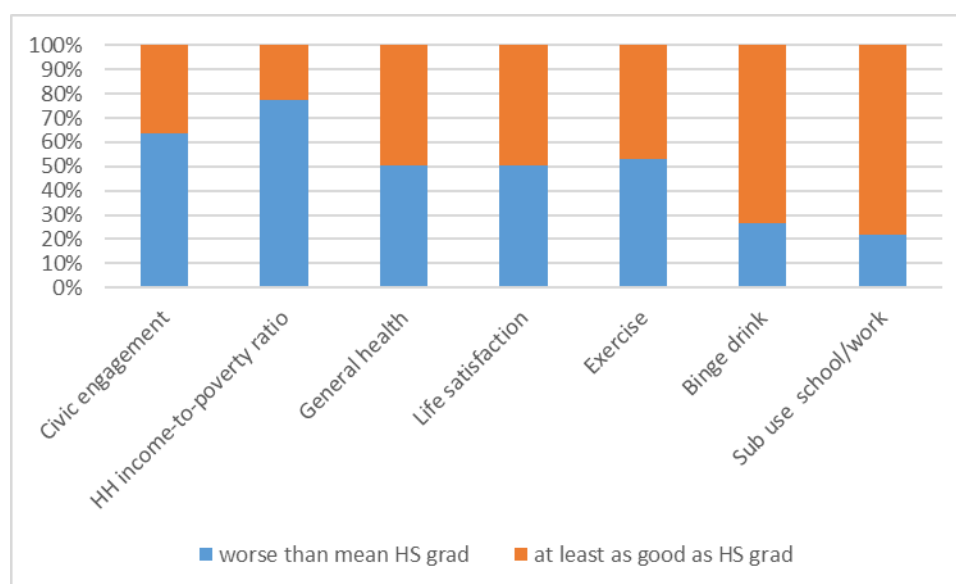


Figure 5.7. GED-without-postsecondary group's prevalence for each created binary life course outcome.

(Notes: *HH*=household; *Sub*=substance; *HS*=high school; *grad*=graduate).

As I show in Figure 5.7, the GED recipient group varied in terms of their prevalence on each of the created binary life course outcomes. Fewer than 50% of GED recipients were at or above the mean high school graduate value on civic engagement (36.6%) and household income-to-poverty ratio (22.5%). Roughly half of GED recipients were at or above the mean high school graduate value on general health (49.6%), life satisfaction (49.4%), and exercise (47.1%). And,

for the final two outcomes—binge drinking (73.2%) and substance use before school/work (77.9%)—the clear majority of GED recipients had better—or lower—instances of these substance use behaviors.

5.6.2 *Analysis: Identifying GED Recipients with Positive Life Course Outcomes.*

I ran a separate logistic regression model for each created binary life course outcome, including all the same demographic measures and covariates measured in adolescence that I included in all prior analyses. Table 5.6 includes the statistically significant predictors for each regression model.

The importance of sociodemographic factors: As with the postsecondary attainment outcome, sociodemographic differences played a significant role in GED recipients' other life course outcomes. In many of the full logistic regression models, sociodemographic variables were the strongest predictors of success or lack thereof. Race and ethnicity, gender, and parental factors all contributed to life course outcomes. Black GED recipients were 1.86 times more likely than non-Black/non-Hispanic GED recipients to be civically engaged at or above the same rate as high school graduates. Black GED recipients were also more likely to engage in binge drinking at rates matching or lower than high school graduates' rates than their non-Black/non-Hispanic GED recipient counterparts. However, Black GED recipients were also much less likely ($OR = 0.20, p < .001$) than non-Black/non-Hispanic recipients to live at/above high school graduates' household income-to-poverty ratio in adulthood. While two of these outcomes are positive—greater civic engagement and fewer instances of binge drinking in adulthood—the household income-to-poverty ratio outcome is alarmingly poor. In other words, holding all other variables in the model constant, non-Black/non-Hispanic GED recipients were five times more likely than Black GED recipients without postsecondary to have a household income-to-poverty

ratio on par with that of a high school graduate in adulthood. It is possible that the effects of interruptions in educational trajectories are more severe for those from traditionally underserved demographic groups (e.g., Tyler & Lofstrom, 2009). In this case, GED recipients who were Black and who did not obtain a postsecondary degree were significantly more likely to live in poverty as adults than non-Black/non-Hispanic GED recipients.

Table 5.6. Statistically Significant Results for Logistic Regression of each Binary Life Course Outcome in Adulthood (ages 25+) on Demographic and other Covariates Measured in Adolescence

<i>Binary Adult Life Course Outcome</i>	<i>Significant covariates (OR reported)</i>
Average civic engagement \geq mean high school grad value	Black 1.86** Male 0.67+ General health 0.74**
Average household income-to-poverty ratio \geq mean high school grad value	Black 0.20***; Hispanic 0.61+ Male 1.70*
Average general health \geq mean high school grad value	Male 1.45+ Overall grades 1.15+ Gangs in neighborhood 0.99** General health 2.17***
Average life satisfaction \geq mean high school grad value	Hispanic 1.85* Born to teen mom 0.65* General health 1.26*
Average number of times exercise per week \geq mean high school grad value	Male 1.49+
Average number of days binge drank (past 30 days) \leq mean high school grad value	Black 1.88**; Hispanic 1.99* Male 0.48** Substance use index 0.70**
Average number of days drank before school/work (past 30 days) \leq mean high school grad value	Father's education 0.89* Born to teen mom 0.54** Overall grades 1.17+

*Notes: Sample restricted to GED recipients without a postsecondary credential. Outcomes were coded as 1=greater than or equal to the mean high school graduate (without postsecondary) value, 0=less than the mean high school graduate (without postsecondary) value. Note that the referent group for racial dummy variables was the non-Black/non-Hispanic group. OR=odds ratio. + $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$.*

Hispanic GED recipients were more likely to report a similar life satisfaction level to high school graduates than non-Black/non-Hispanic GED recipients ($OR = 1.85, p < .05$). Hispanic recipients were also almost two times more likely than non-Black/non-Hispanic recipients to report binge drinking at similar or lower frequencies than the sample's mean high school graduate ($OR = 1.99, p < .05$). While only marginally significant ($p < .10$), Hispanic recipients were less likely to live at or above the mean high school graduate's household income-to-poverty ratio when compared to non-Black/non-Hispanic recipients. Although this statistic ($OR = 0.61, p < .10$) was not as small as that of Black GED recipients described in the preceding paragraph, it supports my claim above: diverging from the traditional high school educational pathway and failing to obtain a postsecondary credential may have more severe consequences from individuals from historically underserved subgroups.

When I examined gender, I found that male GED recipients without postsecondary were significantly more likely than female recipients to live at or above high school graduates' household income-to-poverty ratio ($OR = 1.70, p < .05$) in adulthood. Male GED recipients without postsecondary also reported marginally statistically significantly better general health ($OR = 1.45, p < .10$) and more frequent exercise ($OR = 1.49, p < .10$) than female GED recipients without postsecondary. However, they were significantly more likely than female GED recipients to binge drink at greater levels than the average high school graduate ($OR = 0.48, p < .01$; for this outcome, odds ratios greater than one indicate lower binge drinking frequency than the average high school graduate in the sample). Male GED recipients also reported being less likely than female recipients to be civically engaged at least the same rate as high school graduates ($OR = 0.67, p < .10$). These findings, collectively, seem somewhat contradictory. The typical male GED recipient reported binge drinking more than the average

high school graduate, but then also reported having the same level of general health as the average high school graduate.

Two other sociodemographic measures—born to teen mom and father’s education level—had statistically significant relationships with at least one of the life course outcomes. GED recipients who were born to a teen mother were significantly less likely than GED recipients who were not born to a teen mother to report being as satisfied with their lives as the average high school graduate ($OR = 0.65, p < .05$). GED recipients born to a teen mother were also more likely than GED recipients not born to a teen mother to report higher frequencies of drinking before school or work, with GED recipients born to a teen mother about half as likely as those not born to a teen mother to drink before school or work fewer times than the sample’s average high school graduate ($OR = 0.54, p < .01$). Findings for this factor support my previous assertion that it is possible that interruptions in educational trajectories (e.g., dropping out of school) have more severe consequences for individuals from certain subgroups or those who have other risk factors—in this case, being born to a teen mother—at play in their lives (e.g., Aquilino, 1996).

The final sociodemographic measure that was statistically significant was the respondent’s father’s highest level of education when examining average number of days drank before school or work (less than the mean high school graduate value). There was a small impact of father’s education in an unexpected direction. In other words, GED recipients with more highly-educated fathers tended to have worse substance use before school or work outcomes than GED recipients with less-educated fathers ($OR = 0.89, p < .05$). While this was a relatively small difference—the odds ratio is close to one—it may warrant further investigation to determine what mechanism is responsible for this relationship.

Factors from other ecological domains: Turning to non-sociodemographic indicators, some measures from other ecological domains differentiated within the GED group and some did not. For example, I found that GED recipients who reported better average general health in adolescence were also more likely to report levels of life satisfaction in adulthood at or above the average high school graduate ($OR = 1.26, p < .05$). Also, unsurprisingly, health seemed to persist through the life course, with those reporting greater adolescent general health highly significantly more likely to meet or exceed high school graduates' mean level of general health ($OR = 2.17, p < .001$).

However, GED recipients with better reported general adolescent health were less likely to be civically engaged at or above the same rate as high school graduates ($OR = 0.74, p < .01$). While some studies have examined the association between civic engagement as a predictor of improved health (e.g., Morrow-Howell, Hinterlong, Rozzario, & Tang, 2003), I was unable to locate any studies examining early life health as a predictor of civic engagement in young adulthood, which is what I modeled here: most of the research examining the linkage between these two variables has focused on senior citizens' engagement and their related health outcomes (e.g., Batista & Cruz-Ledon, 2008). More research is needed to understand the mechanisms of civic engagement involvement, particularly in young adulthood.

Respondents' overall grades in school, pre-dropout, was another measure in adolescence that was marginally statistically significantly related to some of the binary life course outcomes I created. GED recipients with higher overall high school grades were slightly more likely to report levels of general health in adulthood that were at or above the mean high school graduate ($OR = 1.15, p < .10$); these recipients were also marginally more likely to report drinking before school or work at similar or lower levels as the mean high school graduate ($OR = 1.17, p < .10$).

I was surprised that recipients' grades were not significantly related to more of the outcomes. However, given their proven relationship with the postsecondary credential attainment outcome, it may be the case that removing the recipients that have a postsecondary degree minimizes the relationship between academic performance and these other life course outcomes.

Much like the finding that general health persisted throughout the life course in the GED recipient population, substance use in adolescence was significantly related to worse binge drinking in adulthood ($OR = 0.70, p < .01$). GED recipients who engaged in greater substance-using behaviors in adolescence were more likely than their lower-substance-using GED recipient peers to have similar binge drinking patterns to the mean high school graduate. In other words, kids who misused substances were more likely to grow into adults who misused substances. This finding is supported by the broader substance use literature and not limited to GED recipients (e.g., Guo, Collins, Hill, & Hawkins, 2000; Guttmanova et al., 2011); however, it is something that programs hoping to serve GED recipients or those pursuing a GED may need to consider to fully support this population.

The final measure with at least one identified statistically significant relationship was the measure of recipients' report of gangs in their neighborhoods throughout adolescence. This measure was statistically significantly related to average general health in adulthood; however, this difference was not likely practically meaningful as the odds ratio was almost one ($OR = 0.99, p < .01$).

5.6.3 *Key Finding from Analysis 5: Sociodemographic Factors were the Strongest Predictors of Positive Life Course Outcomes for GED Recipients.*

Unfortunately, outside of the sociodemographic indicators I examined, I found little in the way of statistically significant predictors of positive life course outcomes within the GED

recipient population. I believe this area warrants further investigation, possibly with a different conceptualization of “positive” outcomes. My use of the high school graduate (without postsecondary) mean was meant to approximate equivalence, but my findings suggest this may not have been a high enough bar for modeling positive outcomes. Future research should continue to attempt to tease out those GED recipients who buck the trend of poor long-term outcomes.

Chapter 6. SUMMARY; IMPLICATIONS FOR RESEARCH, POLICY, AND PRACTICE; AND LIMITATIONS

In this dissertation study, I set out to study GED recipients' range of life course experiences with the overarching goal of adding to—and potentially changing—the dominant narrative about GED recipients, which has focused on skills they lack and their poor long-term outcomes. Using data available, I examined GED recipients' contexts and experiences from a range of ecological domains over the course of approximately two decades of their lives. Rather than only comparing them to high school graduates, I also examined potential within-group differences. While my study begins to unpack some of their differential experiences, there is still much to learn about these individuals, their educational and broader life pathways, and how to support their success. In this chapter, I present a summary of my main findings; discuss potential implications of this work for research, policy, and practice; and conclude by discussing my study's limitations and recommendations for future research.

6.1 SUMMARY OF FINDINGS

I began this project with the hypothesis that GED recipients and high school graduates had different life course experiences beyond their high school completion method—and that these different experiences existed before the end of their secondary schooling. Given the obstacles many GED recipients overcame just to sit for test (e.g., paying the test fee; finding time to prepare and take the exam while balancing family and work responsibilities), coupled with the GED examination's high level of difficulty, I supposed that something beyond their individual skills and characteristics or academic abilities must be influencing their life course pathways and eventual outcomes. Understanding these external influences would indicate new intervention

targets and policy levers to support the GED population after GED receipt, something I argue existing research has failed to do.

My first round of analyses confirmed my hypothesis. Specifically, I found that GED recipients' contexts and experiences (as measured by the NLSY97 sample in adolescence) were characterized by greater involvement in risk behaviors (e.g., gang involvement) than high school graduates' contexts and experiences. Collectively, these differences revealed that significant risk factors or red flags were present in eventual GED recipients' lives long before they dropped out of high school.

I also hypothesized that if I could account for a range of GED recipients' and high school graduates' pre-existing differences, disparities in their life course outcomes in adulthood might no longer be statistically significant. When I used statistical modeling techniques to account for the range of differences in adolescence I identified in analysis 1, many differences persisted. I argue that some of these differences, while still statistically significant, may not indicate practically meaningful differences; however, some did remain statistically *and* practically significant. Specifically, even after accounting for a range of factors from multiple domains in adolescence, GED recipients still had significantly lower rates of postsecondary educational attainment and lower household income-to-poverty ratios than their high school graduate counterparts.

This led me to ask: "Are the persistent differences between GED recipients and high school graduates on outcomes in adulthood really just a function of their postsecondary education, or lack thereof?" When I re-ran the same analyses on a limited sample that compared GED recipients-without-postsecondary to high school graduates-without-postsecondary some differences persisted. For example, GED recipients engaged in high-risk drinking behaviors less

than high school graduates, but showed lower levels of civic engagement. Additionally, GED recipients still fared statistically significantly worse in the labor market than high school graduates as measured by the household income-to-poverty ratios.

Building on these findings and still trying to fully understand the GED recipient population's life course experiences and outcomes, I hypothesized that postsecondary attainment might be the factor that had the most impact on GED recipients' lives. I wanted to quantitatively examine the GED recipients who completed a postsecondary credential; however, the limited size of this group (N=62) severely limited the power for statistical analyses (e.g., King & Zeng, 2001). Using descriptive analyses, I found that that GED recipients who eventually regained their academic footing—those who completed a postsecondary credential—differed from the GED-without-postsecondary population in practically meaningful ways on measures from their adolescence. For example, GED recipients-without-postsecondary engaged in risky behaviors (e.g., gang involvement, carrying a gun) in adolescence more than GED recipients-with-postsecondary. Also, GED recipients-without-postsecondary more often had parents that also did not complete high school whereas the average GED recipient-with-postsecondary's parents both completed at least a high school degree. These descriptive results revealed that intergenerational impact from parental education (i.e., parents not completing high school) and involvement in delinquent activities in youth may impact eventual educational and other life course outcomes for this population.

6.2 IMPLICATIONS FOR RESEARCH

This study has several important implications for research. First, researchers must recognize that the predominant approaches to studying GED recipients have been deficit-based,

focusing almost entirely on skills GED recipients lack and on their non-equivalent outcomes when compared to high school graduates. Viewing GED recipients through a deficit lens overlooks their potential, which I believe they have demonstrated by obtaining their GED and re-entering the educational system via postsecondary, which most of them do. Taking a strengths-based view recognizes the multiple factors acting on GED recipients' life course experiences, pathways, and outcomes and requires different research questions, approaches, and practices than have typically been employed when studying the GED population.

While across the country graduation rates are higher than ever before, many students still fail to complete high school each year. Until this is no longer the case, an alternative method of high school completion will continue to be necessary—whether it be the GED, the TASC, the HiSet, or some future option. In other words, the high school dropout, high-school equivalency (HSE)-completer population is one that will likely continue to exist and grow. To date, research has done an excellent job at identifying the poor outlook for students who complete high school via HSE. What is needed now is a change in focus, to identifying how we can support students in this population to improve their eventual outcomes. I detail what the field needs to make this change in focus next.

6.2.1 *Better Data*

To do this work, better data and an explicit focus on GED recipients' contexts and experiences over time is necessary. To fully understand this population's life course—or courses—data is needed on GED recipients that does not focus solely on their skills or demographics. Focusing on domains like schools or neighborhoods that likely include malleable factors make targeted interventions more possible. As further examples, data on specific school-related items, such as teaching and discipline practices and school climate, may lend themselves

to targeted interventions more so than questions about respondents' academic grades or performance on standardized assessments. I believe my study would have benefited from including school discipline policies as another indicator of respondents' adolescent contexts as research shows how certain discipline policies such as zero tolerance may contribute to pushing students out of school (American Psychological Association Zero Tolerance Task Force, 2008).

Additionally, the ability in the data to distinguish between high school completion via GED versus high school diploma is important. Given these two groups' clear differences in many experiences and eventual outcomes, including them in a singular category is inappropriate. Studying the GED population specifically is impossible when they are included in a larger "high school completer" group. Other datasets ask respondents to report their highest level of education. Because most GED recipients at least attempt college, the GED group gets washed out by the "some college" group. Information about every educational completion milestone is important to build understanding of respondents' educational experiences and trajectories.

Finally, studies must explicitly focus on GED and other HSE recipients and their unique experiences. For example, a promising study conducted by RAND researchers that examined four college systems participating in the "Single Stop U.S.A. Community College Initiative," an initiative focused on providing wraparound support services for community college students on campus, found that nonacademic wraparound services had a positive impact on postsecondary outcomes (Daugherty, Johnston, & Tsai, 2016). They found that the impact was especially large for adult learners age 25 and older; however, no mention of GED recipients was made in this study. Therefore, there is no way to know how many of the community college students in this study were GED or HSE recipients and so no way to know the impact of these services on GED recipients specifically. It is possible that GED recipients would benefit from nonacademic

support services even more than high school graduates given that GED recipients often have a history of adverse life course experiences.

6.2.2 *Focus on the Outliers, or the Positive Cases*

Extant research states that GED recipients generally experience poorer long-term outcomes than traditional high school graduates; they enter postsecondary education, but typically struggle to complete postsecondary credentials; and they are often from traditionally underserved demographic populations (e.g., Hispanic, Black, and/or low-income). However, the research includes nothing about the “success stories”—GED recipients who go on to complete postsecondary education, for example. My study’s findings begin to implicate that differential life course experiences may contribute to GED recipients’ eventual success in postsecondary, but future research is needed to examine postsecondary education’s impact on outcomes for GED recipients specifically.

Current research is unable to provide information about what works for supporting GED recipients to get back on track because the average GED recipient does not have outcomes on par with those of high school graduates. Without explicit focus on the positive cases, understanding what led to these outcomes will never occur. Some researchers have begun to examine current programs targeting GED recipients. For example, “GED bridge” programs focus on supporting GED recipients who enter postsecondary, providing advising and wraparound support services. Research organizations like MDRC have begun exploring this work (e.g., Ruschow & Crary-Ross, 2014); however, to date, they have not published any findings regarding what works in getting GED recipients to persist and complete postsecondary credentials.

6.2.3 *Broaden Research Methods*

Overall, researchers would build knowledge by engaging in more qualitative or mixed-methods research on GED recipients. Understanding GED recipients' unique experiences, as well as the experiences of those who know them best (e.g., adult education teachers; community college faculty) would likely reveal many unique experiences and pathways that quantitative methods are unable to identify. Qualitative research about high school dropouts has revealed much, for example, about students feeling pushed out of school (e.g., Fine, 1991; Golden, Kist, Trehan, & Padak, 2005). The GED literature would benefit greatly from firsthand accounts of factors affecting GED recipients' experiences, particularly in postsecondary education. Learning about these experiences through qualitative interviews would likely open a new frontier of research on HSE recipients, their previous experiences, and contributing factors to their successes and struggles.

For example, researchers might qualitatively interview GED recipients who complete postsecondary to understand their experiences and how they differ from GED recipients who do not complete postsecondary. Qualitative studies could gain information from GED recipients, community college professors (as most GED recipients enter postsecondary via community college), and GED (and other HSE) preparation providers. As Rose (2013) eloquently stated, "What we lack in the reports is the blending of the statistical table with the portrait of a life. Without both, we'll get one-dimensional policy fixes driven by numerical data removed from the daily lives of the people from whom the data is abstracted" (p. 49).

6.3 IMPLICATIONS FOR POLICY

Findings from my study also have pertinent implications for policy and policymakers. Policymakers, like researchers, need to recognize that the existing research on the HSE population has focused on deficits and skills lacking—and that HSE-related policies to date have focused on test logistics, such as test improvements, funding, and providing HSE options (i.e., offering TASC or HiSet instead of the GED), instead of on supports for GED-takers themselves. Policies are needed that specifically seek to support HSE recipients after they obtain their HSE.

6.3.1 *Focus on Higher Education*

Findings in my study suggest that higher education is the logical place for policymakers to intervene to support the HSE recipient population. Most GED test takers report taking the exam to gain access to postsecondary education, and over half of GED recipients enter the postsecondary system after obtaining their GED (GEDTS, 2014). However, their completion rates are extremely low. In the NLSY97 sample, less than six percent of GED recipients obtained a postsecondary credential, and those who did differed in important ways from those who did not. This led me to believe that higher education may be the best vehicle through which supports can reach the GED population.

As Rosenbaum and colleagues stated in their report, *The New Forgotten Half and Research Directions to Support Them*, “increased college access over the past several decades reflects the influence of the widespread ‘college for all’ ideal, which emphasizes the necessity and importance of a college education” (2015, p. 1). HSE recipients are no different than more traditional students in their pursuit of higher education. Each locale’s HSE population likely varies in ways unique to that locale (e.g., community colleges are much more likely to have HSE

students than four-year universities), but my recommendations for policymakers here are geared toward broad support of HSE recipients with the acknowledgement that localities should tailor their policies to their unique HSE population.

6.3.2 *HSE Recipients Likely have Unique Needs for Support*

Individuals who complete high school via equivalency enter postsecondary having never successfully completed a traditional degree. All the barriers they faced in completing high school may still be present in their lives or new challenges may have emerged. However, they have demonstrated their academic ability by passing an HSE exam and shown their perseverance by applying for and entering postsecondary. Policies for incoming students need to recognize HSE recipients as a unique population and capitalize on their strengths while also helping them address possible barriers to their success. Just as colleges and universities tailor resources to other traditionally underserved populations (e.g., first generation college students or students of color at primarily white institutions), resources are also needed to support HSE recipients in postsecondary.

For example, colleges might design a targeted advising program specifically for HSE students. In addition to advising, this program could create an HSE cohort at a college or university, further connecting HSE students to their postsecondary institution while providing a network of peers. HSE students may be less likely to find this cohort on their own given their propensity to be adult learners—and thus older than many college students who seamlessly transition from secondary to postsecondary—and given a lack of knowledge regarding other students at their college who may also be HSE recipients.

6.4 IMPLICATIONS FOR PRACTICE

My study's findings reinforce the importance of taking a strengths-based approach to understand the GED population, and this may have the most important implications for practitioners working directly with the HSE population as they re-enter the educational system via higher education institutions. While I suspect many practitioners may be doing what I recommend, I am not aware of any evidence-based practices that have been proven to be effective in supporting HSE recipients in postsecondary. For example, I know from speaking to two instructors at a community college in Washington state that they target additional support and attention at the students in their course that were GED recipients; however, they said their results were mixed as to whether it helped their students persist in postsecondary.

6.4.1 *The Importance of College Counselors and Advisors*

Counselors and advisors working on college campuses may need to target additional supports at entering HSE students. In particular, counselors and advisors of first-year college students are well-positioned to set in motion the supports necessary for HSE students entering postsecondary. Recognizing the unique experiences of students who completed high school via HSE is most important to those working directly with this population. Given my study's findings, for example, regarding the risk factors present in many GED recipients' adolescent contexts, counselors may need to help match incoming GED students with wraparound services rather than only focusing on academic needs. Counselors and advisors might also be the only practitioners on campuses who actually know about students' GED receipt. They could help students learn to advocate for themselves in their courses—something that might be difficult for

GED recipients given their educational past—or, with students’ permission, serve as a liaison to instructors looking for ways to support students in class.

6.4.2 *Identifying Best Practices*

Practitioners working with this population should also document and share best practices. A major finding of my study was that there is still much we do not know about GED recipients, their life course experiences, and what factors contribute to positive life course outcomes. I argue through my findings that a reconceptualization of and new discussions about the GED population are needed; there is no group more qualified than those who work with HSE recipients daily to lead these efforts. This is an entirely new frontier, but one that is long overdue. Practitioners and researchers need to forge partnerships in this work to research, identify, and disseminate what is already being done to support the GED population in college, as well as to strategically design new kinds of supports. Given the immediate need for both research on and support for this population, this is the perfect opportunity for research-practice partnerships in studying and serving HSE recipients in postsecondary.

6.5 LIMITATIONS

While my study sought to paint a portrait of the full range of GED recipients’ life course experiences, some limitations are important to address. The NLSY97 dataset was the best choice for my analyses, based on its range of longitudinal measures. That said, ideally, I would have had more measures from particular ecological domains. For example, many of the questions asking about family practices were only asked in early rounds and had a minimum age requirement (e.g., asked of respondents who were at least 15 years old) and therefore did not have enough coverage in my created dataset to be included in analyses. Additionally, many of the questions

available focused on risk factors, rather than protective factors, which means that I could not examine the protective factors that may exist in some GED recipients' lives.

Another limitation to my study was the range of ages I could examine. Ideally, I would have had information through recipients' later lives (e.g., late 30s and 40s). Given the average age for GED receipt (25 years old) and the time necessary to complete a postsecondary credential, measuring outcomes in the mid-30s and later might reveal entirely different findings. For instance, as Heckman and colleagues (2014) state, "...at the same level of [academic] ability, GED recipients who complete college appear to have the same earnings as high school graduates who complete college" (p. 177).

An additional limitation of my study was that, in some cases, I attempted to use quantitative methods to understand a phenomenon that might be better understood through qualitative or mixed methods research. Specifically, my analysis focused on GED recipients with postsecondary credentials did not have enough power to statistically detect predictors. Despite these limitations, my study takes a first step in the important work of humanizing the life experiences of GED recipients who have, to date, been narrated as failures.

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VITA

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